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RESEARCH ARTICLE

Locating Exchange Stations of Dry Municipal Solid Waste in Urban Areas Case study: City of Mashhad

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ABSTRACT

Population increase and higher waste production and fewer landfills are of the biggest problems and calamities of major cities. Accordingly the need for recycling and reducing mechanisms in waste production and landfilling is beingtaken more into consideration day by day.Separation at source by citizens and creating motives for their higher contribution are of the most beneficial mechanisms in reusing dry solid waste. As an instance daily production of 15 tons of paper in the city of Mashhadrequires studies and creating appropriate approaches to encourage citizens and implementing waste sortingin this city more than ever. One of the measures taken by Mashhad Municipality in this field is establishing stations for solid waste exchange in order to enable receiving and proper use of municipal non-corrupt materials.Thus the present article tries to locate such stations by consideringmeasures of population, accessibilities, waste physical analysis of municipality districts,determining the proper distance with other stationswith GIS software. The findings of the present study suggests 1, 8,9 and 11 as the suitable place for establishing the new waste collection stations.

Key words: waste, recycling, locating, exchange station, GIS

INTRODUCTION

Rapid population growth and increase in production of consumable as a result of progress and development in the recent years have led to daily increase of municipal waste.Development of industries, expansion of urbanization have madethe collecting issue, landfilling or reusing the municipal waste, a serious problem (Rafie'e et al., 2011). The fact that Iranian municipal waste management system is in critical condition and far from the desired condition is notconcealed to anyone (pour Ahmad, 2008). Recycling dry and usable materials of waste is one of the most desiredmechanisms of waste management, which results in less environmental pollution and incomes gained from recycling in addition to saving costs of reproduction and landfilling of such consumables.

In fact Management and recycling solid waste is of crucial importance because of reducing the current waste amount and weight, easier method of collection and landfilling and the possibility of reusing materials in a more profitable way (Karimzadegan et al., 2005).

Separation at source by citizens is one the most beneficial methods among recycling mechanisms in reusing dry waste. The separation at source plan began in 1999 in Mashhad and its developing process during the past 12 years has started from collecting dry waste from citizens' house in 1999 and currently includes activities such as collecting offices' paper waste by installing special containers, establishing stations for paper waste exchange with book purchase tickets and stationary, waste exchange stations with goods at schools, permanent dry waste exchange throughout the city and organizing and controlling traditional recyclers (Kazemi, 2011).According to statistics in Mashhad in 2010 around 650 thousand tons of waste were produced of which about 76% include home waste that around 2.5% of which are separated at source. It refers to low level of recycling activities in Mashhad and highlights the need for better municipal waste management more than ever.

Dry waste exchange stations is one of the separation at source mechanisms that was carried out 2008 by Municipal waste Management Organization in Mashhad. Implementing this mechanism enables recycling and proper use of non-corrupt materials in municipal waste and prevents unsanitaryrecycling of such materials by traditional recyclers in addition to encouraging citizens in separating production waste. Since development of this plan and its success requires accurate locating of waste bank stations based on cultural, social and economic qualities of each district, the current study attemptsin locating dry waste exchange stations in the city of Mashhad byGIS.

The studies show that locating waste bank stations received minute attention despite their importance in municipal waste separation and recycling and majority of the researches carried out have attempted in locating proper landfills. In this field it can be referred to studies done by MoeinO'dini et al. (2012), Motakan et al. (2009), Poorahmad et al. (2008), KhorshidDoust&Adeli (2010),SeyhaniPorshokooh et al. (2012), Niknami&HafeziMoqadas (2011) and Ali akbari& Jamal Livani (2012) on locating landfills in cities of Karaj, Tabriz, Babolsar, Bonab, Holpaygan and Behshahr. Additionally it can be referred to Rafiee et al. (2011) on the contribution of Mashhadi families in separation at source plans.

Due to the importance of waste bank stations in collecting municipal recyclable materials it is expected that this study functions as an introduction toward better planning and more accurate locating of permanent collecting stations, developing separation at source plan and spreading the culture of municipal waste separation.

Regional setting

The study area is the city of Mashhad. Mashhad is the second metropolitan city and also the largest religious city of Iran where due to the presence of the shrines of 8'th Imam of Shia has history of 1200-year.The city covers an area of over 300 $km^2$and has a population of over 2.77 million persons in 1390 (Rahnama et al., 2013). Because of presence of

the shrine of Imam Reza (AS), Mashhad is the spiritual capital of Iran and the international excellent pilgrimage, which more than 20 million internal and foreign pilgrims and tourists will travel there every year (Saghayee et al, 2013).The tourism economy in Mashhad due to the continuing of pilgrims and tourists, has a special stability in terms of economic factors. Important factors such as the number of pilgrims and tourists, the number of residential accommodation, catering and travel units, catering and travel, the average stay of tourists and the presence of different tourism attractions in the city, has highlighted the role of the tourism economy in Mashhad. So that due to the dominance of the tourism economy in Mashhad, the typology of the economy indicates the correlation between the different sectors of the urban economy in the field of services to pilgrims and tourists, and economic functions of Mashhad developed in providing needed services to tourists and pilgrims (Rahnama et al, 2013). And it can be concluded that with population increase, the amount of waste delivered to stations increases

MATERIALS AND METHODS

Firstly permanent dry waste exchange stations in 2012were determined separately in each district on a map of the city of Mashhad. Each station's levels of income and people's reference were considered as the measures of success in achieving people's contribution.Several information levels based on measures such as education level, population, districts level of development, the proportion of dry waste to total waste (as a measure of people's welfare in a district), accessibility network, activities of the traditional group, the distance between existing stations from each other and also people's willingness toward contribution in this plan were created and the effectiveness of such indexes on waste stations' income and contribution in order to locate new stations were considered.The distances between the stations were considered by Thiessen'spolygons and the effective radius of each station and locating in disadvantaged spaces and with lower density was determined by using GIS. In this regard after establishing the data bank and carried out studies, the indexes that have a direct association with rising contribution level were determined and their effectiveness were weighed by experts and by GIS analytical functions, the suitable spots for new stations were determined.

The data used in the present study were collectedthrough library-based research and interviewing with experts in waste management plan of Mashhad city in 2012.In this regard the data concerning education indexes and population was taken from population records of Mashhad, districts' development level from the study done by Shahnooshi et al. (2007), physical analysis of dry waste from Recycling Organization and also traditional efforts and people's willingness toward contribution in carrying out the separation at source plan from a study done by Rafiee et al. (2011).

DISCUSSION AND CONCLUSION

In order to determine the required stations, firstly the relationship between defined measures with the present dry waste exchange stations in the city was described.

Population

By comparing the income gained and the population around the stations in the city of Mashhad, it can be concluded that with population increase, the amount of waste delivered to stations increases.In order to apply population index, the statistics related with population and housing census in 2007 by Statistic Organization were used.

In order to classify population the Natural Breaks method with 5 classifications was used. Then the first group with the highest population was rated 5 and the lowest population was given 1, and groups of 2, 3 and 4 were rated in the

same order.According to the experts, the overall score of population index among other indexes was considered 14. Map 1 shows the population and success of waste bank stations in drawing dry waste.

The proportion of educated people to the total population of each district

The same approach was used in creating this layer. A direct relationship can be realized in comparing this layer with the success of the present waste bank stations.Thus 5 groups were considered for this layerthat the district with the highest proportion of education was rated as 5based on the direct relationship between education and present waste bank stations' success. In the same order the rating of other groups were given from highest to lowestwhich is 1. The total rating of education index among other indexes was considered 10 according to experts.

The distances between present stations

Obviously determining the distance between present and suggested stations should not affect negatively on other stations. In fact closeness of stations may lead to their inefficiency in case of unjustifiable economic, fundamental, etc. aspects.Thus two approaches were used to reduce the effect of this factor in the suggested areas.

In the first approach, by studying the distances between stations and the incomes gained among them and based on the comments by concerned experts it was concluded that stations should not be in a radius of less than 1000 meters from each other.Therefore the distance of stations from each other was defined within an area with 1000 meter radius from each of the present stations.The spaces within such limits were weighed as 1 and spaces out of them were weighed as 2. The total rating of stations distances from each other were considered as 12 according to experts.

In the second approach the Thiessen Network function among the tools in Arc Toll Box and GIS was used to determine the distance among stations. This function is applicable in finding the effective limit between several hypothetical sources. In a more clear statement it indicates that which station is closer to a specific station.The magnitude of these multi sided shows the lack of stations and their smallness indicates the higher number of stations in a short distance. The total rating of the index of stations' distance among other indexes was considered as 12 by experts.

Map 3 shows the 1000 meter limit of each station and map 4 shows Thiessen multi sided for each station and waste banks' success in receiving dry waste.

Position of Locating of present stations in municipal passages

By comparing the location of successful waste banks, it can be concluded that most of the stations are located in 2nd degree streets.

Moreover with further study it was found out that most of stations are located in at most 150 meters away from second degree arterial streets or 50 meters away from collecting and distributing streets. Thus by using limit making function (Buffer) in GIS software, the appropriate spots for new stations were considered 150 meters away from second degree arterial streets and 50 meters away from collecting and distributing streets. The value of arterial streets were considered as 2 and the value for collecting and distributing streets as 1. The total rating of locating index of stations among other stations was considered as 12 based on experts.

Physical analysis of dry waste in districts

In order to create the dry recyclable waste layer in each district, the information related to waste physical analysis of each district separately were used. The results of the analysis showed that districts 1 and 9 had the highest amount of dry waste recyclable at source.Since that higher amount of dry recyclable waste in one district is a good reason for establishing a new waste bank station, the districts with higher shares were given higher weights. Finally, districts 1 and 9 were weighed as 5, districts 8 and Samen as 4, 5, districts 11 and 12 as 3, districts2, 3, 4, 7 and 10 as 2 and district 6 with the least dry recyclable waste was weighed as 1. The total rating of this index was considered as 12 according to experts.Map 6 shows the amount of dry recyclable waste in districts with stations' income. By referring to map 5 the direct relationship between stations' success and high level of dry waste in each district can be observed.

Districts' level of development

In this regard the results from Shahnooshi et al. (2008) plan were used to determine the level of development of different city areas. By comparing districts' level of development and the success of present stations, a direct relationship between these measures can be realized by which with higher level of development, stations' income also rises.Thus in creating development layer firstly all districts were classified in 5 groups and each was given a weight. Districts with the highest level of development were given 5 and respectively to the lowest level which was weighed as 1. The total rating of development index among other indexes was considered as 25 according to experts. Map 6 shows districts' level of development with stations' income.

Families' contribution in waste sorting in district

The index of citizens' contribution defined by Rafiee et al. (2011) was used in this regard. By creating this map, it was noticed that districts with average level of development had the highest level of contribution.Therefore in providing the layer the highest weight (3) was given to this group. The districts with higher development and lower development were weighed as 2 and 1 respectively. The total rating of families' contribution among other indexes was considered as 10 according to experts. Map 8 represents the level of contribution made by families in different districts along with stations' income.

CONCLUSION AND SUGGESTIONS

After preparing the required layers in GIS software and determining their weighs by Union function in Arc Tool Box and putting all the layers altogether, a unified layer including all the required indexes was made. Due to the overall weighs of each layer, the final value of each unit was calculated by adding the multiplication of each layer's total value by their sub layers (For instance, in the index of present stations' location there are two sub layers: the value of locations in the second degree arterial streets was considered as 2 and the value of locations in collecting and distributing streets was considered as 1. The total weight of this layer was defined as 15. Thus by multiplying sub-indexes by total weights, the total value of the layer was calculated resulting in 30 for the second degree arterial streets and 15 for the collector and distributing streets.)

The values achieved were classified in 7 groups.In this classification the Natural Breaks method in symbology of layers was used. In map 8, the appropriate spots for locating new stations were suggested in 7 priorities. The darker spots have a higher priority.

Based on the studies conducted and analyzing the effective factors on people's contribution in the plan of permanent exchange stations, the most suitable spots considering the current situation for locating and establishing the stations

are districts 9, 11, 1 and 8. Since these spots are in the central and western part of Mashhad, the following suggestions are presented for even and further development of such centers.

Advertisement and face to face training is suggested for better cooperation of lower educated people in districts with less contribution,in regard with the direct effect of education level on contribution.

Paying higher attention to children's contribution and their education in this concern is extremely essential. Accordingly encouragements and motivations by various presented prizes and proper to their ages in addition with their education should be provided.

Since the lowest level of contribution in sorting and delivering waste to stations was observed in districts 5, 4 and 6 despite their high population, effective encouraging policies such as more prizes per more cooperation should be considered more attentively.

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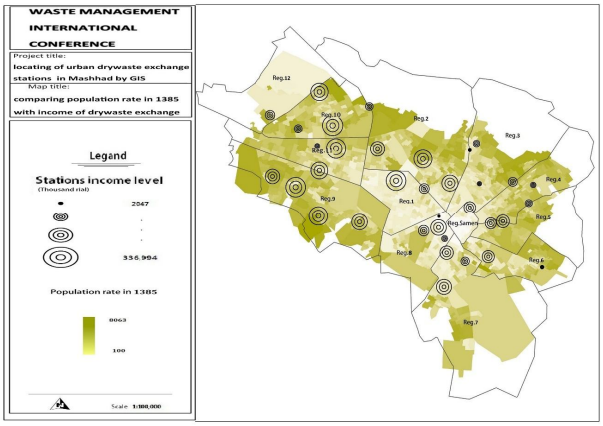
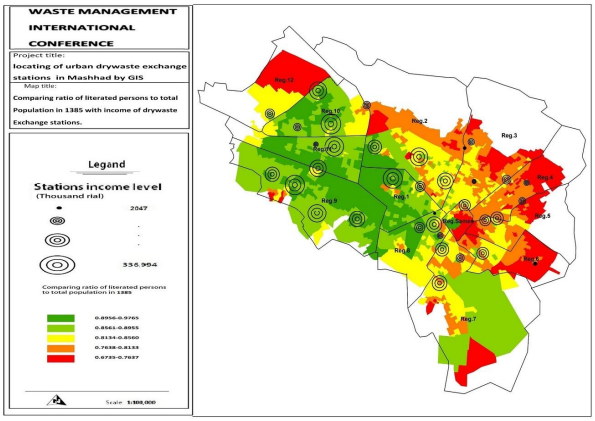
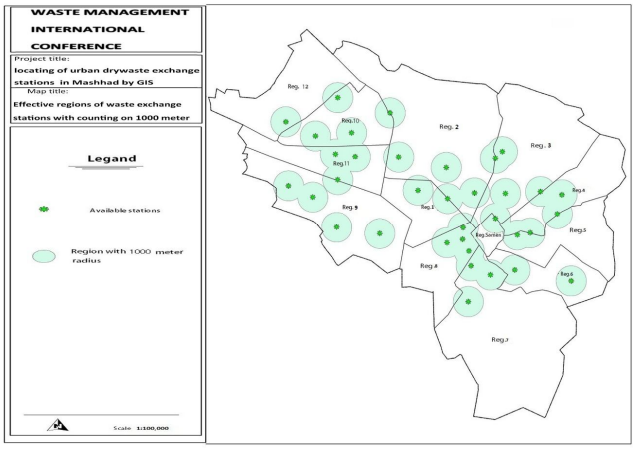


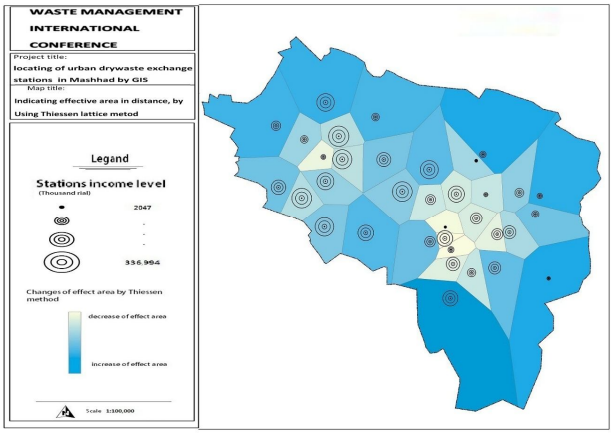
Map 1- The relationship between population density and success of waste bank stations.



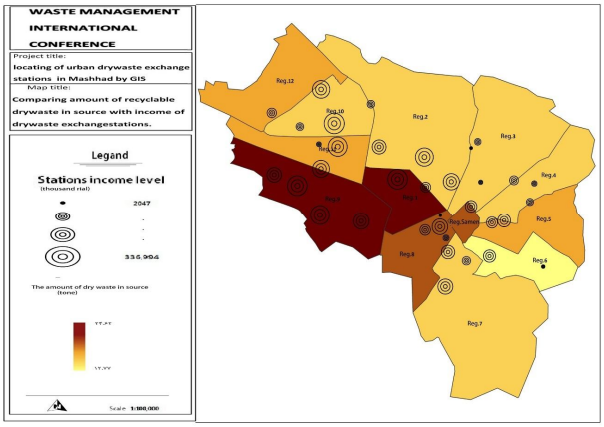
Map2- The relationship between the proportions of education to waste banks station's success



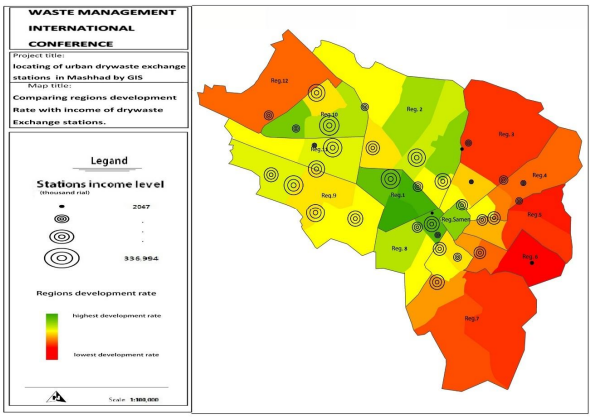
Map3- The 1000 meter limit of each waste bank



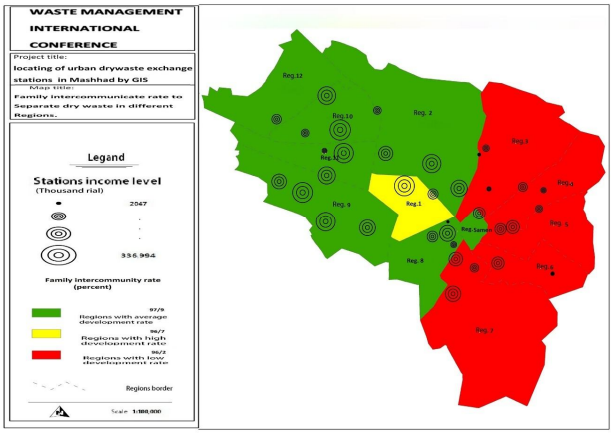
Map4- Thiessen's polygons for each station and waste bank's success in receiving dry waste



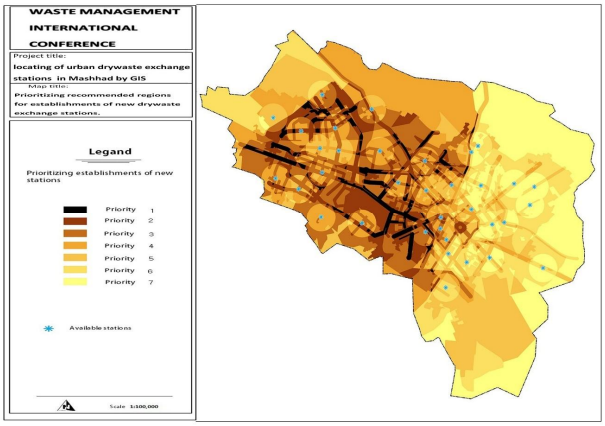
Map 5- The amount of dry recyclable waste in districts compared with waste bank stations' income



Map 6- Districts' level of development compared with waste bank stations' income.



Map 7- Families' contribution in waste sorting in districts compared with waste bank stations' income.



Map 8- The suggested areas for establishing new waste bank stations

Table1- Comparison between income and waste banks'waste weight in relation to their location in different municipal passages

Waste's weight		Received income		Number of stations		Municipal Passage type
percent	ton	percent	Million Rls	percent	number	
72%	2795	72%	2207	66%	23	Second degree arterial
28%	1072	28%	875	34%	12	Collector and distributor
100%	3867	100%	3082	100%	35	Total

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RESEARCH ARTICLE

The Effect of Mutual Interests of the Group 5+1 in Iran's Nuclear Dossier

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ABSTRACT

The purpose of this study was investigating the effect of mutual interests of the group 5+1 in iran's nuclear dossier. Great powers' positions on Iran's nuclear program roots in great powers' common concerns, especially at international level, which increased Iran power due to achieving nuclear power is on top of these concerns. Theoretically, convergence theory and functionalist approach can better explain why of adopting a common position by members of the Group 5+1 (economic sanctions) despite many mutual interests in the region. The United States tries to define many common interests among America, China and Russia to convert threats against them to public threats. The important issue is that the United States also gives many interests to their partners in this course. Consequently, any conflicts of American and European positions over Iran issues pertain to conflicts over tactics and treatment of these issues, not conflicts over the nature of these issues. Russian and American positions over Iran issues, however, emerge in third party relations or global relations rather than in bilateral relations, which is very important. Of course, Chinese relations with other states in the Group 5+1 are defined in economic interests. These conflicts and mutual interests of each of these states in the international scene made the states reach consensus about imposing economic sanctions against the Islamic Republic of Iran.

Key words: Mutual Interests, Group 5+1, Iran's Nuclear

INTRODUCTION

During several past years after the 11 September 2001 event, Iran has the most deals with great powers to solve its challenging nuclear issue. Thus from policy point of view it is important to know the roots and effects of various aspects of great powers advantages in their taking approach to nuclear issue of Iran and will help us in codification of

suitable strategies to advocated the Islamic Republic of Iran rights . In this survey relying on the convergence and divergence theories among the 5+1 group countries noticing that each one has mutual advantages in International scene, we try to study the impact of the mutual advantages in the process of Iran's nuclear case. Therefore the question is that: what was the impact of mutual and strategic advantages of 5+1 group on Iran nuclear case?

Among the countries called 5+1 there are three ranks of countries. The first rank includes superpower America. Second rank includes three European countries France, England and Germany, that always accompanies with America in push against Islamic Republic of Iran. The reaction of great powers in front of the nuclear activities of Iran was push, bargaining, deal, economic offers and such a thing to Iran. Therefore this hypothesis is raised that : "It seems these countries has been reached to the consensus to apply economic sanctions against Iran is spite of mutual strategic advantages among the 5+1 countries about the Iran nuclear case.

The effect of mutual interests of Europe and America on Iran nuclear case process

Since the beginning of the Iran nuclear issue project has a rough and strict strategy against Iran using of the nuclear power and wanted strict position against Iran. Meanwhile America would like the best companionship of Europe in this direction .So always bring up the military option. In this connection America by pushing of the Israel said that if Iran wants to continue its sensitive nuclear activities, it may use of the military options against the Iran nuclear facilities. However Europe always would like to prevent the probable war and was interested in continuation of the negotiations with sanctions. At the end Europe has get an intermediate solution relying on the comprehensive sanction sand negotiation and pushing. America and Europe in policies and International strategies have mutual view and same value and in fact the policies of America and Europe are in direction of consolidation of the relationship in two sides of the Atlantic Ocean. Including the main mutual view of these two power is in Middle East, the big Middle East the concept of post is a cold war that includes the crises of Caspian Sea till Nil and from Cyprus till Persian Gulf and includes a new thinking as strategic idea a comprehensive deal with origin. Big Middle East is a great show between America and Russia with Europeans that are not confident of their role and role-playing in many positions (Bules, Sulks, 2006: 80).

Therefore differences of three European countries of the Group 5+1 and America is difference in tactics and deal method with these issues, not difference in the nature of these issues, if the allies of the America still believe that the leadership of America is necessary about the most international issues, that apparently it seems so , their challenge is that provide their criticism of America leadership method in a way that be suitable for clear and hearty discussions of the friends and be in a way that reinforce the America and Europe relationships, not make it complex. The issues that made they reach to convergence and get mutual position on Iran nuclear issue with mutual advantages of America and Europe includes: 1) War of America and Iraq and not participation of most of European countries and taking distance of America, has made a cold space in relation among Europe and over-Atlantic. After a while European countries felt that they should end this situation and renew their relations. The kind of relation with Iran and specially Iran nuclear activities has made the best conditions for European countries. 2) The heads of three European negotiators countries with Iran have been changed. In France Nikolas Sarkozy vicar of Jacques Chirac, in England Gordon Brown vicar of Tony Blair and in Germany the Ms. Angela Merkel was vicar of the Gerhard Schroder. These people had more tendencies to America and tried by sending Iran nuclear case to the Security Council to push Islamic Republic of Iran. 3) Europe has shown more weakness in Balkan crisis and in the environment that international system was governed and European countries intended to dhow the Europe as a pole in international system, the Balkan crises made damage to its prestige. Evolutions of Balkan showed that until Europe has not an independent military system could not solve the problems in its continent and hereof needs America. Therefore each of these countries saw reinforcement of their security and defense system in convergence with America. 4) Basically, Europe as a real calm power is not enough ability to put itself out of America protection, and Iran case made clear this issue once again. 5) The kind of deal of ninth government with nuclear case caused that European made their position close to United States and Vienna agency and accompany with America want to send the Iran nuclear case

to the Security Council to withdraw Islamic Republic of Iran through politics leverage, pushing and various sanctions of Security Council. Meanwhile America would like the best companionship of Europe with itself. In this approach there was made a division of affairs among America and Europe that in that negotiation in one side and sanctions and economic punishments on the other side was seen. This policy of European Union especially since the second half of 2008 was in forced and the aim of it was prevention of military involvement from America and Israel side against the military and economic facilities of Iran. We see this policy at least for two years mostly, one in frame of UN Security Council and the other as extraordinary sanctions of Security Council and in the European Union level.

The interactions of Russia and china with America and their effect on Iran's nuclear case

Russia and China are considered as two important actors on the issue of Iran's nuclear case. In the past ages, the two states, despite finally accompanying the West on imposing sanctions against Iran, have always prevented from harsh formulations and threats of severe actions against Iran by the UN Security Council. Considering important conflicts with America, the two states have always tried to use the issue of Iran's nuclear case as card game against the West and to reduce the speed and pressure of these resolutions, despite finally accompanying the West on imposing sanction resolutions.

The interaction of Russian and American interests on Iran's nuclear case

Since the mid 1990 decade and following concluding an agreement on the Establishment of the Bushehr Nuclear Power Plant with Russia, Iran's nuclear case is considered as one of main elements on the agenda for US relations with Russia. The influence of America on Russia about Iran's nuclear case first appeared as the "Gore-Chernomyrdin" agreement between American vice president Albert Arnold Gore and Russian Prime Minister Chernomyrdin in the Clinton administration in America to encourage Russia to stop military and nuclear cooperation with Iran. Today, Russia is one of the most important business partners of Iran. Of course, conditions have never been like this. Although Russia has always been interested in Iran throughout history, they have always looked at Iran as a tool of increasing their power, not as a partner (Pourfard, 2006:32).

The interaction of Chinese and American interests on Iran's nuclear case

As to China, It can be said that Iran's nuclear crisis is one of highly important international crises in which China and America have entered cooperation with each other. China's position on Iran's nuclear case can be examined in two sections, before referring Iran's nuclear crisis to the Security Council and after referring Iran's nuclear crisis to the Security Council. In both sections, most effort, in fact, has been made by US authorities to destroy Iran-China relations in nuclear cooperation.

In present periods, changes to foreign policy of the sides of the triangle of China, America and Iran's nuclear program have produced new space for their interactions. After the September 11 attacks, The United States put fight against terrorism and the prevention of proliferation of weapons of mass destruction in their top priority of foreign policy, considered the Middle East as the main focus of spread of these threats, and focused on transforming their trends. Within this framework, Iran was considered as a member of the axis of evil where changes to political systems in its countries were placed on the agenda through forcing. In the other side, Iran's nuclear program entered more sensitive stages and one of the most important crises around it was evolved. The situation took a more acute form as the 9th government rose to power and Iran foreign policy approach changed. In the third side, China-America relations in periods after September 11 were followed in a form of "cooperation and strategic competition" pattern but the cooperative aspect dominated within it. In fact, US focus on the Middle East is regarded one of great chances of China's foreign policy in these periods (Shariatinia, 2007). In Chinese policy on Iran's nuclear case, there are three fundamental considerations, which their authorities make decisions accordingly:

China honors their long-term relations with Iran as a regional power dominating the Persian Gulf and Caspian Sea and, also as an important source to supply their energy in the future;

China has an expansive commercial and business interaction with the United States and Europe and they do not want the relations, which are to promote their strategic objectives in order to be converted to an economic superpower, to be damaged when dealing with Iran's nuclear case; In their positions on Iran's nuclear case, china tries not to damage their prestige as a responsible and emerging power, in addition to supporting the Treaty on the Non-Proliferation of Nuclear Weapons (Saghafi-Ameri, 2008:8).

The interaction of China and Russia interests with European Union on Iran's nuclear case

Europe and Russia relationship is one of the beigest and complex challenges in the compass f European policy. Complex in that these two main international actors in spite of having disagreements about East European and commercial issues, have mutual strategic requirements. In the other words interfacing the mutual and contradictory advantages of Russia and Europe has caused most ups and downs in the relations of these two actors. It seems right now circumstances and transformation that happen in an environment of Russia and European Union, has put a hard examination in front of deals of these two powers. China also is a worldwide power and its decision is effective in the global politics. China industrial and economic politics too has impact on economic approach of European Union. However, European Union still supposes the China as an emerging power. Foreign and internal politics of China is in a way that has less attention to the European values. From other side, china has a power that caused to disagreement of European governments in the method of having relation with this country.. Right now China is a main factor in any global politics that is important for European. In spite of cooperation of European Union and Russia in various dimensions and mutual requirement of each other, we are witness increasing tension in these relations. This is due to the antithetical aims and advantages break in negotiations and getting antithetic directions in security and foreign policies of these two European power. In the increasing contravention circumstance of Europe position and increasing push of America, keeping Russia as the balance factor from Iran authorities point of view, is evaluated in the Iran advantages direction. With relying on national capacities and measures of the authorities, Iranian politicians, veto right of Russia and China in the Security Council is considered as fulcrum point during negotiations of Iran and Europe. However Russia with a pragmatic approach, tried to develop the mutual effective commercial and economic relations and reinforcement of its objects in Iran market. Yet announce of its opposition of having nuclear fuel circle by Iran and probable reaching to the nuclear weapon.

CONCLUSION

In an overview, it should be said that countries of the Group 5+1 have not the same position in their relations with Iran and each one has different quality and quantity with relation with Iran. Some mostly follow their political goals in negotiations with Iran and some put economic goals in priority, but at the end they had reached to consensus on Iran nuclear file and get a mutual position that is applying economic sanctions against Iran, they have convergence. This consideration , the diplomacy system of our country should consider with more consciousness , meanwhile by determining the private probabilities and agreements of European countries and America about Iran that clearly will have direct impact on the advantages and national defense of our country , will have plans to decrease the negative impacts of the economic sanctions against Iran .From other hand as most of the domestic analysts emphasize , the foreign politicians of our country can have no rely on one or some special country , decrease the pushing by America by improving the relations with China and Russia and finally comprehensive cooperation with 5+1 group countries. We have this issue in our constitutional law in the concept of No West, No East. Therefore we should influence world public opinion by using of our positions that is our right in nuclear file that is scientific , lawful , right, justice and sincerity and stressed on reactionary positions , unearned mercenary and discriminatory of America and Europe , with strong logic , clear and convincing, too. Therefore, there is no doubt that negotiation is the

best way in front. The responsible authorities for the country's nuclear program should not forget that it was through these negotiation and diplomacy they could end a lot of concerns and strengthen the position of our country in the international community.

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RESEARCH ARTICLE

The Role of Targeted Control and Emotional Processing in Predict Academic Compatibility with Test Anxiety

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ABSTRACT

The purpose of this study to be examining the role of targeted control and emotional processing in predict academic compatibility with test anxiety. This research is descriptive and correlational. The population consists of all high school students in Ardabil. 90 students were selected randomly. The students answered the same questionnaire including Test anxiety, emotional processing, compatibility and scalability targeted control. Data analysis included descriptive statistics, Pearson's r Correlations, Regression Analysis, ANOVA analyses and SPSS software (package of Spss / pc + + ver18). The results of this experiment showed that the increasing targeted control increased compatibility study. Students with high emotional processing were higher compatibility Study. As a result, it can be concluded that the targeted control and emotional processing the most important variables related to the compatibility study in students with test anxiety.

Key Words: Targeted Control, Emotional Processing, Compatibility Study, Test Anxiety

INTRODUCTION

Education is vital for every country in the world, and Iran is not an exception as a strong and effective education can help boost the development of the country. However, education can also become a burden to the country as low academic achievement is one of the major problems facing the families, society and government at large. As for Iran, the prevalence of low academic achievement among high school students was high. Academic achievement can be explained using attribution theory (Weiner, 1986). Attribution theory is a cognitive theory of motivation which states that a relationship between student's beliefs regarding cause of success or failure and the ways these beliefs are internalized will influence student's academic achievement, expectation to success and self concept. There are several factors affecting academic achievement, one of these is test anxiety. According to Nosrati Shoar (2003), test-anxiety is a multidimensional signs that can be described as a group of phenomenological, physiological, and behavioral reactions to appear with possible negative consequences or failure on an examination or similar evaluative situation. Test-anxiety, especially worry has impact on academic performance, and working memory (Eysenck, 2001). In addition, Richards and Davis (2004) found that test- anxiety decreases attention span, memory and concentration, then leads to low academic performance. Masson, Hoyois, Pcadot, Nahama, Petit and Ansseau (2004) found that high school students with high test–anxiety had a poor school performance. Thus, test- anxiety contributed to academic achievement because of vulnerability to distraction and interference experienced by the students. Margret et al (2013) showed that the relationship between emotional processing and emotional adjustment and finding emotional processing is associated with emotional adjustment and behavior problem. Mohammadian (2010) reports Students have the ability to manage high (associated with targeted control) had received high marks for consistency. Petridis et al (2004) reports students with high emotional processing were of higher consistency. The aim of this study to was examine the role of targeted control and emotional processing in predict academic compatibility with test anxiety. Chapell, Blanding, and Silverstein (2005) carried out a study among 5,551 undergraduate and graduate students in Pennsylvania and Illinois and found a significant difference of academic achievement among three different levels (low, moderate, and high) of test–anxiety. For instance, students with low test-anxiety had higher academic achievement than students with moderate and higher test-anxiety. Similarly, students with moderate test-anxiety had higher academic achievement than students with higher test- anxiety. The purpose of this study to was examine the role of targeted control and emotional processing in predict academic compatibility with test anxiety.

METHODOLOGY

This research is descriptive and correlational. The population consists of all high school students in Ardabil in 2014-2015. 90 students were selected randomly. The students answered the same questionnaire including test anxiety, emotional processing, compatibility and scalability targeted control. Data analysis included descriptive statistics, Pearson's r Correlations, Regression Analysis, ANOVA analyses and SPSS software (package of Spss / pc + + ver18).

RESULTS

Table 1 shows the results mean and standard deviation of emotional processing, compatibility study and targeted control. According the results table 2 there is relationship between targeted control (r=0.346), emotional processing (r=0.229) and compatibility study.

Table 1 shows the results of multiple regression analysis for targeted control and emotional processing in predicting academic compatibility with test anxiety. To determine the impact, targeted control and emotional processing as predictor variables and academic adjustment as criterion variables were analyzed in the regression equation. Table 3 shows the F observed is significant and 7.7% of the variance in academic adjustment is explained by variables

studied. According the results targeted control β values (β=0.184) and emotional processing (β=0.215) and can predict change the compatibility school students with test anxiety.

DISCUSSION AND CONCLUSION

The purpose of this study to be examining the role of targeted control and emotional processing in predict academic compatibility with test anxiety. According the results there is relationship between targeted control and compatibility study. So as the increasing targeted control increased compatibility study. These results are compliant with result Muris (2006), Muris et al (2005) and Mohammadian (2010). Mohammadian (2010) reports Students have the ability to manage high (associated with targeted control) had received high marks for consistency. This can be expressed in explaining is targeted control one of the most important aspects of self-regulation. Due to its impact on various aspects of working people is necessary for growth. According to theory Rothbart, targeted control indicates the ability of individuals to inhibit behavioral responses appropriate and strong response and consequently the more appropriate behavior and finally the compatibility (Rothbart, and Bates, 2006). Therefore, students who have a low targeted control show less consistency. According the results there is relationship between emotional processing and compatibility study. So as the increasing emotional processing increased compatibility study. These results are agreement with result Petridis et al (2004), Extermera et al (2007) and Margret (2013). Petridis et al (2004) reports students with high emotional processing were of higher consistency. Margret et al (2013) finding emotional processing is associated with emotional adjustment and behavior problem. According to theory Rachman (1980) emotional processing is a process through which emotional disturbance is absorbed and then put declining. Actually emotional processing is aligning consistency. So as to reduce problems and emotional disturbances can take to assist interactions and communication with others.

In general, the results showed a significant relationship between emotional control and compatibility process with compatibility study in students with test anxiety and according to these findings can be said that the targeted control and emotional processing the most important variables related with compatibility study in students with test anxiety. The using available sampling and limited statistical population the boys were limitations of the present study. Therefore, it is suggested to future research examined students of both sexes and random sampling methods used.

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Table 1: Mean and SD of the emotional processing, compatibility study and targeted control

	Variables	Means	SD
Emotional processing	Emotional repression	14.02	5.14
	Bad emotional regulation	15.75	3.76
	Positive emotional experience	13.76	4.48
	Unprocessed emotions	14.56	4.08
	Avoid emotional	16.77	4.47
	Total	74.87	14.75
Compatibility Study		23.63	7.92
Targeted control		22.16	8.96

Table 2: Correlation coefficient between targeted control, emotional processing and compatibility study in students with test anxiety

Variables	Statistics	Compatibility Study
Targeted control	Correlation coefficient	0.071
	Level of significance	0.346
Emotional repression	Correlation coefficient	0.177*
	Level of significance	0.018
Bad emotional regulation	Correlation coefficient	0.118
	Level of significance	0.115
Positive emotional experience	Correlation coefficient	0.196**
	Level of significance	0.008
Unprocessed emotions	Correlation coefficient	0.129
	Level of significance	0.084
Avoid emotional	Correlation coefficient	0.137
	Level of significance	0.067
Emotional processing	Correlation coefficient	0.229**
	Level of significance	0.002

Table 3: The results of multiple regression for targeted control and emotional processing in students with test anxiety

Model	SS	DF	MS	F		P	
Regression	827.978	2	413.989	7.202		0.001	
Residual	9943.971	173	57.480				
Total	10771.949						
Predictor variables	R	RS	ARS	Non-standard coefficients		T	P
constant				SE	B		
Targeted control	0.277	0.077	0.066	10.563	3.504	3.015	0.003
				0.012	10.563		
Emotional processing	0.215	0.046	0.041	0.039	0.114	2.902	0.004

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RESEARCH ARTICLE

Relation between Emotional Intelligence and Resiliency (A Case Study: Students in Center Tehran Branch, Islamic Azad University, Iran)

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ABSTRACT

The purpose of this research is to investigate the relation between emotional intelligence and resiliency among the students of Center Tehran Branch. The method of this research is descriptive-correlative and it was performed under field methods. The population includes 6580 individuals among whom 350 students were selected as the sample through Morgan's table and stratified random sampling methods. For the purpose of data collection, the Goleman's (1995) emotional intelligence questionnaire and the resiliency scale of CD (Connor & Davidson) (2003) were used. The validity of these questionnaires was approved by experienced scholars and also their validities were approved through the application of Cronbach's alpha method and the calculated values were respectively 0.72 and 0.79 In addition to descriptive statistic indexes, the tests of Kolmogorov-Smirnoff, Pearson's correlation and linear regression were employed. Results indicated that there exists a significant relation among emotional intelligence and its dimensions and resiliency among the students (P= 0.01).

Key words: Emotional intelligence, resiliency, student.

INTRODUCTION

One of the approaches that might be effective on accommodation is the positivist psychological (mental) approach. During the recent years, the positivist mental approach has defined its ultimate purpose as identification of structures

and methods which are followed by humans' welfare and happiness. Therefore, the elements that lead to more compatibility between humans and life's threats and demands, are considered as the most basic and fundamental studied structures of this approach (Samani et al. 2008). Luthar and Cicchetti (2000) and Mastem (2001) believe that resiliency is one of these concepts and normal structures which are considered by positivist psychology and most researches related to resiliency are performed in the domain of transformational psychology (Besharat et al. 2009; Samani et al, 2008; Kurd-Mirza Nikoozadeh 2010). Resiliency is necessary for people's welfare. This feature enables people to cope with life's hard challenges and stressful situations (M.Befrouei et al. 2013). Connor and Davidson have studied resiliency in terms of social contexts and believe that resiliency is not only stability against traumas or threatening situations, its rather individual's active participation in environment. They define resiliency as the individual's capability in establishing bio-psycho balance in dangerous situations (Block, 2002). In addition, researchers believe that resiliency is a type of self-healing with positive emotional and cognitive consequences (Inzlicht et al. 2006). One of the effective personal features in resiliency is the ability for establishment of self-control or self-discipline. In general, personality characteristics such as positive self, sociality, intelligence, efficiency in educational affairs, autonomy, self-esteem, good communications, problem solving skills and mental health are considered as elements effective on resiliency. One of the issues that is introduced in the context of effective elements on resiliency, is the role of intelligence on resiliency. Some findings have revealed that intelligence is a resiliency defining element and some others have also proved the opposite of this view (Homayoon nia et al. 2013). Findings of Khodajavadi and Pro indicated that (2009) emotional intelligence has a positive effect on students' resiliency. Also the findings of Homayoon nia et al. (2015) indicated that emotional intelligence is positively related to resiliency among wrestlers. In the view of Solow and Meyers, emotional intelligence is defined as the ability for comprehension of emotions and acceptance of emotions in a way that it is compatible with cerebration and the comprehension of emotions and emotional knowledge and thoughtful adjustment of emotions in a way that the mental and emotional growths are increased (Davoodi, 2008).

As the future maker class of the society, students have an important role in advancement and progression of the society. With respect to the fact that resiliency imposes positive effects on learning and educational performance, therefore investigating resiliency and elements effective on it is a necessity. Also with respect to shortage of researches regarding the context of resiliency and its relation with emotional intelligence and mental toughness, the necessity of this research was formed. Also as a result of high volume of educational content, educational stress and being far from families, the possibility of occurrence of mental issues is more frequent among students. Resiliency is a structure which provides students with the capability of resisting against these problems. With respect to provided content, in the perspective of researchers the question comes up that what methods can be effective in reducing students' mental stresses? Is it possible to increase students' levels of resiliency through improvement of emotional intelligence and mental toughness? For this purpose, the present research was performed aimed at discussing the relation between emotional intelligence, mental toughness and resilience among the students of Center Tehran Branch in Iran.

METHODOLOGY

The method of this research is descriptive-correlative and it was performed under field methods. The population includes 6580 individuals among whom 350 students were selected as the sample through Morgan's table and stratified random sampling methods. For the purpose of data collection, the Goleman's (1995) emotional intelligence questionnaire and the resiliency scale of CD (Connor & Davidson) (2003) were used. The validity of these questionnaires was approved by experienced scholars and also their validities were approved through the application of Cronbach's alpha method and the calculated values were respectively 0.72 and 0.79 In addition to descriptive statistic indexes, the tests of Kolmogorov-Smirnoff, Pearson's correlation and linear regression were employed.

RESULTS

In this section, through the tests of Kolmogorov-Smirnov, Pearson's correlation and linear regression the research hypotheses are exposed to test. First, before the execution of Pearson's correlation test, the Kolmogorov-Smirnoff test was executed for determining the normality of data. Results of this test indicated that the data in studied variables was normal.

Research hypotheses test

With respect to the fact that significance level of all research variables is larger than 0.05, therefore the Pearson's correlation test and the test of linear regression are used for testing the research hypotheses.

In table 2, the results of linear regression test are shown.

With respect to table 2, there is a relation between emotional intelligence and its components and resiliency in level of 0.99 and error value of less than 0.01. In table 3, the results of linear regression test are shown.

With respect to the results of table 3, with respect to the value of F and also the value of calculated t, it can be seen that the relation between the variables is linear and also with respect to calculated significance level, it can be said that independent variables impose positive effects on dependent variables among the students.

DISCUSSION AND CONCLUSION

Results indicated that there is a significant relation between emotional intelligence and resilience under a confidence level of 0.99 and an error value of less than 0.01. On the other hand, the value of this relation is equal to 0.855 which is linear, positive and strong. It means that as the emotional intelligence increases, the level of resiliency is also increased. Results of this research indicated that there is a significant and positive relation between emotional intelligence (EI) and its dimensions and resiliency which is in compliance with previous theories and researches. Also the sub-scale of emotional intelligence has a high capacity in anticipation of resiliency. These findings are compatible with the findings of Jokar (2008). He had used the scale of self-evaluation of resiliency. Therefore, the results of this research can provide the contexts for intervening researches for growth of resilience among the aforementioned groups and also by the education of skills of EI and its dimensions, occurrence of behavioral issues and some psychiatric disturbances are avoidable. Therefore, the subordinate managers and authorities of the students of Center Tehran Branch are recommended to seek solutions for improvement of emotional intelligence of their students in order to improve their resiliency.

Results indicated that there is a significant relation between self-awareness and resilience among the students of Center Tehran Branch. Self-awareness is defined as emotional awareness, exact self-evaluation and self-confidence (Zahra Kar, 2008). Results of analyses of first subsidiary hypothesis indicated that there is a relation between Self-awareness and resilience. On the other hand, the value of this relation is equal to 0.691 which is positive linear and suitable. Results of the research by Zahra Kar indicated that there exists a significant relation between self-awareness and educational performance. Therefore, with respect to the results of the research it can be concluded that increase of self-awareness in students leads to increase of their resiliency and their success is also expected to improve in this regard. Therefore, the subordinate managers and authorities of the students of Center Tehran Branch are recommended to seek solutions for improvement of self-awareness of their students in order to improve their resiliency.

Results indicated that there is a significant relation between self-control and resilience among the students of Center Tehran Branch. Self-control is defined as being trust worthy, seriousness, and commitment and flexibility and innovation (Zahra Kar, 2008). Results of analyses of second subsidiary hypothesis indicated that there is a relation between Self-control and resilience. On the other hand, the value of this relation is equal to 0.733 which is positive linear and suitable. Therefore, the subordinate managers and authorities of the students of Center Tehran Branch are recommended to seek solutions for improvement of self-control of their students in order to improve their resiliency.

Results indicated that there is a significant relation between self-motivation and resilience among the students of Center Tehran Branch. With respect to the results, it was observed that there is a relation between self-motivation and resiliency under a confidence level of 0.99 and an error value of less than 0.01. On the other hand, the value of this relation is equal to 0.660 which is positive, linear and suitable. It means that as the level of self-motivation increases, the level of resiliency also increases for students. Therefore it can be concluded that people who have high levels of self-motivation also have high levels of resiliency. Therefore, the subordinate managers and authorities of the students of Center Tehran Branch are recommended to seek solutions for improvement of self-motivation of their students in order to improve their resiliency.

Results indicated that there is a significant relation between empathy and resilience among the students of Center Tehran Branch. Empathy is defined as understanding others, growing others, orientation of services, variation of influences and political awareness (Zahra Kar, 2008). Results of analyses of fourth subsidiary hypothesis indicated that there is a relation between empathy and resilience. On the other hand, the value of this relation is equal to 0.766 which is positive linear and suitable. Therefore, the subordinate managers and authorities of the students of Center Tehran Branch are recommended to seek solutions for improvement of empathy of their students in order to improve their resiliency.

Results indicated that there is a significant relation between social skills and resilience among the students of Center Tehran Branch. Social skills are defined as influence, communication, conflict management, leadership, transformation catalyzer, establishment of bonding, collaboration and team working (Zahra Kar, 2008). Results of analyses of fifth subsidiary hypothesis indicated that there is a relation between social skills and resilience. On the other hand, the value of this relation is equal to 0.740 which is positive linear and suitable. Therefore, the subordinate managers and authorities of the students of Center Tehran Branch are recommended to seek solutions for improvement of social skills of their students in order to improve their resiliency.

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Table 1- Results of Kolmogorov-Smirnov test

Group	Average	Z	Standard deviation	Significance
Emotional intelligence	3/17/8	0/941	0/311	0/338
resiliency	3/799	0/989	0/365	0/282

Table 2- Results of Pearson's correlation test

Independent Variable	Dependent Variable	Correlation Coefficient	Significance
Emotional Intelligence	Resiliency	0/855	0/000
Self-Awareness	Resiliency	0/691	0/000
Self-Control	Resiliency	0/733	0/000
Self-Motivation	Resiliency	0/660	0/000
Empathy	Resiliency	0/766	0/000
Social Skills	Resiliency	0/740	0/000

Table 3-Results of linear regression test

Independent Variable	Dependent Variable	T	β	R^2	R	F	P
Emotional Intelligence	Resiliency	29/413	0/855	0/731	0/855	865/096	./000
Self-Awareness	Resiliency	17/040	0/691	0/677	0/691	290/347	./000
Self-Control	Resiliency	19/242	0/733	0/538	0/733	370/258	./000
Self-Motivation	Resiliency	15/654	0/660	0/435	0/660	245/039	./000
Empathy	Resiliency	21/269	0/766	0/587	0/766	452/353	./000
Social Skills	Resiliency	19/643	0/740	0/548	0/740	385/830	./000

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RESEARCH ARTICLE

Relation between Leadership Style and Emotional Intelligence (A Case Study: Sport Teachers from Sari)

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ABSTRACT

The main purpose of this research is to investigate the relation between leadership style and Emotional Intelligence among the Sport Teachers from Sari. It's an applicable research carried out via a descriptive approach and under survey methods. The population includes the entire Sport Teachers from Sari. At the time of research, 290 questionnaires were distributed among the population based on census method and ultimately 275 questionnaires were collected back and analyzed through parametric statistical tests (Pearson's correlation coefficient and Regression test). Findings of the research indicate a significant meaningful relation between leadership style and its related dimensions (Rational style, Intuitive style, and Instant style and Dependency style) and Emotional Intelligence except for Avoidance style.

Key words: Leadership Style, Emotional Intelligence, Teachers.

INTRODUCTION

Among the necessary skills of the 21st century, the ability for continuous compliance with people of different cultures and the ability of inter-Emotional communication are highly significant. Deployed working environments require individuals who are familiar with different cultures and are able to communicate with the people of different cultures. For this purpose, people require Emotional Intelligence (Poursaed et al. 2012). Emotional Intelligence is a personal capability for comprehension, interpretation and effective acting in situations with Emotional diversification; it is also in compliance with a series of intelligence related concepts that consider intelligence mostly

as a cognitive ability (Peterson, 2004). Previous researches have indicated that differences between national cultures are a determining element for different behavior types (Thomas, 2006).

Some have considered the process of decision making as the heart of the organization and management and believe that the entire functions of management and dimensions of organization can be adjusted based on the process of decision making (Griffiths 1959, Quoted from Abbaspour 2004). Managers are supposed to undertake several different tasks and functions in order to be able to guide and lead their organization. Generally, decision making is one of the challenges that managers are faced with during time; because during their organizational mission, they face situations and issues which require making a decision. (Kaucher2010). Even if the manager refuses to decide in a situation, he still needs to decide since avoiding making a decision in a special situation is a decision making (Pears and Robinson, 1989). In this regard, Peter Drucker says: the emphasis of future management is on the process of decision making and comprehension of this process (Aberlin, 2005). Paying attention to this fundamental point is necessary because decision making is the essence of management and management could be considered equal to decision making. On the other hand, all management activities are bound to decision making (Hazer, 1995). Scott and Bruce (1995) have introduced five leadership style for managers' namely as rational, intuitive, avoidance, instant and dependency. And believe that these five styles are under the influence of individual's internal characteristics.

One of the most basic variables regarding determination of every organization's strategic framework is decision making and its related styles. As a result, this research is concerned with an investigation on employee's leadership style on one hand and evaluation of the effects of these styles on their Emotional intelligence.

Research hypotheses

Main hypothesis

There is a significant and meaningful relation among health insurance employee's leadership style and their Emotional intelligence.

Subsidiary hypotheses

There is a significant relation among health insurance employee's rational decision making style and their Emotional intelligence.
There is a significant relation among health insurance employee's intuitive decision making style and their Emotional intelligence.
There is a significant relation among health insurance employee's dependency decision making style and their Emotional intelligence.
There is a significant relation among health insurance employee's instant decision making style and their Emotional intelligence.
There is a significant relation among health insurance employee's avoidance decision making style and their Emotional intelligence.

METHODS

In terms of purpose, this research is an applicable study and in terms of data collection and the level of controlling the variables, is a survey research. Also in terms of time it's a sectional study. Data collection instrument is a questionnaire with close-ended questions. The population of the research is consisted of the entire Sport Teachers from Sari which was 290 individuals during the fall of 2015. As a result of limitation of population, the census

method was used and after distribution of questionnaires among employees, ultimately 275 questionnaires were collected back and further analyzed via SPSS and parametric statistical tests (Correlation and Regression tests).

RESULTS

In this section, the hypotheses of the research are investigated according to yielded information. In the present research, 6 hypotheses (1 main hypothesis and 5 subsidiary hypotheses) are introduced which are summarized in tables 3 to 4 for correlation and regression tests.

With respect to table2, the correlation coefficient for leadership style and Emotional Intelligence except for avoidance style indicates a positive significant relation.

With respect to table 3 in terms of constant values and the Beta coefficient for each variable, the main model also contains a decision making with respect to significance level. With respect to the calculated significance level, regression is significant at 0.001 and the assumption of existence of a direct relation between variables except for avoidance style is accepted.

DISCUSSION AND CONCLUSION

The present research tries to recognize the existing relation among leadership style and Emotional Intelligence among managers and employees of the department of health insurance.

According to the findings of the research, there was a significant relation discovered among leadership style and Emotional Intelligence of employees. The reason for the relation among leadership style and Emotional Intelligence is as follows: among the 5 elements that constitute leadership style, 4 of them have a direct significant relation with employee's Emotional Intelligence which is the result of employee's self-confidence and the fact that they intend to make decisions with seeking the help of other employees. The findings of this hypothesis are in accordance with the research conducted by Kubus in South Africa (2008) which indicated that Emotional decision making and judgment among black African leaders with higher Emotional Intelligence was more than white leaders. Emotional decision making and judgment is determined via a level of Emotional cognitions (Ang et al, 2007). These levels of measurement point to the ability for precise evaluation of a culture as a part of the process of decision making before acting in an inter-Emotional scenario.

The reason for existence of relation between rational style and Emotional Intelligence with a Pearson correlation coefficient of 0.266 is that: people trust their internal vision and tend to make decision based on their cognitions and feelings.

The reason for existence of relation between intuitive style and Emotional Intelligence with a Pearson correlation coefficient of 0.41 is that: the personnel tend to investigate all the information sources related to decision making and performs a decision making based on a systematic and rational method.

The reason for existence of relation between dependency style and Emotional Intelligence with a Pearson correlation coefficient of 0.564 is that: individuals seek each other's ideas regarding decisions and demand to be supported by other co-workers.

The reason for existence of relation between instant style and Emotional Intelligence with a Pearson correlation coefficient of 0.395 is that: most individuals make decisions and calls which they believe are right at the moment and as a result they decide instantly.

According to the Pearson's correlation coefficient of -0.498, there are no significant relations among avoidance style and Emotional intelligence; and based on this findings it may be concluded that some employees might believe that the only possible option for decision making in every situation is pure rational style and decide completely rational. But in the current world and in the real-time decision making which is full of complications and evolutions, they avoid making decisions. On this basis they also avoid to take responsibility for making decisions.

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Table1- Cronbach's alpha coefficients for research variables

Total Coefficient	Cronbach's Alpha	Variable Name
0.86	0.88	Intuitive Style
	0.72	Rational Style
	0.91	Dependency Style
	0.81	Instant Style
	0.79	Avoidance Style

Table2- Summary of correlation test for research hypotheses

Value Correlation	Sig	Independent Variable	Dependent Variable
./571	./000	Emotional Intelligence	Leadership style
./266	./000	Emotional Intelligence	Rational Style
./410	./000	Emotional Intelligence	Intuitive Style
./564	./000	Emotional Intelligence	Dependency Style
./395	./000	Emotional Intelligence	Instant Style
- ./498	./000	Emotional Intelligence	Avoidance Style

Table3-Regression test

Significance	R2	T Score	Standardized	Non-Standardized Coefficients		Model	Variable
			Beta	Standard Deviation	B		
000		18.989		.381	6.038	1 (Static)	Emotional Intelligence
000	.270	7.293	.571	110	.802		
000		17.346		0.184	3.193	1 (Static)	Emotional Intelligence
000	.062	2.888	0.266	0.051	0.148	Rational	
000		13.756		.202	2.775	1 (Static)	Emotional Intelligence
000	.161	4.715	.410	.050	.235	Intuitive	
000		61.758		.068	4.196	1 (Static)	Emotional Intelligence
000	.312	7.169	0.564	.027	0.192	Dependency	
000		33.554		.128	4.300	1 (Static)	Emotional Intelligence
000	.151	4.549	0.398	.050	0.226	Instant	
000		47.953		.089	4.246	1 (Static)	Emotional Intelligence
.000	- 0.24	-6.018	-.498	.048	-.288	Avoidance	

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RESEARCH ARTICLE

Eulogy of Imam Ali in Mohammed Hussein Ali Al- Saghir Poems

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ABSTRACT

Allama and doctor "Mohammed Hussein Ali Al-Saghir" is one of the poets and writers of contemporary Iraq. In terms of science, knowledge, merit, competence and academic position in theology science and also university position, he has a valuable character. Because of beautiful and profound issues he declared, most of the scholars are considered him as the No. 1 of all professors at the universities of Iraq. This is the highest academic rank in Iraq that he has achieved because of his great and diversity of knowledge. His poems are including praise of the Prophet (PBUH) and his Ahl al-Bayt Court and the Infallible Imams. Many of his poems presented in international festivals, national forums and conferences; hence, the poet's decided to collect them in a book entitled "The Court of Ahl al-Bayt". The importances of these beautiful verses are because of their beauty of praising regards the Imams. In this article, the researcher tries to examine the way of praising Imam Ali by this Iraqi poet and expressed its features.

Key words: Imam Ali, Mohammed Hussein Ali Al- Saghir, Arab poetry, Praise

INTRODUCTION

The visage of Ahl al-Bayt in Arabic literature has a significant history and has always been their greatness praised by lots of poets. Each of the poets have tried to expressed glory and greatness of Ahl al-Bayt as they deserve; so they try by composing appropriate poems illustrate their bright and innocence portray; however, to illustrate the visage of Holy Persons is much higher and more important to be praised by publics; but still scholars and educated poets around the globe and with any religion and tradition always strive to utmost of their poetic talent to compile and offer the best poems about the Prophet's Ahl al-Bayt; thus this a certain issue that the lovers always pay to praise the

beloved. Since no comprehensive research has been done on the poetry of Mohammed Hussein Ali Al-Saghir; his poems hasn't been translated and aspects of his poetry hasn't been investigated, doing this study is necessary. Reading these poems make the reader familiar with methods of eulogy and panegyric in his poems. Therefore, in this article the author tries to study the position of Imam Ali in poems of Mohammed Hussein Ali Al-Saghir.

Research Questions

Research questions of the present study are

1- How is the place of praise in the poems of Mohammed Hussein Ali Al-Saghir?

2- What are the features of Mohammed Hussein Ali Al-Saghir poems' about Imam Ali?

Praising Poem

"Eulogy" is one type of poetry that the author or narrator who praised someone and attributed him/her to good and acceptable traits. This literary type is common themes and issues of the first Persian poetry 12th centuries ago; the theme of this genre can be moods and sensual tempers of human (Dad; 1996: 266). Talk about the beginning of the praise and eulogy among humans as a poetic technique is very difficult and certainly its initiation, like poetry, is unknown. The human desire to eulogizing their orientation is an instinctive thing and basically every one enjoyed of self praising and with pleasure likes to be praised and appreciated by the others; as if the generosity, courage, chivalry, justice, charity and so on moral virtue given to someone, he/she would have a happy face and mind and may be a source of pride to him, although it is not in him/her virtues (Ashmawi; 1983: 51).

The history of praise among Arabs dates back to the pre-Islamic era which is the main issue of that period poetry (Wazin Pour; 1995, 410).

Special frame of praise is Ode. Ode or balladry is a form of classical Persian poetry and often it is very long and has more than fourteen verses. This form of poetry does not apply only to praise but to blame, mourning (Elegy), banquet, describing the nature and preaching are also used by the poets (Homaiee; 1982, 102).

And also does not particular to the kings, ministers and others like them, but this is used for the Prophet and the infallible Imams, in which it is called "Epithet" (Pour yazdan panah kermani, 2009, 42).

Praising of Imam Ali in Mohammed Hussein Ali Al- Saghir Poems

Praise has a special position in Mohammed Hussein Ali Al-Saghir poems and without doubt the greatest praises of this poet dedicated to Imam Ali. His collection of poems has been published by the name of Ahlul Bayt. This collection includes most of poems that Mohammed Hussein Ali Al-Saghir has written in conferences and literary events in praise of Imam Ali. Most of his poetry is praise, but between the verses he has a special look to social and political issues of the day and his society.

Leading and Guidance of People

The poet believes that the direction and guidance of Imam Ali has brilliant periods of human life:

نَوَّرْتَ في رُشْدِکَ الأجْيالَ و الحِقبا وَ صُنْتَ في مَجْدِکَ التَّاريخَ وَ الكُتُبا

Your guidance has lightened people's life and time (teachings and your wisdom words as a light shining over people and guided them) and your dignity saves the history and the Books.

Elsewhere, in describing the guidance by Imam Ali he writes:

أَلْهَمَتْني بِهُدَاکَ الفَذَّ جَمْهرةً مِنَ العَزائمِ تُدْنى المُرْتَقى الصَّعِبا

With your guidance (over coming to) all bars of gamble about difficult decisions that is closed, inspired to me (by your leading I could be successful and prosperities and take the tough decisions on sensitive situations).

كالسَّيْفِ فوقَ رُؤُوسٍ قدْ مَشَى صِلِفٌ فيها، و خَامَرَها الطُّغْيَانُ فاعْتَصَبا

(You) like a sword were over the heads whom have the boast and vain claims and insubordination and rebellion had indecisive him; therefore, he had been mutinied (you were caused to punish those who had doubts in religion and to try to disobedient).

Description of Wisdom and Dignity

Poet called Ali's greatness as the universe forehead and believes that his gracious behaviour and manners are based on the lessons of the Holy Quran and his wisdom, dignity and thoughts are examples for the people of the world:

هُدَاکَ فى صَفحاتِ الفَتْحِ قُرْآنُ وأنْتَ فى جَبَهاتِ الدَّهْرِ عُنْوانُ

The Holy Quran among the Books guided you through victory and you're forehead of the universe (your behaviour is based on the lessons of the Holy Quran and you have a great and undeniable role in solving the problems and important issues of the time).

وَ فِي نُهَاکَ نُغذِى الجِيلَ فلْسَفَةً يَقْضى الحَياةَ عليها، وَهْوَ يَقظانُ

And your wisdom would feed people and generations and time spent on it, while your wisdom and thoughts are still awake (your wisdom and words are as model for the people and an example for them because they achieved their sapience and mind by you and the passage of time has no effect on its validity).

فأنْتَ أنْتَ، ومِنْ عَلْياکَ ما بعَثَتْ لنا العُصُورُ، و ما أحْيَتْهُ أزْمانُ

You are you and the periods of time won't create greater than you for us (your dignity are unique in all-time and no one is like you).

We can see such themes in contemporary Iranian poets as Ali Mousavi Garmaroudi in which he describes Imam Ali in a blank poem and writes:

How a poisoned sword,

Opens your high forehead, this Holy Book of God,

How a sword could struck the sea! (Mousavi Garmaroudi; 1978, 34).

The poet believes that the talent and ideas of people root from Imam Ali's roaring gusto and stems and plants are because of his fertilized dynamism and freshness:

مِنْ وحْیِ قُدْسِکَ ما تَجْنی قَرَائحُنا ومِنْ ثمارکَ ما حَمَّلْنَ أغْصانُ

What talents we pick are because of your revelation; and what is carried by the branches are of your fruits (source of our talents and ideas come from you and even tree branches grow their fruit because of you).

وَ مِنْ عَقِیدَتِکَ العَصْمَاءَ أفْئِدَة حَمَّ الفِداءُ بِها، و اهْتَزَّ بُرکانُ

The hearts gladded by your pure opinion and my sacrificing and devoted spirit were keen to you and the volcano erupted to praise you.

Mousavi Garmaroudi (1978) with the same theme says:
Night inherited its relaxation from your eyes,
And storms from your anger you, their roaring's,
Your word fertilize the plant,
And by your breath flowers grows,
From that time that you cry on it, well is boiling,
Dawn will be appeared by your bright eyes,
And night in its blackness stands to pray,
The stars are indebted to your glance
Your smile let the life to be in existence,
Blooms owed their smile to you (Mousavi Garmaroudi, 1978, 35).

Muhammad Ali Saghir called Imam Ali as a maker of courage who returns honour, glory, and respect and exalt to the man. He believes that Imam Ali is a storm winds against rebellion and oppression and if he was not they are going to cover the whole world and destroy it:

یَا أیُّهَا البَطلُ الخَلَّاقُ جَمْهرَةً مِنَ المَوَاهِبِ .. لا مَسَّکَ أدْرانُ

Oh the gallant creator in society who among the blessing stigma and shame did not touch you (you did not do anything disgraceful).

وَ یَا مُعِیداً إلی الإنْسَان حُرْمَتَهُ لوْلاکَ مَاصِینَ فِي الأحْداثِ إنْسانُ

Oh restoring human dignity to him, if you were not existed people won't protect of the incidents. (Existence of you may have been caused disposing of bad events).

وَ يا عَصُوفاً عَلى الطُغيان مُنْدَلِعاً لوْلاكَ ما انْصَاعَ لِلْإيمان طُغيانُ

Oh rebellion arose storm, if you were not, inspection do not give up against the faith (oh you who go to war against rebellion and disobedience, existence of you caused to victory of faith over infidelity).

وَ يَا مُعيناً مِنَ الإحْسان مُنْقَجِراً لوْلاكَ لاَنْدَكَّ إيثَارُ وَ إحْسَانُ

Oh spirit of goodness! If you were not, selflessness and beneficence would be destroyed (you're the cause of continuity of goodness and self-sacrifice).

وَيَا سِرَاجاً عَلى الدُّنيا كَوَاكِبُهُ بِهَا تَنَوَّرُ أفْكارٌ و أذْهانٌ

Oh the light of the globe and its stars, thoughts and minds brightened with your lighting (your guidance).

لوْلاكَ مَا كانَ لِلْإسْلام مِنْ أثَرٍ وَ لا لشَرْعَتِهِ البَيْضَاءِ أرْكانُ

Islam, its pillars and also its law would annihilate if you were not.

للآنَ لمْ تَلِدِ الأجْيَالُ مِنْ بَشَرٍ عَلى يَدَيْهِ تَرَامَى الإنْسُ وَ الجانُ

(If you were not) some human generations won't be born for some humans and jinn to shot by their hands (you were the creator and example for the brave men).

Stand against oppression

ولا أقِمْت عَلى ضَيْمٍ مَرَارتُهُ تَجْتاحُ مِنْكَ ضميراً نابضاً صَلِبا

You stand against the oppression (and fight it) and the bitter taste and difficulty of governing destroyed your faithful beating heart.

Poet defined and called Imam Ali's greatness and dignity as a removing of oppression and darkness, then says:

مَولايَ هذا المَهْرَجانُ الأكْبَرُ وَ لأنْتَ أعْظَمُ، و المَكانَةُ أوْقَرُ

O my Lord! This great celebration and your greatness and the position you have is significant.

وَ لأنْتَ مِنْ عُلْيَاكَ فِي إشْرَاقَةٍ ظُلَمَ الحَيَاةِ بِضَوْئِهَا تَتَنَوَّرُ

Indeed and because of your dignity and brightness, life darkness have been lightened by your glory.

Generosity and Chivalry

كالشَّمْس فى الأفق لا تَذْوى أشِعَّتُها والماءُ فِي البحر يُعْطى الدُّرَّ وَ السَّحبا

(For us) you are like sun that its rays do not withered (the plant) and like the water of the sea which it gives the pearls and make clouds.

يا واهِبَ النُّورَ إمْداداً لِفِكْرَتِهِ كَواكباً تَتَبَنَّى فَيْضَ مَنْ وهَبا

Oh donor of starlight, and helpful to thoughts! Give your generosity to those who you want. (Anyone who donate something he/she get it from you; and you are the most generous merciful).

Being immortal of Imam Ali's Glory

تَمْضى الرِّجَالُ و تُطوَى فى صَحَائِفِها وأنْتَ للمَجْدِ ما إنْ خَطَّ أو كَتِبا

Men pass and being obliterated by the time, and you are the only generous (Great men disappear, but your greatness immortal over time).

هذا عَلِىٌّ لِواءُ الحَقِّ فى يَدِهِ فكُلُّ حَقٍّ إلى عَلْيائِهِ انْتَسَبا

This is Ali; the flag of truth is in his hand and all rights are attributed to him.

Describing the Birth of Imam Ali

Poet called the birth of Imam Ali auspicious and blessed and counts this blest day because of difficulties and hardships Muslims have tolerated. Reminisce of Imam Ali's greatness caused to enjoy and happiness of people's hearts and minds:

مَوْلايَ مَوْلودُكَ المَيمُونُ قدْ نَبَضَتْ بِهِ الحَيَاةُ، فَلا بُؤسٌ وَ حِرْمانٌ

My Lord, your birthday is blessed and the world is without difficulty and privation by it.

أعادَ آيَةَ ذِكْرى مِثْكَ رائِعَةٍ مَشَى بِهَا الدَّهْرُ صَحْواً، وَ هوَ سَكْرانُ

Remembering you is like a beautiful sign (memory of you came to my mind), time becomes conscious by reminding you while it was instable (the time gladded and become happy by remembrance of you).

فالوَعى مُنْتَشِرٌ، وَ الفِكْرُ مُزْدَهِرٌ وَ القَلْبُ مَخْضُوضَرٌ، و الذِّهْنُ فِينانُ

(By remembrance of you) consciousness and awareness is expanded so mind become beaming and heart brighten and exultant.

وَالأفْقُ تَعْمُرُهُ الأشْذاءُ حَافِلَة ... بالطَّيِّباتِ فَنِسْرِينٌ وَ رَيْحانُ

And land covers with scarce good things and good smells of Basil and Nasrin flowers (by your blessed birth everywhere became full of joyful, temperament and sweet smell of flowers).

وَ اللَّيْلُ تَعْمُرُهُ الأضْوَاءُ مُسْرَجَة ... بالدُّرَّاتِ فياقُوتٌ وَ مَرْجانُ

And the dark night brighten with the lights and brightness of rubies and coral (your birth eliminated the dark night and bright it).

ما أرْوَعَ الحَفْلُ، وَ الأعْنَاقُ مُرْهَفَة قَدْ رَنَّحَتْها أغاريدٌ وَ ألْحانٌ

What a wonderful and funny celebration! And the neck (for happiness) has been caress, and proper poems and rhythm plastered it.

ألْحانُ فُتِّح شَرُوق عَنْهُ قَدْ عَمِيَتْ بَعْضَ العُيُون وَ صُمَتْ مِنْهُ آذانُ

Pleasant songs of which some eyes are blind to see him and some ears are deaf to hear it.

وَ نَحْنُ نَحْضى برضوَانِ تَعاهِدَهُ لِلْمُتَّقينَ مِنَ الجَنَّاتِ (رُضْوَانُ)

And we are keen to (go) that heaven with covenant with him, and righteous are pleased and satisfied with God's Heaven.

DISCUSSION AND CONCLUSION

Mohammed Hussein Ali Al-Saghir is one of the contemporary committed poets and writers of Iraq. His collection of poems is based more on praising the qualities and greatness of Imam Ali. Most of his poems have been written in meetings and celebrations to commemorate the birth of Imam Ali. His poetic language is soft and smooth and has not verbal difficulties. The poet has a special look to political and social issues of the day among his praising; he also knows restless and turmoil of this time because of having not a united nation under a committed and honourable leader.

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RESEARCH ARTICLE

The Effect of Beta-Amino Butyric Acid on some Metabolites of *Echium amoenum*

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ABSTRACT

Beta-amino-butyric acid (BABA), is a synthetic non-protein amino acid that is rare in nature. It increases resistance to fungal diseases, bacterial, viral and nematode in many plant species. In this study the effect of beta-amino butyric acid was investigated on some biochemical parameters of *Ecchium ammonium* .The results showed that carotenoids, Sugar content of leaves significantly increased with increasing concentrations of BABA but The content of tannins significantly decreased. BABA had no significant effect on the phenol content. Flavonoids and flavonols content increased in 300µm but decreased in 600 µm.

Key words: Beta-amino-butyric acid (BABA), *Ecchium ammonium*, secondary metabolites.

INTRODUCTION

Plants are the sources of many chemical substances that are consumed as medical compositions. Secondary metabolites are the most valuable herbal chemical substances. Echium amoenum, Fisch & C.A Mey, belongs to the family of Boraginaceae. It is a biennial or perennial herb indigenous to the narrow zone of northern part of Iran and Caucasus, where it grows at an altitude ranging from 60 to 2200 m. It is one of the important medicinal herbs in traditional Iranian medicine. E. amoenum have been advocated for variety of effects such as demulcent, anti-inflammatory and analgesic, especially for common cold and sedative.

Beta-amino butyric acid ((BABA) is a synthetic non-protein amino acid that is rare in nature and in many herbal species increases resistance against fungus, bacterial and virus diseases. (Jacob et al., 2005; oka et al, 1999). Studies show that BABA indices the morphogenesis response caused by stress. SIMR (stress induced morphogenic response) is observed in plants under strict stress. These responses due to Suppression of cell division in main meristems prevent the growth of lateral organs. By stimulating plants for building physical barriers, the accumulation of proteins related to diseases (PR-proteins) phytoalexins, reactions of over-sensitization and rapid production of active oxygen in stimulating the defense mechanism of plants against diseases is effective. (cohen, 2002).BABA is also effective in various signal transduction including salicylic acid, jasmonic acid and ethylene that can have a role in induction of secondary metabolites biosynthesis and signaling pathway. Thus, in the present study we attended to examination of the effect of BABA on the quality and quantity of the compositions of Echium amoenum.

Plant Cultivation

The seeds sterilized with 0.1% sodium hypochlorite solution for 5 min. then the seeds washed two times with deionized water to remove sodium hypochlorite. Four seeds were sown in each pot of 30 cm×30 cm containing perlit. Seedlings were irrigated with Hoagland solution for 28 days. Pots were irrigated with ground water 1-day interval. The vases were kept in growth chamber at 25 ± 2_C with 16/8 h D/N at 40 µmol m^{-2} s^{-1} photon flux density.

Preparation of solutions

BABA (300 and 600µM) was added to the vases. The zero concentration of BABA was used as control group. The amount of carotenoids was determined according to the method of Lichtenthaler (1987).

Extraction

0.5 grams of dry powder of the plant were grinded in 25ml water: methanol (80:20) and incubated at 70°C in a water bath for another 20 min. the extract was centrifuged for 15 min at 9000× g . The mixture was kept at -80 °C.

Determination of total phenolic compounds

Phenolic compounds were determined using the boonyuen et al, 2009 method. The extract was mixed with 0.5 ml of Folin–Ciocalteu's reagent (diluted 1:1 with water) and 1 ml of a 5% sodium carbonate solution was added. The absorption at 725 nm was measured after 1 h. Gallic acid was used as a standard and results were expressed as mg g-1 fw.

Determination of total Flavonoid

The flavonoids content was determined by chang et al, 2002. The colorimetric method of aluminium chloride was used for this.
Determination of total flavonol: The total phenol concentration of the samples was determined using routin reagent (Akkol et al., 2008).
Determination of tannin contents: The tannins were quantified by Hagerman's radial diffusion method.

Statistical analysis

All the experiments were performed in triplicate. Data were analyzed by SPSS, and the means were separated by Duncan test. The significant level was $P \leq 0.05$

RESULTS AND DISCUSSION

The extent of carotenoids in treated plants with BABA was significantly more than control plant.

The extent of sugar in 300 µM BABA didn't have significant increase, but in 600 µM significantly increased. As seen in figure 3. The content of phenol didn't show significant increase with increase of BABA concentration.

The content of flavonoids and flavnols in 300µm concentration of BABA showed significant increased compare to the control, but in 600µm decreased compared with the 300mm treatment.

BABA in used concentration in this experiment probably acts via the defense mechanism of salisic acid (SA) (zimmerli, 2000). Tsai et al (2011) reported that responding genes to SA under BABA treatment will be up-regulated and of course in other cases when the plant is under stress, BABA acts by the signaling pathway depended on ABA. Moreover the genes involved in biosynthesis of gibberellins (GAs), jasmonate, ethylene and ABA are also affected by BABA.

The induction of the signaling pathway of SA by BABA can be one of the reasons of the increase of carotenoid pigments. Based on Kang's report after 24 hours of the BABA treatment change was evident in the expression of 761 genes. Most of the expressed genes were induced after the BABA treatment (678 genes) and 83 genes were inhibited. In the report of Sigh et al (2010), BABA affected the balance of free amino acids in Arabidopsis plant.

Based on the report of Bengtsson et al (2014) the analyses of microarray in potato plant showed that 5378 transcripts were expressed after 48 hours of the treatment with 10mM beta butyric acid. It's obvious that many functioning mechanisms of the plant are affected. This analysis shows that two main groups of transcripts that their expression changed were related to the response to stress and transcripts related to the growth and metabolism of the plant. The genes that are effective in the path of substance transference are glucose 6, phosphate/phosphate translocator that in the plastid of the non-green texture of the plant can enter carbon in the form of glucose 6- phosphate. The other group of genes is tetrapyrroles. They play a vital role in various biological processes like phytosynthesis and respiration. High plants include 4 ranks of tetrapyroles, chlorophyll, heme, siroheme and phytochromobilin. (bengtsson et al, 2014).

BABA causes down-regulation of several transcripts related to sterol biosynthesis, while it increases transcripts related to biosynthesis of sesquiterpenes phytoalexcines. The increase of phenol and phelavnoid and phelavnol in Echium amoenum under treatment of BABA (particularly in 300Mm concentration) is because of the effect of this composition on dihydrokaempferol 4-reductase. (lillo et al, 2008). The analysis of gene expression with qRT-PCR showed that the expression of gene of dihydrokaempferol- reductase in plants under BABA treatment increases. This enzyme catalyzes the change reaction of leucopelatgonidin to dihydrokaempferol.

cis-3,4-leucopelargonidin + $NADP^+$ ⇌ (+)-dihydrokaempferol + NADPH + H^+

This enzyme is effective in biosynthesis of phlanoids. With increase of BABA concentration the extent of phelavnoids decrease but in lower densities, the extent of them will increase. Another enzyme that under the effect of BABA treatment increases is chalcone synthase or naringenin-chalcone synthase (CHS). This enzyme has role in the changing process of 4-coumaroyl-coa and malonyl-coa to naringenin-chalcone. (wu et al, 2009). The increase of phenols can be due to activation of proxidases involved in defense responses of the plant that lead to production of phenol and phytoalexine (bengtsson et al, 2013). In the potato treated with 10Mm BABA, the phenol oxidase enzyme

increases. This enzyme catalyzes the hydroxylation of mono-phenols (phenol molecules that the benzene loop includes one single hydroxyl),(bengtsson et al, 2014).

Few studies have been done on the effect of non-protein amino acid on plant metabolites. Generally, based on the findings of this study, beta amino butyric acid causes the increase of flavonoid compounds in the plant.

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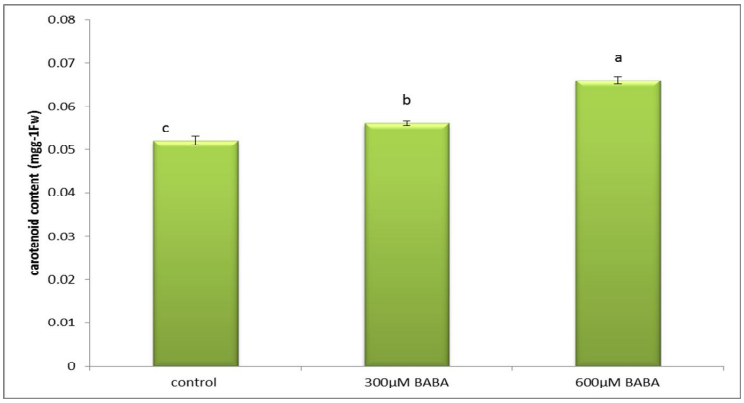

Fig 1. The effect of beta-amino butyric acid on carotenoid content

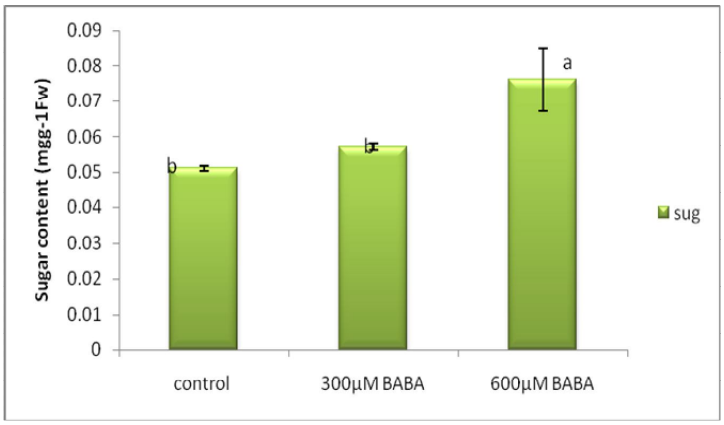

Fig.2. The effect of beta-amino butyric acid on sugar content

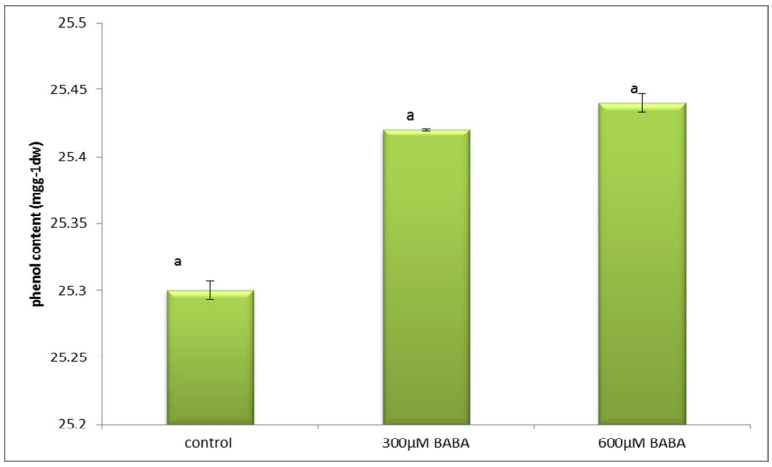

Fig.3. The effect of beta-amino butyric acid on phenol content

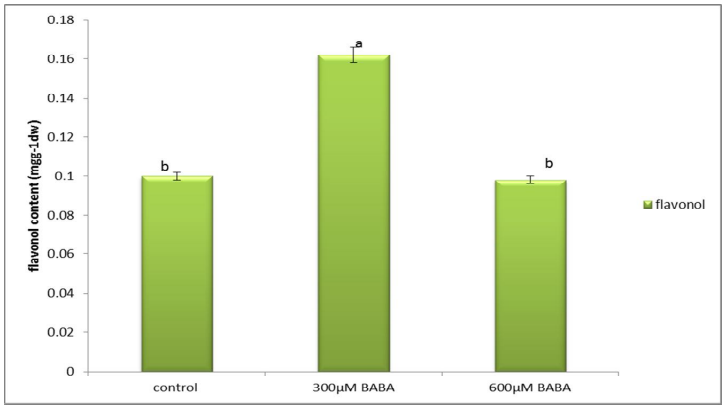

Fig.4. The effect of beta-amino butyric acid on flavonol content

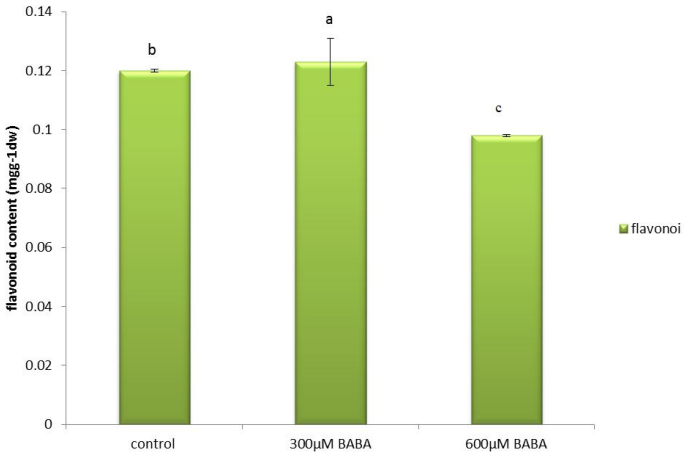

Fig.5. The effect of beta-amino butyric acid on flavonoid content

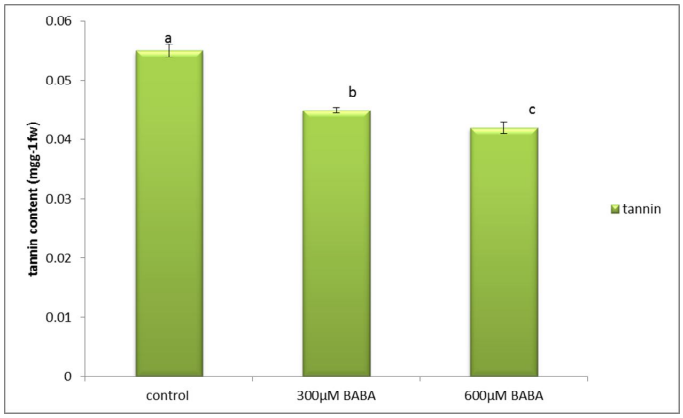

Fig.6. The effect of beta-amino butyric acid on tannin content

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RESEARCH ARTICLE

Antibacterial Activity of Methanol Extract of Two Species of Artemisia from Iran

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ABSTRACT

In many parts of the world there is a rich tradition in the use of herbal medicine for the treatment of many infectious diseases. Because of the side effects and the resistance that pathogenic microorganisms build against the antibiotics, much recent attention has been paid to extract the biologically active compounds from plant species used in herbal medicine. In this study, the antibacterial activity of methanol extract of *Artemisia persica* and *Artemisia aucheri* against 4 bacteria, *Escherichia coli, Staphylococcus aureus* , *Salmonella enterica* , *Bacillus cereus* were investigated . Plant samples were dried in shade and extracted with methanol by maceration method for 10 days at room temperature. Antibacterial activity tested by agar well diffusion assay. A concentration of 60 mg/ml of each extract was prepared in dimethyl sulfoxide: methanol (1:1 v/v) solvent and administered in each well. Cultured plates were incubated at 37°C for 24 hours for bacteria. After incubation, the antibacterial activity was determined by the measurement of the diameter of inhibition zones. Finally MIC was determined. Both extracts showed antibacterial activity. MIC value about *Artemisia persica* to *Staphylococcus aureus* ,*Salmonella enterica* and Bacillus cereus was 1.8 ,15,7.5 mg/ml respectively. MIC value about *Artemisia aucheri* to *Staphylococcus aureus* , *Salmonella enterica* and *Bacillus cereus* was 3.75 ,0.45,1.8 mg/ml respectively. E. coli was resistant to both of used extracts .Gram positive bacteria were more sensitive to the extracts than gram negative bacteria and *Artemisia aucheri* had more antibacterial activity than *Artemisia persica*. The obtained results confirm and suggested

the justification of extracts of Artemisia species used in traditional medicine as treatment for microbial infections or as preservative in food.

Key words: Antibacterial activity, *Artemisia persica*, *Artemisia aucheri*,Methanol extract

INTRODUCTION

Today microbial resistance and abilities of bacteria in inducing acute infections have led to a new interest in plants for antibacterial effects of them. Plants show a vast spectrum of antibacterial and other activities; this subject can help the discovery of new species of antibacterial drugs. More than 8000 plant species showing representatives from many plant families were scattered in Iran.Artemisia belongs to the Asteraceae family is one the main genera of the herbs which contains a wide number of species. There are 34 species of annual and perennial herbaceous plants of this genus in Iran that spread throughout this country(Das et al., 1999; Zargari, 1994).This plant has been traditionally used to treat bacterial and parasitic infections. Studies have shown that the extract of this plant is effective in curing allergy. In addition, it's proved that it has medical effects and prevents the allergic signs and can partly prevent from asthma. Also it can be effective on inflations due to sting of insects. (Amin, 1991).Studies have shown that ethanol and chloroformic extracts of this plant has been able to prevent the growth of E. coli and Bacillus subtilis. The existence of some chemical ingredients in species of Artemisia impedes bacterial activities. Artemisia-ketone (5/48%), 1,8 cineol (19/7%), alpha-celinen, oul 4 (6/4%) and lavandolon (8/2%) are the main ingredients of the essence.(OmidBeigi, 2008). Since the issue of antibacterial resistance is mentioned very seriously. Bacteria as a sickening and opportunistic factor in people with immune defect through various ways can be resistant to various species of bacteria. Therefore, research for obtaining antibacterial substances from other sources like plants seems necessary.

MATERIALS AND METHODS

Plants and Bacterial Species

The plants tested in this study were *Artemisia persica* and *Artemisia aucheri* from Hezar Mountain in Kerman province, Iran. The bacterial speicies were Escherichia coli (PTCC), Staphylococcus aureus (PTCC1431), Salmonella enterica (PTCC 1709) and Bacillus cereus (PTCC 1015).

Preparing the methanol extract

The collected plants were dried in shade at room temperature and then milled to fine powder and extracted with methanol (Merck,Germany) for 10 days at agitation conditions in a separating funnel. Obtained extracts were filtered by Whatman paper number 1 and then concentrated using rotary evaporator (Heidolph,Germany) in 42°C. The crude extracts were stored at 4°C for anti-bacterial analysis. The different amount of crude extract was suspended in dimethyl sulfoxide and methanol (1:1v/v) to get different concentration of suspension (Shahidi Bonjar, 2004)

Antibacterial assay

The well diffusion method was used to determine the antibacterial activity. The bacterial suspension equal 1.5×10^8 CFU /ml in sterile normal saline (adjusted to 0.5 McFarland standards) were prepared. The Muller-Hinton agar (Merck Company) medium with depth of 4 mm was poured into petri dishes to give a solid plate and inoculated with 100 µl of suspension containing $1.5x10^8$ CFU/ml of bacteria by sterile cotton swabs. Wells in 6 mm diameter were punctured in the media by sterile cork borers and filled with 20 µl of the extracts. The first concentration used

was 60 mg/ml(Shahidi-Bonjar and Kariminik, 2004). The plates were incubated at 37°C for 24 hours. Following incubation, antibacterial activity was determined by measuring the inhibition zones around each of the wells in mm(Shakibaa et al., 2011).All tests were done in triplicate. DMSO: Methanol (1:1 v/v) solvent was considered as negative control(Shahidi Bonjar, 2004).

Determination of Minimum inhibitory concentration (MIC)

To determine Minimum Inhibitory Concentration (MIC) , Two fold dilution series 60, 30, 15, 7.5, 3.75, 1.8, 0.9, and 0.4mg/ml of each crude extract in the solvent of DMSO : Methanol (1:1 V/V) was prepared and bioassayed using well diffusion agar assay as mentioned above. The plates were then incubated at 37°C for 24 hrs.

RESULTS AND DISCUSSION

Results of antimicrobial activity of Artemisia on bacterial species are shown in tables 1 and 2.The methanolic extract of Artemisia persica and aucheri exhibited antibacterial activity against all investigated microorganisms except E.coli with a 10-24 mm zone of inhibition for A persica and 10-25 mm for A aucheri.Results of the MIC determinations indicated that methanol extracts of A. aucheri was more active than A. persica.

The thought of using medicinal plants is not reverting back to the past, but is a new and completely scientific attitude for the more using of them in helping the primary materials needed in medical industry and also preparing drugs that could be supplied in newer medicinal forms, and is in fact a facilitating agent in the drug and medicine chain of country. Today attention to bacteria resistant to drugs has found a vast importance in curing infectious diseases. Since plants are made in nature and have more adaptation with the metabolic system of the body, for obviation of these problems the attention of researches has been diverted to herbal medicines. (zargari, 1989). It's noteworthy that herbal extractions have various ingredients that even under similar conditions might give different results from two extractions that are prepared at different times. Sine a team in Netherlands found that the alcoholic extract of the skin of earth branches of Gracinia huillensis from the type of Guttifera have antibacterial and anti-fungus effects, while extracts that were gained from non-polar solubles didn't have such effects (Harrison, 1990). In 1797, the antibacterial effect of Artemisia herba slab was studied and results showed the fleeting oil of the plant was against some positive and negative bacteria. The fractions of this oil were separated by column chromatography and their activity was tested and it was found that the main active composite of this plant is Santolina alcohol. (yashpha, 1979). Regarding that result and the gained results from the mountain Artemisia plant it can be said that if the antibacterial substance of this plant be detected and prepared in net quality, it might be quite effective on many microorganisms. The researches done on the antibacterial effects of essences have shown that positive bacteria are more sensitive to essence oils than negative bacteria. (Cedarleaf et al., 1983).Shahidi et al examined the methanol extract of 221 plant species from 98 families regarding antibacterial and anti-fungus effects. The most active plants were Myrtuscommunis, Zingiber officinale, Dianthus caryophyllus. The positive bacteria showed more sensitivity compared with negative bacteria, which is also evident in the present study. (shahidi-bonjar et al, 2003).Negative bacteria have an external membrane in their cellule wall, which is composed of proteins called purine, which doesn't allow the penetration of antibiotic and antibacterial substances, and therefore always negative bacteria have more resistance compared with negative ones. In this study the methanol extract of two species of Artemisia were studied against four bacteria and two fungi in laboratory conditions. As seen in the results of the response of density of plants on tested microorganisms, it was found that the used extract was effective on all microorganisms except E coli. In addition, generally, positive bacteria are more sensitive than the negative ones and the nimbuses of their lack of growth show this fact, which is parallel with the results of other studies.

Considering that the antibacterial activities of medicinal herbs as impure in low concentrations are evident and considerable, it can be predicted that by use of purifying methods and chromatography, the effective substances can be separated, and in very lower concentrations, we may observe the antibacterial activities of the used plants.

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Table 1.Antibacterial activity of the methanol extracts of Artemisia persica using disk diffusion method (IZ: Inhibitory zone)

Bacteria IZ(mm) / Extract (mg/ml)	E. coli	B. cereus	S. aureus	S. entrica
60	-	16	22	14
30	-	14	22	12
15	-	12	20	11
7.5	-	10	19	-
3.75	-	-	15	-
1.8	-	-	14	-

Table 2. Antibacterial activity of the methanol extracts of Artemisia aucheri using disk diffusion method (IZ :Inhibitory zone).

Bacteria IZ(mm) / Extract (mg/ml)	E. coli	B. cereus	S. aureus	S. entrica
60	-	24	27	14
30	-	22	27	13
15	-	18	25	12
7.5	-	17	23	11
3.75	-	15	24	11
1.8	-	10	23	-
0.9	-	-	17	-
0.45	-	-	14	-

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REVIEW ARTICLE

Role of Arbuscular Mycorrhizal Fungi in Abiotic and Biotic Stress Tolerance

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ABSTRACT

More than 90%of terrestrial plants are associated with root-colonizing fungi, establishing a permanent and intimate mutualistic symbiosis, called mycorrhiza. Mycorrhizas are commonly divided into ectomycorrhizas and endomycorrhizas. Endomycorrhizas are variable and have been further classified as arbuscular, ericoid, arbutoid, monotropoid, and orchid mycorrhizas. Colonization of a plant host by AMF induces many changes not only in root architecture, but also in levels of gene expression. Changes in host chemistry are dependent upon both the host and the AMF species. Colonization of plants by AMF has been speculated to have a positive effect on specialist insects such as aphids but an opposite effect on generalist insects such as beetles and fall armyworms. Some hypotheses have been used to explain AMF mediated plant-herbivore interactions.Another pairwise negative interactions occurred between plants and soil pathogens, such as nematodes and pathogenic fungi. Plants are often subjected to unfavorable environmental conditions – abiotic factors, causing abiotic stresses - that play a major role in determining productivity of crop yields. In salt stressed soils, AM fungi are supposed to improve the supply of mineral nutrients to the plants, especially the supply of P, Cu, Mn and Fe which otherwise would be precipitated by ions like Ca^{2+}, $Mg,^{2+}$ and Zn^{2+}. AMF effects on plant water relations and metabolism during drought have been associated with morphological and phenological effects. AM symbiosis protects host plants against the detrimental effects of drought stress through mechanisms of drought avoidance. Protection against oxidative damage by various antioxidants is another fundamental mechanism that can enhance drought resistance in mycorrhizal plants.

Key words: *Arbuscular mycorrhiza*, Abiotic Stress , Biotic Stress

INTRODUCTION

Plants have evolved symbiotic relationships with partner organisms (e.g., fungi, bacteria, insects). More than90%of terrestrial plants is associated with root-colonizing fungi, establishing a permanent and intimate mutualistic symbiosis, called mycorrhiza. Although most plants including angiosperms, gymnosperms, pteridophytes, and a few bryophytes are colonized with AMF, no members of at least three plant families (Brassicaceae, Caryophyllace, and Chenopodiaceae) are colonized by AMF(Hawksworth, 1991). Mycorrhizal colonization evolved by the Early Devonian era, approximately 400 hundred years ago. In the fossil record, plants colonized by mutualistic fungal partners identified as arbuscular mycorrhzial fungi have been identified(Bonfante and Genre, 2008). It is hypothesized that terrestrial plants in their early stages of life did not have true roots so they depended upon a symbiotic relationship with fungi; this helped them to establish their root systems in very harsh environments(Pirozynski and Malloch, 1975).

Mycorrhizas are commonly divided into ectomycorrhizas and endomycorrhizas. The two types are differentiated by the fact that the hyphae of ectomycorrhizal fungi do not penetrate individual cells within the root, while the hyphae of endomycorrhizal fungi penetrate the cell wall and invaginate the cell membrane (Smith and Read, 1996). Endomycorrhiza includes arbuscular, ericoid, and orchid mycorrhiza, while arbutoid mycorrhizas can be classified as ectoendomycorrhizas. Monotropoid mycorrhizas form a special category (Hawksworth, 1991).

Arbuscular mycorrhiza

Endomycorrhizas are variable and have been further classified as arbuscular, ericoid, arbutoid, monotropoid, and orchid mycorrhizas. Arbuscular mycorrhizas, or AM or VAM), are mycorrhizas whose hyphae enter into the plant cells, producing structures that are either balloon-like (vesicles) or dichotomously branching invaginations (arbuscules). The fungal hyphae do not in fact penetrate the protoplast but invaginate the cell membrane. The structure of the arbuscules greatly increases the contact surface area between the hypha and the cell cytoplasm to facilitate the transfer of nutrients between them(Read, 1991, Hijri and Sanders, 2005).

Arbuscular mycorrhizas are formed only by fungi in the division Glomeromycota. Fossil evidence (Remy et al., 1994) and DNA sequence analysis (Simon et al., 1993) suggest that this mutualism appeared 400-460 million years ago, when the first plants were colonizing land. Arbuscular mycorrhizas are found in 85% of all plant families, and occur in many crop species (Harrison, 1997). The hyphae of arbuscular mycorrhizal fungi produce the glycoprotein glomalin, which may be one of the major stores of carbon in the soil. Arbuscular mycorrhizal fungi have (possibly) been asexual for many millions of years and, unusually, individuals can contain many genetically different nuclei (a phenomenon called heterokaryosis)(Redecker et al., 2000).

Ectomycorrhizas, or EcM, are typically formed between the roots of around 10% of plant families, mostly woody plants including the birch,dipterocarp, eucalyptus, oak, pine, and rose (Wang and Qiu, 2006) families, orchids (Molina et al., 1992) and fungi belonging to the Basidiomycota, Ascomycota, andZygomycota. Some EcM fungi, such as many Leccinum and Suillus, are symbiotic with only one particular genus of plant, while other fungi, such as the Amanita, are generalists that form mycorrhizas with many different plants (Den Bakker et al., 2004). An individual tree may have 15 or more different fungal EcM partners at one time (Saari et al., 2005). Thousands of ectomycorrhizal fungal species exist, hosted in over 200 genera. A recent study has conservatively estimated global ectomycorrhizal fungal species richness at approximately 7750 species. Although, on the basis of estimates of knowns and unknowns in macromycete diversity, a final estimate of ECM species richness would likely be between 20000 and 25000 (Saari et al., 2005). Ectomycorrhizas consist of a hyphal sheath, or mantle, covering the root tip and a Hartig net of hyphae surrounding the plant cells within the root cortex. In some cases the hyphae may also

penetrate the plant cells, in which case the mycorrhiza is called an ectendomycorrhiza. Outside the root, Ectomycorrhizal extramatrical mycelium forms an extensive network within the soil and leaf litter.

Alterations in host chemistry

Colonization of a plant host by AMF induces many changes not only in root architecture, but also in levels of gene expression. Changes in host chemistry are dependent upon both the host and the AMF species (Hause and Fester, 2005). Barley plant roots that were colonized by G. intraradices showed a 4-fold significant up-regulation of jasmonic acid (JA), and its amino acid conjugate JA-isoleucine (JA-Ile) expressions, compared to non mycorrhizal plants. Other enzymes [e.g., allene oxide synthase, and jasmonate-induced protein (JIP23)] were also stimulated; increases were detected primarily during the peak colonization of AMF when mycorrhizal infection was high (60%), approximately 8 weeks (López-Ráez et al., 2010). One of the plant's main benefits from the AM symbiosis is improvement of phosphate uptake. Recent molecular studies of various phosphate transporters have demonstrated how plants can adapt their phosphate uptake to the interaction with the AM fungus. Specific phosphate transporters with different properties compared to those known so far are expressed in the arbusculated root cells (Rausch et al., 2001). It was shown that glucose and fructose are effectively taken up by the fungus within the root and are metabolized to yield mainly trehalose and lipids (Wright et al., 1998). The lipids are then translocated to the extraradical mycelium, translocated within AM fungal colonies, and are recirculated throughout the fungus (Bago et al., 2002). Carbon flux and gene expression studies indicate that the glyoxylate cycle is central to the flow of carbon in the AM symbiosis (Lammers et al., 2001).

Many studies on plant secondary metabolites in AM roots were carried out. In alfalfa, increases in transcription levels of phenylalanine ammonia-lyase and chalcone isomerase were observed (Volpin et al., 1994). In soybean roots, however, the level of chalcone isomerase decreased (Lambais and Mehdy, 1993). In Medicago truncatula and Phaseolus vulgaris, transcript levels of phenylalanine ammonia-lyase and chalcone synthase increased (Blee and Anderson, 1996), whereas isoflavone reductase transcript formation was suppressed in Medicago truncatula (Blee and Anderson, 1996).

Increasing Plant Tolerance to biotic stress

Colonization of plants by AMF has been speculated to have a positive effect on specialist insects such as aphids but an opposite effect on generalist insects such as beetles and fall armyworms (Bonfante and Genre, 2008). Herbivores negatively interact with plants. Herbivores removed plant biomass and reduced photosynthetic area, while plants evolutionarily obtained defensive systems to herbivores (Agrawal et al., 2012). Some hypotheses have been used to explain AMF mediated plant-herbivore interactions. For AMF positive effects on plant-herbivore interactions, it was hypothesized that AMF improved plant quality for herbivores (Cosme et al., 2011); for AMF negative effects on plant-herbivore interactions, it was assumed that AMF induced plant defense responses and increased chemical resistance (Bezemer and van Dam, 2005), changed palatability of plants to herbivores (Klironomos and Kendrick, 1996), or interacted with fungal endophytes to inhibit herbivores (Gehring and Whitham, 1994). In return, herbivores possibly suppress AMF by affecting carbon allocation of plants (Barto and Rillig, 2010). Another pairwise negative interactions occurred between plants and soil pathogens, such as nematodes and pathogenic fungi (Yang et al., 2014). Nematodes and pathogenic fungi cause serious plant diseases, especially for crops (Zambolim and Schenck, 1983). However, there is now more recognition that AMF could modify this negative interaction by directly or indirectly interacting with these plant biotic stressors (Bennett et al., 2006).

Colonization by AM fungi can enhance plant host resistance to soilborne plant pathogens by: 1) producing a more

robust plant and facilitating availability of nutrients to the host; 2) competing for both space and photosynthetic products with the pathogen; 3) interacting with other rhizosphere microorganisms such as plant-growth-promoting rhizobacteria (PGPR) that are antagonistic to the pathogen; 4) compensating for the damaged tissues; and 5) inducing plant disease resistance genes (Lioussanne, 2013). Synergism among AMF species has been documented in which one individual has less effect than a consortium of isolates. For example, cucumber plants (Cucumis sativus L.) infected with Fusarium oxysporum f. sp cucumerinum and colonized by Glomus caledonium were smaller and had fewer fruit than cucumber inoculated with combinations of Glomus spp. and Acaulospora spp (Jun-Li et al., 2010).

Increasing Plant Tolerance to abiotic stress

Plants are often subjected to unfavorable environmental conditions – abiotic factors, causing abiotic stresses - that play a major role in determining productivity of crop yields (Boyer, 1982) but also the differential distribution of the plants species across different types of environment (Chaves et al., 2003). Some examples of abiotic stresses that a plant may face include decreased water availability, extreme temperatures (heating or freezing), decreased availability of soil nutrients and/or excess of toxic ions, excess of light and increased hardness of drying soil that hamper roots growth (Verslues et al., 2006).

Salt stress

Salinity not only decreases the agricultural production of most crops, but also, as a result of its effect on soil physicochemical properties, adversely affects the establishment, growth and development of plants leading to huge losses in productivity (Zarea et al., 2014). To counteract this problem, many strategies were proposed to overcome salt detrimental effects such as searching for new salt-tolerant crops, genetically engineering plants, removing excessive salt accumulation in groundwater and desalinizing water for irrigation (Ashraf and Harris, 2004). Although these strategies appear efficient, yet they are costly and out of reach for developing countries that are the most affected. Among these various strategies, application of Arbuscular Mycorrhizal (AM) Fungi is better increment, vigorous growth and consequently higher yield and biomass of plants. AM fungi are ubiquitous among a wide array of soil microorganisms inhabiting the rhizosphere. Symbiotic association of a plant with AM fungi makes it able to access immobile nutrients in nutrient-poor soils (Marschner and Dell, 1994). In salt stressed soils, AM fungi are supposed to improve the supply of mineral nutrients to the plants, especially the supply of P, Cu, Mn and Fe which otherwise would be precipitated by ions like Ca^{2+}, $Mg,^{2+}$ and Zn^{2+} (Kadian et al., 2013). Besides improving nutrition, AM fungi improve physiological processes, like water absorption capacity of plants by increasing root hydraulic conductivity and favourably adjusting the osmotic balance and composition of carbohydrates (Rosendahl and Rosendahl, 1991). Thus, they mitigate the adverse effects of excess salt accumulation in the root (Dixon et al., 1993).

Drought Stress

The water stress is considered the main factor that causing limitations to plant growth. The effects of drought on plant growth depend on several factors such as plant genetic resistance, stage of growth and duration of plant expose to drought.

The results in several studies on drought stress conditions indicated that the plant biomass, chlorophyll contents and rate of transpiration were greater in plants inoculated with AMF compared with plants without AMF infection (Asensio et al., 2012). Also AMF have been observed effects on stomatal conductance with similar frequency under amply watered and drought stress (Davies et al., 1993). AMF symbiosis has also affected stomatal sensitivity to atmospheric water status (Huang et al., 1985). AMF effects on plant water relations and metabolism during drought have been associated with morphological and phenological effects. AMF maize had relatively more green leaf area than non-mycorrhizal maize after drought (Subramanian et al., 1995) and AMF symbiosis delayed leaf senescence of

Alfalfa in drought conditions. The effects of G. mosseae on plant water status have been associated by enhanced host nutrition, especially phosphorus (P) nutrition. The plant leaves chlorophyll content values were decreased in drought stress comparing with same treatment in well irrigation condition, that indicate to plant photosynthesis decreased in drought, which lead to inhibit some essential material for protein synthesis, therefore the protein synthesis dramatically reduced or even stopped (Abdelmoneim et al., 2014).

AM symbiosis protects host plants against the detrimental effects of drought stress through mechanisms of drought avoidance (Augé, 2001). Strategies of drought avoidance in mycorrhizal plants rely on the ability to maintain an adequate hydration status on the level of whole plants as characterized by relative water content, although a thorough review of the literature indicates that leaf water potential was not measured in some experiments (Augé, 2001). The improved capability of drought avoidance mediated by AM colonization has often been associated with the AM promotion of plant growth through enhanced nutrition (Ruiz-Sánchez et al., 2010).

The colonization of roots by AM fungi in various plant species induces proline accumulation when water is limiting (Ruiz-Sánchez et al., 2010, Azcón et al., 1996). The enhanced accumulation of proline in these studies was linked to AM-induced drought resistance with proline acting as osmoprotectant. Conversely, in several studies, while proline content increased in response to water deficit, a lower accumulation of proline has been observed in mycorrhizal plants relative to nonmycorrhizal counterparts (Ruiz-Lozano, 2003) suggesting that AM symbiosis enhanced host plant resistance to drought. AM symbiosis can increase the drought tolerance of plants if the commonly observed higher rates of photosynthesis lead to an increased accumulation of nonstructural carbohydrates that, acting as osmoprotectants, can lower the osmotic potential (Augé, 2001). Several studies have reported the accumulation of carbohydrates when plants are subjected to water stress in both woody species.

Oxidative Stress

Protection against oxidative damage by various antioxidants is another fundamental mechanism that can enhance drought resistance in mycorrhizal plants (Ruiz-Lozano, 2003). Each stress involves the production of excess ROS, such as singlet oxygen, superoxides, hydrogen peroxide, and hydroxyl radicals, leading to cell damage or death (Smirnoff, 1993). Plants are characterized by a complex response network of antioxidant compounds and enzymes that defend plant cells against excess ROS. AM symbiosis ameliorated the response of plants to oxidative stress by improving photosynthetic performance but mainly through the accumulation of the antioxidant compound glutathione, which was concomitant with a reduction in oxidative damage to membrane lipids and to low cellular levels of hydrogen peroxide. In the same study, while glutathione levels increased, ascorbate levels decreased in mycorrhizal plants compared to nonmycorrhizal counterparts. This comprehensive study further supports the premise that mycorrhizal protection against induced oxidative stress may be a crucial mechanism by which AM symbiosis increases the resistance of host plants (Ruiz-Sánchez et al., 2010). In addition, it suggests differential up-regulation of the various antioxidant systems (Marulanda et al., 2003). Among other potential ROS scavengers, flavonoids might also play a role in protecting mycorrhizal plants against oxidative damage: AM-mediated increases in the amounts of these compounds were sometimes found when plants were exposed to drought conditions (Abbaspour et al., 2012).

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RESEARCH ARTICLE

The Effects of Environmental Pollutants from Refinery Ferro Alloys Manoojan in Kerman on Compounds Essential Oils from Aerial Parts of Plant *Otostegia percica* Bioss.

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ABSTRACT

Otostegia persica Bioss and *Otostegai aucheri* L. (Labiatae) are very important for treatment of diabetes mellitus and other various diseases in Saravan region. Iran has a great wealth of various naturally occurring medicinal plants which have great potential pharmacological activities. *Otostegia persica* (Burm.f.) Boiss. is one of these plants which is a perennial shrub found in South and Southeast of Iran. The aerial parts of O. persica have been used in Iranian traditional medicine to treat various types of diseases (e.g., in flam matory and pain mediated diseases, malaria and diabetes). In this study the effect of environmental pollutants from refinery ferro alloys Manoojan on compounds in essential oils from aerial parts of plant *Otostegia persica* has been investigated. The first two samples were selected one case and other control .Then of samples preparation Oils were obtained by hydrodistillation(HD) method and analyzed by GC and GC-MS. 12 compounds were identified in essential oil from case plant, from 68.3% of the total oil. The main constituents of the oil were Thymol(48.9%), Spathulenol (6.2%) and Caryophyllene oxide (5.7%). 11 compounds were identified in essential oil from control plant from 56.8% of the total oil. The main constituents of the oil were Thymol(14.4%) and trans-Caryophyllene(6.8%) .

Key words: *Otostegia persica*, GC-MS, Hydrodistillation, Environmental pollutants

INTRODUCTION

The genus Otostegiais belonging to Lamiaceae family and include of about 33 species, which grows mainly in the Mediterranean region and adjoining Asia Minor (Khan et al., 2009). Three species of this genus are available in Iran: *O. aucheri, O. michauxi* and *O. persica*, of which the last two are endemic to Iran (Ghahreman and Attar, 1992, Ayatollahiet al., 2009).

O. aucheri and *O. persica* have widely distributed in Sistan and Baluchestan province. Several interesting work of biological and pharmaceutical properties on *O. persica* were published in the last 10 years. This species is traditionally used for treatment of malaria, fever and diabetes.(Sadeghiet al., 2014). Additional biological screening of this species has revealed strong antibacterial activities against various Gram-positive strains and Gram-negative bacteria, anti-malarial, anti-inflammatory and healing of burn wound, anti-glycation activity as well as anti-aphids and pesticidal activity (Salariet al., 2010; Nateghpouret al., 2012; Ganjaliet al., 2013; Ayatollahiet al., 2010;Asghari et al., 2006). O. aucheri has also antidiabetic effects (Sawaret al., 2009;

Mosihuzzaman, 2005).Plants are the oldest source of pharmacologically active compounds, and have provided humankind with many medically useful compounds for centuries (Cordell,1981). Screening of anti-microbial plants for new agents possesses an enormous challenge and is importantes pecially with the emergence of drug resistant pathogenic strains. Plants produce a diverse array of secondary metabolites, many of which have antimicrobial activity. Some of these compounds are constitutive, existing in healthy plants in their biologically active forms. Others such ascyanogenic glycosides and glucosinolates, occur as inactive precursors and are activated in response to tissue damage or pathogen attack (Sykes,1985).

Plant species of Labiatae are reputed for their medicinal uses. Due to their essential oils content, several species of this family show antimicrobial activity (Skaltsa,2003). It was reported that Menthaspp. exhibit antimicrobial activity against Escherichia coli, Bacillus subtilis, Salmonella enteritidis and Staphylo-The genus Otostegia Bioss. (Labiatae) comprises 20 species, no previous antimicrobial investigation of this genus has been reported, and however there are reports on the anti insect activity of *O. integrifolia* (Waka,2004). Methanolic extract of Otostegia persica has been exhibited strong antioxidant activity (Sahrififar,2003). Two compounds which were separated from methanolic extract by column and paper chromatography showed significant antioxidant activity. These active compounds were identified as morin and quercetin *Otostegia persica* Bioss. grows in south of Iran in Fars province between Shiraz and Jahrum, also in south east region mainly in Sistaan and Baluchestan (Ghahraman,1996). The aim of this work was to examine the effect of the methanolic, chloroform and hexane extractsof O. persica on several microorganisms.

MATERIALSAND METHODS

Plant materials

The aerial parts of *Otostegia persica* Bioss was collected in the region of Manoojan city in Kerman during April 2015.The sample was collected at the early flowering stage and was deposited in the Herbarium and was dries at room temperature (20-25°C).

Hydrodistillation

Dried aerial part of (100g) *Otostegia persica* Bioss were submitted to hydro distillation with Clevenger type apparatus for 4 h and the oils were dried under anhydrous sodium sulphate and kept in 4ºC until analyzed.

Analysis

Analysis by GC was carried out using a Hewlett-Packard 5890 chromatography equipped with a FID detector and a HP-5 column (30 m × 0.25 mm i.d., film thickness 0.25 μm).GC-MS analyses were performed using an Agilent-7890A chromatograph interfaced to an Agilent-5975Cmass spectrometer (ionization voltage 70 eV, scan time 0.5 s, scan range 40-400 Da) and equipped with a capillary column HP-5 (30 m × 0.25 mm i.d., film thickness 0.25 μm). The oven temperature was held at 60°C for 5 min, then programmed from 60 to 260°C at a rate of 5°C/min and finally held for 1 min at 260°C (for GC-FID and GC-MS) using He as a carrier gas (1.0 mL/min), split 1:50. Injector and detector temperatures were 250°C.

Identification of chemical compound

Identification of the compounds was based on a comparison of retention indices and mass spectra with those of authentic samples and with the NIST MS library.The identification was also confirmed by comparison of the retention indices with data in the literature (Lawrence, 1991 and Adams, 2007).The percentages of compounds were calculated by the area normalization method, without considering response factors. The retention indices were calculated for all volatile constituents using a homologous series of n-alkanes.

RESULTS AND DISCUSSION

The oil isolated by HD from the aerial parts of *Otostegia persica* Bioss was found to be a yellowish liquid, obtained in yields of 0.3% and 0.2 respectively.The chemical compositions of aerial parts of the *Otostegia persica* Bioss (case sample and control sample) were given in Table 1. The components are listed in order of their elution on the HP-5 column. As is shown in Table1,12 compounds were identified in essential oil from case plant, from 68.3% of the total oil. The main constituents of the oil were Thymol (48.9%), Spathulenol (6.2%), Caryophylleneoxide (5.7%). 11 compounds were identified in essential oil from control plant, from 56.8% of the total oil. The main constituents of the oil were Thymol(14.4%) and trans-Caryophyllene(6.8%) . Also is shown that %Thymol increased in case sample while% Spathulenol Decreasedhn this sample.

High test results show that the combination of α - Pinene in the main plant has been cut in half and Combine 1-Octen-3-ol and is not found in the control sample, but the sample has been found And compounds such as Terpinene-α and β-Ionone and Zonarene Cis-Verbenol and Pinocarvone and plant samples can not be found in the control of plant specimens to be found And also compounds such as 1-Octen-3-ol and Thymyl methyl ether and γ-Terpinene and Carvacryl acetate and γ-Cadinene and Trans-Nerolidol control can be found in the plant, but the plant prototype has been found Or compounds such as Thymol and Spathulenol the prototype plant to control plant to the considerable amount of high or plant compounds such as Caryophyllene Oxide in the original sample are relatively low compared to control plants.

According to the analysis of dust samples Manoujan ferroalloy plant output).Similar weather conditions are collected, very different from the original sample some of the compounds in amounts much lower than the control sample compounds or some compounds in the plant sample does not exist or sample some of the constituents inThe plant pollution removal ferroalloy plant materials and their absorption by the plant is made of this material has changed. non-trpn reduction of oxygen non- Oxygen and growth diterpene (thymol) and many non-oxygenated sesquiterpene oxide Kayvfyln in this study may be due to the plant cell response in response to the heavy metal manganese.

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Table 1.Comparative chemical composition (%) of *Otostegia persica* Boiss. Samples: case and control

No	Compound	K.I.	Case%	Control%
1	α - Pinene	939	0.5	1.0
2	1-Octen-3-ol	979	1.5	N.D
3	Terpinene**α**-	1017	N.D	1.6
4	γ-Terpinene	1060	0.7	N.D
5	Cis-Verbenol	1141	N.D	1.2
6	Pinocarvone	1165	N.D	0.8
7	Thymol methyl ether	1245	0.7	N.D
8	Thymol	1290	48.9	14.2
9	Carvacryl acetate	1373	1.2	N.D
10	Trans-Caryophyllene	1419	0.9	6.8

11	B-Ionone	1489	N.D	1.4
12	γ-Cadinene	1514	1.2	N.D
13	Zonarene	1530	N.D	2.4
14	Trans-Nerolidol	1563	0.8	N.D
15	Spathulenol	1578	6.2	1.2
16	Caryophyllene Oxide	1583	5.7	26
-	Total Percentage	-	68.3	56.8

N.D = Not Detection

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RESEARCH ARTICLE

Influence of Teaching the Coping Skills on Control State and Reduced Anxiety among the Couples

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ABSTRACT

The present article aimed to study the influence of teaching the coping skills on control state and reduced anxiety among the couples. The studied population consisted of couples visiting counseling centers in Kerman city. For this purpose, a sample containing 40 couples was randomly selected and classified into two groups, namely research and control groups. Data collection tool was two questionnaires, including control state questionnaire and Spielberger anxiety questionnaire. In a pretest-posttest design with the control group, the couples replied to the questionnaires before and after the training. To provide inferential analysis of data, statistical hypotheses testing and analysis of covariance were used. Results of analysis of covariance showed that teaching the copings kills significantly decreased state and trait anxiety among the female and male test samples. Results indicated that control state of the research group had more inner state in post-test than in the pre-test.

Key words: coping skills, control state, state anxiety, trait anxiety.

INTRODUCTION

As a core part of the society, family has long been focused by the society policy-makers and sociologists. World Health Organization (WHO) introduced the family as a primary social factor in increasing the health and well-being of the society. Therefore, couples must receive considerable amount of attention, as the main part of the family. Health and vitality of the family has root in the couples' psychological health and freshness, while the couples' psychological health and freshness depends on their attitude, feeling and behavior (action). Interpersonal differences,

and on top of it the differences resulted from marital relationships are considered as a distressing and complex phenomenon by the couples. Whereas, difference of views and conflicts are natural and inevitable phenomena in interpersonal relationship; different people may adopt different approaches in facing the conflicts caused by interpersonal relationships. What is worthy of attention and study in this area is type of the confrontation against the conflict. If the conflicts are positively resolved by the couples and appropriate strategies are gradually adopted to resolve the problems caused by the martial relationship, then it will improve and stabilize the relationship in long term period as well as improves the skills associated with the martial relationship. Even, learning this adaptive strategy can also help the person become stronger when confronting other stressful conditions in life (Dunham, quoted by Gottman and Levinson, 2009). However, if the conflicts are inappropriately dealt with, then it will destroy the martial life and will have negative physical and emotional effect on the couples and can create a range of behavioral and emotional problems for children exposed to the parent's conflicts (Hendson, 2006).

What is obvious is that type of confrontation strategy is affected by various personal factors, each of which can be an applied topic for research in this field. Gottman (1994) believed that the couples with avoidant style principally deal with their difference and dissimilarities with a more indirect approach and adopt some methods to minimize the conflicts and suppress their negative and fragile emotions in an inappropriate way (quoted by Steuber, 2005). This belief is not in agreement with the contemporary findings. Valner and Karner believed that conflict avoidance does not bring any positive consequences for the couples, because no interaction and discussion takes place between the couple in this condition and there is no experience to learn from. In other word, this type of couples suppresses their emotions and feelings with a great fear about uncontrollable conflicts and quarrels. In a study by Bahari et al. (quoted by Vafa'eepour, 2010), titled as "effect of couple's coping skills on reducing martial conflicts and control state of conflicting couples who asked for a divorce", it was concluded that educational courses for the couples' relationship skills could decrease emotional reactions, decrease attraction of the child support by each of the couples, reduce relationship with relatives and friends when having conflict, and generally reduce conflict level among couples who asked for a divorce. Also, the findings showed that coping skills training internalized the couple's control significantly more than the case before the training.

Among the personal characteristics with determining impact on type of the person's reaction when facing stressful situations is their perceived dominance over the situation and generally over the events during their life. In fact, control state determines how the person attributes the events and behaviors in his life. In marital life, there are some unpredictable situations with stress according to the state control of the couples which can be followed by various consequences. When the control state of the couples is internal, they are expected to manage the anxiety and stress and to make a better decision; however, when the couple feels that there is no dominancy over the current situation, not only they experience greater level of anxiety, but they also choose a more emotional reaction to accommodate with the stressful situation (Sadeqi et al., 2009).

Kampaz et al. (2011) conducted a study on how the couples face the stress and tension and concluded that they have greater control over the situations where they use focused (concentrated) method. They also mentioned that the couple mostly uses the focused method when confronting the stressful events in their life, because they think that these stresses are more likely to be controlled; on the contrary, emotion-focused method is more used in confronting the social stressful events since they can be controlled to a lesser extent.

In a study by Waling and Marting (2009), it was found that desperate people have lower control over the situation in their physical and daily activities. They added that people who feel they have control over the situation, can also control the consequences of their performance and use problem-solving methods when exposed to the activities which are difficult to learn.

Hanson and Land Boland (2006) showed in a study that teaching the communicative and problem-solving skills to the couples who have problems in their martial interactions improved their marital relationship and reduced conflicts and increased their psychological health.

The ability to understand the emotion and conceive the feelings in the interpersonal relationship is an important topic in problems related to the interpersonal relationship, especially marital relationship, and this ability is a skill which is a very important and undeniable skill in restoring the interpersonal relationship. Providing coping skills for the relationship, especially inside a complex organization named "family", and its effects on level of anxiety and control over marital conflicts are the topic which is examined by the related research. In fact, the fundamental question in the study is related to the issue that whether acquiring the coping skills by the couple can reduce their anxiety and create a more positive feeling in the couples to control over their life?

METHODOLOGY

The present article is a quasi-experimental research and of pretest-posttest design type with control group. In these designs, the sample group is divided into two groups. Then, one of the groups is regarded as the intervention group exposed to the intervening variable (learning coping skills in this study), and posttest procedure is conducted on the group after the intervention. Statistical population of the current research included all the couples visiting family counseling centers in Kerman city in the first half of year 2014. Purpose of their visit was to resolve the family problems and marital conflicts. The sample size was equal to 187 couples, based on the obtained statistics. Samples in this study were composed of 80 subjects, including 40 couples (40 men and 40 women), based on Cohen table.

The sample group was randomly selected from three different counseling centers. Then, the subjects were divided into two identical groups depending on the social and financial status, age and marriage duration. Next, on a random basis, one of the groups was considered as the research group, while the other was regarded as the control group. Training sessions on the stress coping skills included 7 sessions, each session was as follows. Duration of the sessions for the couples was 60miniutes.

Data collection tool included Rotter's locus of control questionnaire (1966) which has been prepared to test the people's expectations about locus of control and contains 29 items, where each item has a pair question (A and B). Rotter prepared 23 items of this questionnaire with the certain purpose of identifying person's expectation about the locus of control, while the 6 remaining items follow the test objectives in a despise. These neutral items obscure the measured structure and dimension for the subjects. Rotter reported the validity of this questionnaire between 0.49-0.84; while, its reliability within two months period was reported vary from 0.68 to 0.83.

Spielberger State-Trait Anxiety Inventory (STAI)

Spielberger state-trait anxiety inventory have been deeply used in studies and clinical activities. This questionnaire is composed of multiple self-evaluation scales for measuring manifest and hidden anxieties. Manifest and hidden anxiety questionnaire consists of multiple self-evaluation scales for measuring manifest and hidden anxieties. Manifest anxiety scale (form y-1) consists of 20 sentences that evaluate the subject's feeling at "the moment of answering to the questionnaire". Hidden anxiety scale (form y-2) also includes 20 sentences which evaluate the person's general feeling.

In 1993, Mehram carried out a study in order to standardize the Spielberger test. He separately investigated reliability coefficient of the test in two groups, including normal and standard groups. Reliability of the normal group (600 subjects), under the scale of manifest and hidden anxiety based on Cronbach's alpha was respectively 0.9084 and 0.9025, while this value was 0.9418 for the standard group (130 subjects). Furthermore, reliability of the test was

calculated through ratio of the variance of the real scores to variance of the observed values, which was obtained as 0.945 for the normal group. The measured standard error for the test was equal to 4.64. Also, correlation of the observed scores with the real score was 0.972 and 0.234 with the error scores.

In addition, validity of the study was of concurrent validity type. Regarding the validity, and appropriate with the standard sample size (130 subjects diagnosed as anxious by the psychologist), 130 patients were randomly selected from the normal group (by maintaining the sex ratio and age groups of subjects in the standard group) and the in order to study validity of the test, the average values of manifest and hidden anxiety and finally the total anxiety were calculated separately at two levels, including 95% and 99%, where calculation results of 95% and 99% confidence levels were significant.

Also, reliability of the questionnaire in various studies was calculated as 87%. In a fundamental study, Rouhi (2005) calculated reliability of the Spielberger test respectively as 89% and 90%.

Data analysis method

The data were analyzed using descriptive statistics methods including tables and diagrams related to descriptive indices and distribution of variable scores as well as inferential statistics methods such as Levene's test to test hypothesis of variance homogeneity, Kolmogorov–Smirnov test to examine normal distribution of scores in each studied group, test of homogeneity of regression slopes and finally analysis of covariance. Data were analyzed by spss-19 software.

Hypothesis 1: teaching coping skills reduces the anxiety.

In order to study the intervention, multivariate analysis of covariance was done on the posttest scores, comparing with the pre-test scores.

Data in table 1 indicate that there was a significant difference between intervention and comparison groups in terms of at least one of the dependent variables (state and trait anxieties). In order to examine point of difference, analysis of covariance in MANCOVA context was conducted on the variables. Results of this analysis are presented in table 2.

Results shown in table 2 indicate that analysis of covariance on variables including evaluation of others (F=10.72, P=0.01) and trait anxiety (F=14.07, P=0.01) were significant. Based on the obtained results, it can be expressed that in the intervention group, there was a significant variation in reduction of scores related to posttest state and trait anxieties with respect to the comparison group, caused by the intervention. Therefore, the research hypothesis, stating that teaching anger management is effective on reducing the state and trait anxieties, was accepted.

Hypothesis 2: teaching coping skills causes the control state to become more internalized (centralized)

According to the results presented in above table, pre-test impact was significant (0.47) ($p<0.05$). Also, effect of intervention which are indicated by the effect of the groups (11.15), was significant at level 0.01. Also, values of ETA square and power of the test were obtained as respectively 0.47 and 0.99.

Hypothesis 3: Teaching the coping skills reduces the anxiety among men.

In order to examine the intervention, multivariate analysis of covariance was conducted on posttest scores and compared with pre-test scores.

Data in the table indicates that there was a significant difference between the intervention and comparison groups in terms of at least one of the dependent variables (state and trait anxiety). In order to study the point of the difference, analysis of covariance in MANCOVA context was conducted on the dependent variables. The results are presented in table 5.

Results obtained in table 5 show that analysis of covariance on variables including state anxiety (F=8.20 and P=0.01) and trait anxiety (F=12.92 and P=0.01) was significant. According to the obtained results, it can be concluded that in the intervention group, there was a significant variation in reduction of scores related to posttest state and trait anxiety among male subjects compared to the comparison group, under the influence of intervention. Therefore, the research hypothesis, stating that teaching the anger management is effective on reduction of state and trait anxiety among men, was accepted.

Hypothesis 4: Teaching the coping skills causes the control state in men to become more internalized.

According to the results shown in the table above, the pre-test impact (7.10) was significant (P<0.05). Also, effect of intervention which are indicated by the groups (7.67), was significant at level 0.01. Also, values for ETA square and power of the test were obtained respectively as 0.45 and 0.99.

Hypothesis 5: teaching coping skills reduces the anxiety among women

In order to examine the effect of intervention, multivariate analysis of covariance was done on the posttest scores with respect to the pretest scores.

Data in the table show that there was a significant difference between intervention and comparison groups in terms of at least one dependent variable (state and trait anxiety). To test the point of difference, analysis of covariance in MANCOVA context was conducted on dependent variables. Results of the analysis are presented in table 8.

Results obtained in table 5 show that analysis of covariance on variables including state anxiety (F=6.19 and P=0.01) and trait anxiety (F=9.95 and P=0.01) was significant. According to the obtained results, it can be concluded that in the intervention group, there was a significant variation in reduction of scores related to posttest state and trait anxiety among female subjects compared to the comparison group, under the influence of intervention. Therefore, the research hypothesis, stating that teaching the anger management is effective on reduction of state and trait anxiety among women, was accepted.

Hypothesis 6: teaching the coping skills causes the state control in women to become more internalized.

According to the results in the table above, the pre-test impact (5.88) was significant (p<0.05). Also, effect of intervention which is shown by the effect of the groups (6.62) was significant at level 0.01.

RESULTS

Effect of teaching the coping skills on the anxiety

In order to investigate effect of teaching coping skills on the couple's level of anxiety based on the considered posttest and pretest design, analysis of covariance was used which usually control the pretest effect. First, the result was studied on the general sample group. As shown by the results, the teaching would had effect on at least one of the dependent variables (state or trait variable). In the final analysis also, the results showed that decrease in the scores of

both the state and trait anxiety was significant. The results were obtained separately for male and female groups. The obtained results were in agreement with the national studies including Dafe'e (2010), Kamardinzadeh (2010), Sadeqi, Narimani and Rajabi (2009) as well as international studies Kampaz et al. (2011), Waling and Marting (2009), Hanson Land Boland (2006), Okin, Das, Tom, Soprof and Christance (2005).

Results of the study by Kampaz et al. (2011) showed that the couples have more control over the situations in which they use the focused method. The couples mostly used the focused method when facing stressful situations in their life; whereas, emotion-focused method is mostly used at the social stressful conditions since they can be controlled to a lesser degree. According to Waling and Marting (2009), people who are desperate also have less significant control over the situations in their physical and daily activities. They also added that people who feel they have control over the situation are also able to control the consequences of their behavior and they use problem-solving methods against activities that are hard to learn.

Hanson Land Boland (2006) also showed in a study that teaching the coping and problem-solving skills to the couples in their marital interaction improved the marital relationship and reduced the conflict and increased the mental health. Okin, Das, Tom, Soprof, and Christiance (2005) also showed that teaching the coping skills to the couples significantly reduced the anxiety and conflicts and improved the couple's performance (behavior).

Effect of teaching coping skills on the control state

Results of the analysis of variance one the general samples and also the separate results of the female and male samples showed that teaching the coping skills caused the control state to more from external to internal areas. These results were in agreement with the results of studies by Kampaz et al. (1988) and Waling and Marting (2009). Problem-focused confrontations are defined as the direct mental and behavioral activities of the person which are done to change and modify threatening environmental condition. In other words, problem-focused confrontation is related to the person's efforts to change the condition and direct struggle with the problem.

No one can accomplish his goals without making effort. Making decision when the person is faced by a stressful condition requires his judgment, which is unfortunately affected by the negative emotions due to the negative past experiences. For example, if a person who is mentally devastated rarely have the experience of affecting the world to change his condition, and depression also caused hopelessness in his life, then probably in spite of all the works he can do to improve his condition, he will not make an effort to overcome the problem. Instead of considering themselves as the main player of the life, these people regard themselves as the victim of others' actions, behaviors, and suggestions. Lack of belief about one's performance is a great obstacle in solving the problem, because in this condition, the person makes the least effort to solve to solve the problem.

In a study by Kampaz et al. (1988) on how the youths confront the stresses, it was concluded that people have greater control on the situations in which problem-focused method is used. They indicated that youths mostly use problem-focused method when facing educational stressful condition, because they think these stresses are easier to control and on the contrary they use emotion-focused method in social stressful events because they are harder to control.

In a study by Waling and Marting (1995), it was found that people who are desperate have lower control over their physical and educational activities. They added that students who think they have higher control over the situation, can also control consequences of their performance and would use problem-solving methods for activities that are hard to learn.According to the previous studies, problem-focused coping skills are effective for instances which can be controlled; whereas, emotion-focused coping is effective for uncontrollable situations (death of a beloved one) (Dafe'e, 2010).

In the problem-focused coping skills, the person applies strategies which are as follows:

Active coping: is a process during which the person actively makes effort to change the source of psychological stress.

Planning-based coping: in this type of coping, the person relies on his though and mind evaluates different strategies to control and solve the problem and then chooses the best method to solve the problem.

Patience coping: is defined as self-restraint and avoidance from unthoughtful activities which further complicates the problem and hinders in problem-solving process.

When the person finds him incapable of solving the problem, he can easily use helps from others; depending on the need and type of the problem, this help can be received from the information via guidance and counseling services as well as attracting material or spiritual facilities from others. Coping strategies are thoughts and behaviors that are used when the person is faced with a stressful condition; while coping sources are defined as personal characteristics which exists prior to the stress, such as self-esteem, feeling of having control over the situation, cognitive styles, control source, self-efficacy and problem-solving capability (Vafa'ee, 2010). Among the important issues in this regard is the person's evaluation about his capabilities in confronting the problem. These evaluations might be based on the person's actual and real capabilities, or against his actual and real capabilities; but, the person's conception about his abilities and capabilities is the main determining factor for confronting the difficulties. If the person feels incapable, in spite of all of his skills, he will not be able to overcome the problem. The person's evaluations from his ability in confronting the problem consist of three steps, which are highly effective in formation of coping behaviors. In this step, the person evaluates the situations that predict and threaten the stress. For example, the person asks himself whether the situation is threatening or not? In this step, the person evaluates his capability in performing a task in relation to a stressful situation; the person asks himself about the possible methods he can use to solve the problem? In step 3, the person re-evaluates the situation to see if his judgement about the situation or the available resources were correct or not? Then, he modifies and reconstructs his behaviors.

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Table 1: Summary of multivariate analysis of covariance for comparison of average posttest score of state anxiety and trait anxiety with pre-test values in intervention and comparison groups

Significance level	df Error	df Hypothesis	F	Value	Test	Impact
0/01	75	2	80/20	0/91	pill's trace	
0/01	75	2	80/20	0/08	wilks'lambda	
0/01	75	2	80/20	10/46	hotelling's trace	
0/01	75	2	80/20	10/46	roy's largest root	

Table 2: Results of one-way analysis of covariance in MANCOVA context to compare posttest state and trait anxieties with those of the pre-test, between intervention and comparison groups

Significance level	F	Mean squares	Degree of freedom	Sum of squares	Dependent variable	Impact
0/01	10/72	1784/34	1	1784/34	state anxieties	group
0/01	14/07	1962/18	1	1962/18	trait anxieties	

Table 3: Results obtained from analysis of covariance to examine impact of intervention on variation of control state

Power of the test	ETA square	Significance level	Fvalue	Mean squares	Degree of freedom	Sum of squares	Variable indicator
0/99	0/47	0/01	4/57	112/14	1	112/14	Pretest
		0/01	11/15	274/62	1	274/62	Groups
				24/61	76	1870/36	Error

Table 4: Summary of results of multivariate analysis of covariance to compare average posttest state and trait anxieties with those of the pretest, among male intervention and comparison groups

Significance level	df Error	df Hypothesis	F	Value	Test	Impact
0/01	75	37	404/09	0/92	pill's trace	group
0/01	75	37	404/09	0/07	wilks'lambda	
0/01	75	37	404/09	12/32	hotelling's trace	
0/01	75	37	404/09	12/32	roy's largest root	

Table 5: Results of one way analysis of covariance in MANCOVA context to compare posttest state and trait anxiety with the pretest values, among male intervention and comparison groups

Significance level	F	Mean squares	Degree of freedom	Sum of squares	Dependent variable	Impact
0/01	8/20	276/03	1	276/03	state anxieties	group
0/01	12/92	320/12	1	320/12	trait anxieties	

Table 6: Results obtained from analysis of covariance to test impact of intervention on variation of state control among men

Power of the test	ETA square	Significance level	Fvalue	Mean squares	Degree of freedom	Sum of squares	Variable indicator
0/99	0/45	0/01	7/10	274/85	1	274/85	Pretest
		0/01	7/67	297/32	1	297/32	Groups
				38/72	47	1432/32	Error

Table 7: Summary of results of multivariate analysis of covariance to compare average posttest state and trait anxiety with the pretest values in intervention and comparison groups, among women

Significance level	error df	df Hypothesis	F	value	test	Impact
0/01	37	2	52/14	0/80	pill's trace	group
0/01	37	2	52/14	0/19	wilks'lambda	
0/01	37	2	52/14	4/19	hotelling's trace	
0/01	37	2	52/14	4/19	roy's largest root	

Table 8: Results of one way analysis of covariance in MANCOVA context to compare the posttest state and trait anxiety with the pretest values, in the female intervention and comparison groups

Significance level	F	Mean squares	Degree of freedom	Sum of squares	Dependent variable	Impact
0/01	7/21	6/19	1	145/09	state anxieties	group
0/03	4/07	9/95	1	172/14	trait anxieties	

Table 9: Results obtained from analysis of covariance to test the impact of intervention on variation of state control among women

Power of the test	ETA square	Significance level	Fvalue	Mean squares	Degree of freedom	Sum of squares	Variable indicator
0/98	0/41	0/01	5/88	184/35	1	184/35	Pretest
		0/01	6/62	207/64	1	207/64	Groups
				31/32	47	1473/54	Error

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RESEARCH ARTICLE

Trade Liberalization and Government Expenses Influence on the Growth of Agricultural Sector of Iran

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ABSTRACT

Liberalization is an undeniable trend these days which countries can not evade that. Trade liberalization policy implemented within "development programs" in Iran. The government pays a huge subsidy for consumption. In spite of government expansionary policies, it has not been affect on raisings of living standards. Although agriculture is the most important sector in Iran's economy, the research attempts to study the impact of Government expenses on the growth of agricultural sector in the process of trade liberalization. We used Solow's model that is determined for the economy of Iran with the assistance of subject literature and the anticipation is accomplished for the future with the contribution of econometric methods VECM, VAR. But we explore that: Government expenses have dual effects on the agricultural productions.

Key words: GDC, CGE, Trade Liberalization, Iran, VECM, VAR

INTRODUCTION

After war in 1989, planned and organized Efforts were formed to achieve development. In this stage the country made a great effort on putting the liberalization policies into action. In this regard, in June of 1995, Iran asked to join WTO.The accession to be delayed till in 2005and through nuclear negotiations with EU, Iran was accepted as an observer member in WTO. Iran is the biggest observer economy in the WTO. It is 204 percent bigger than the next economy, i.e. Algeria and 790 percent bigger than Syrian. (WTO, Trade Profiles 2012). Iran boasts the world's third largest petroleum reserves and the second largest gas reserves, after Russia. Iran's economic growth had decreased in recent years, because of owing to the decline in international oil prices, domestic economic

mismanagement, and limited oil revenue savings to weather the recent global economic turndown. During this period, economic growth was driven by government spending on priority sectors, expansionary monetary and fiscal economic policies, increased growth in credit, and private consumption. Economic growth is expected to pick up modestly in 2015. Iran's international relationships have faced a lot ebb and flow so that its efforts to reform its economic structures have not been welcomed internationally. This inability to succeed in agricultural sector, which enjoys a more traditional nature and on which there are more sensitive concerns, has been intensified. Agriculture sector dependency is very little that the other sectors. This situation cased that agriculture sector, as the smallest sector has an effective role in Iran's economy. It is accepted that the agricultural sector enjoys a huge portion of subsidies in Iran and the government has a major role in that sector's affairs, while actually this role is so few compared with other sectors. Although agriculture is mostly counted as undeveloped, but the reality is that it provides several opportunities to improve technology. Agriculture while preserving related importance in the economic growth, plays a significant role in countries holding medium incomes in respect with social justice and distribution of the income.

Simultaneously a great portion of the paid subsidies here goes to urban consumers not to rural producers. Liberalization is an undeniable trend these days which countries cannot evade that. It will effect on all aspects of economics in the world. In recent decades, trade liberalization policy implemented within "development programs" in Iran. The main instruments of liberalization is the elimination of trade barriers such as quota and other non-tariff barriers(NTBs) and to tariff the omitted trade barriers together with gradual reduction of the tariff and deduction of export subsidies.

The necessity of accomplishing the research

Nowadays different countries of the world are following after increasing the abilities of national economics and struggle to increase their own bulk of foreign trades, to exploit the advantages. Trade liberalization is one of the effective factors which are forcible in the foreign trade discussion and related augmentation. On one hand, the specific significance of Agricultural sector in Iran, producing different varieties of the crops and their exports; and on other hand, the better as possible interactions with the world economics and the globalization of economics reveals the necessity of pertinent transaction accomplishment.

Importance of the topic

An agricultural section has a special and important position in the economy of many countries including Iran. Particularly, in Iran, this section is one of the powerful sections of country in GDP, which about 20 % of GDP, about 3.5 percent of economy s total exports and 20 and 22.7 percent occupation and Iran's non-oil export respectively has been allocated to it. In addition, an agricultural section is supplier of a noteworthy section of employment in the country. On the other hand, this section in Iran, placed over a period of transition from traditional method to modern methods, which led to communication this section with other economic section of country. Thus, considering to the raised issues, this section by economic policymakers should be considered. But, today, one of the issues, which is considered by an economists and policymakers, is Trade Liberalization. "In general, the trade liberalization process, is obtaining the interests, resulting from the development of international exchanges. (Tayebi & Mesrinejad, 2007). Indeed, Trade liberalization through the establishment of foreign competition can lead to development of exports and improving productivity. Also through Trade liberalization, technology can be improved and achieved to the economy of scale (Mesrinejad & Ebrahimi, 2006). In addition, it should be noted that, WTO (world Trade Organization) which the large part of trade allocated to it, and many countries have been joined to this organization, or in adhering to it. Indeed, the globalization of trade is like a train that, in each time the speed will increase. Iran considering external and internal conditions is in joining to WTO.

Now considering the mentioned contents, the importance of the study of trade liberalization impacts in agricultural section productions can be realized. Because, on the one hand, liberalization of a process is inevitable and the other side, an agricultural section is very important section in Iranian economy. what should be added to above contents, is that, the mentioned relationship should be examined, in a close framework to the growth model of developing countries . Thus, in this study, the Solow's Model is used for modeling.

Fundamental aim and method of the research

The aim of this paper, is to study the impact of Trade Liberalization(TL) , Government Development Costs (GDC) and Current Government Expenses (CGE) on the growth of agricultural sector in Iran which considers about financial phenomena and liberalization due attention. Thus, in this research, Solow's model is determined for the economy of Iran with the assistance of subject literature and the anticipation is accomplished for the future with the contribution of econometric methods VECM ,VAR.

Iran's Economy

Iran's economy has been shaped by oil export. Agriculture sector, as the smallest sector, has an effective role in Iran's economy. Iran is a major world provider source of caviar and pistachio nuts. Iran's climate and terrain also support tobacco, tea, wheat and barley, among other food commodities.[13] Although the share of agriculture has decreased in recent decade, but this sector shared 13 percent of Iran's GDP about 3.5 percent of economy s total exports and 20 and 22.7 percent occupation and Iran's non-oil export respectively.[17] The government introduced some structural reforms such as tax policy changes and adoption of new foreign investment laws to promote Iran's global market integration and attract investment. Iran shifted to a unified managed float exchange rate system in March 2002 [7]. At various times previously, Iran has had different combinations of exchange rates, including official, export, parallel market, and Tehran stock market versions. The exchange rate reform is considered to enhance Iran's trading environment and public sector transparency modestly [3].

Since 2005, fiscal policy has been expansionary. The government provides extensive public subsidies on gasoline, food, and housing. In addition to subsidies, the government has provided cash handouts to the poor. Subsidies and cash handouts are considered to be un-targeted and ineffective at helping the poor.Many analysts contend that the government expansionary policies are ineffective in raisings of living standards in country and they do not give Iranians an incentive to conserve. [4].

Monetary policy also has been expansionary. The government has provided low-interest loans for agriculture, tourism, and industry and has instituted loan forgiveness policies. Other activities include the creation of a number of social programs to assist farmer and rural residents. On the other hand, many of the export agricultural products have lost their comparative advantage in the international markets. In order to find a solution for this problem, some export subsidies are paid to very limited number of agricultural commodities. But practice the government supports the export commodities in two more ways which can be known as export subsidies.[14]

Background Research

In a paper entitled "Trade Liberalization with costly adjustment" written by Alvaro Forteza[1] and et al in 2002 found that by the efficiency and the distributional effects of eliminating a tariff in a protected sector, in a Heckscher-Ohlin model of trade with costs of adjustment. The tariff can be eliminated at the onset or after a while. It is shown that while large adjustment costs reduce the efficiency gains from trade liberalization, small to moderate adjustment costs may raise the efficiency gains from a pre-announced liberalization.

Roberto Chang et al[10] (2005) in their article explained how the effect of trade openness on economic growth depends on complementary reforms and used a simple Harris-Todaro model. They find that the growth effects of openness are positive and economically significant if certain complementary reforms are undertaken.

Moreover, Susan Senior Nello[12] (2007) has elaborated the role of agriculture in determining many of the controversies and problems of the current phase of globalization. This first entails presenting key statistics indicating the main developments in world agricultural trade, illustrating how there has been a relative deterioration of the export performance of developing countries.

Besides, in another paper, published by John Romalis[5] (2007) in a study investigated the causal effect of openness to international trade on growth using tariff barriers in the United States as instruments for the openness of developing countries. It was stated that trade liberalization by a large trading partner causes an expansion in the trade of other countries. Trade expansion induced by greater market access appears to cause a quantitatively large acceleration in the growth rates of developing countries.

Sang-Wook (Stanley) Cho and Juli´an P. D´ıaz[11] in their paper discussed that the potential effects of two ongoing trade liberalization experiences: Ecuador signing a Free Trade Agreement with the United States and Slovenia joining the European Union as a full member. The paper finds that different forms of trade liberalization have different implications on the patterns of trade and welfare.

In the same way, a paper written by Xiaohe Liu[18] in 2007 .The results from this study could be of great value for policy makers to identify courses of action for enhancing the positive income distributional outcomes and reducing any unfavorable effects from further changes in trade policy.

In the same manner, Rizwana Siddiqui[9] (2007) illustrated that Pakistan is an agrarian country. A larger proportion of its exports are agro based. Higher agriculture trade is expected to contribute larger to growth of agriculture as well as non-agriculture sector due to strong linkages between agriculture and non-agriculture economies. The objective of the research is to examine the growth effects of liberalized trade.

In an article published by M. Bruna Zolin[6] (2008) explained that in the trade policy debate, the complete liberalization of world trade for agricultural products is one of the most relevant issues. The elimination of trade barriers among the EU member states has achieved European self-sufficiency in food and a strong integration in the European market.

The paper "Trade Liberalization and Agriculture: Does it Ensure Food Security and Food Sovereignty in Developing World?" published by Ataharul Huq Chowdhury[2] in 2008 declared that free trade policy promoted by WTO worldwide in developing world.

ANALYSIS

Aspect of Research Innovation

Limited researches have conducted on the effects of liberalization on agricultural productions. But, so far, Solow's model has not considered based on this analysis. It should be noted that, Solow's model is more capable in conformity with the actual situation of the developing countries economy. So, this research compared to other models can provide better results. In addition, in connection with the applied econometric techniques, should said

that, the other studies have been attempted to station the nonstationary time series of model. (Rahmati&esmaeili,2007).[8]

This difference will make that, variables not examine in level, and this makes to lose some information about long-term behavior. In some studies, a simple econometric model such as OLS has been used that require to stationary variables by taking first difference. Thus, in total, can be said: The present study in terms of modeling based on Solow's model, and also applied econometric methods VECM ,VAR, has been differentiated from done researches and this can be considered as a new work.

Stipulates of Model

As mentioned, a basis for modeling in this study is Solow's model . Hence the production function :

$$Q = AK^{\alpha}L^{\beta} \quad (1)$$

Can be said that, the research variables are, agricultural section production, Active population, Capital Stock, the government size in both developing and current section and Degree of trade freedom. It should be noted that the basic equation of Solo's model is shown following:

$$\Delta k = sy - (\delta + n)k \quad (2)$$

Where k = K / L capital per capita worker, n the population growth rate, δ the depreciation rate of capital stock, y production's per capita labor , and s is the amount of savings in each period.

Government Expenses

Government expenditures will generally place in the fields of developing and Current (GDC&CGE) Ratio of developing and current costs of government to GDP, both have been other explanatory variables which have been entered into the model.On the other hand, the current budget can show its inflationary effects, and thus, affects on the production of agriculture. Developing budget by directing towards the infrastructure of agricultural section in the development of transport can help to the production growth of agricultural section.

Trade Liberalization (TL)

As described earlier, trade liberalization is an inevitable process and is effective on production growth of various economic sections, including the agricultural section. In fact, by entering this variable, are following to find a solution for a basic question in this research, namely, how the impacts of trade liberalization in agricultural sections products. Indeed, it should be examined, whether, liberalization is more in favor of agricultural product's import or in favor of agricultural product's export in Iran? It should be noted that, the replaced variable of Trade liberalization, is the degree of commercial freedom, which based on definition include: the ratio of total export and import to GDP.

Time series of all variables has been annual form in (1984-2008) period and has been extracted from central bank internet base. All variables, in the form of logarithm have been entered to model. For preventing from false regression unit root test has been done for variables of model. According to results of these tests ,all variables of model are in a stationary first degree. Means that, by making difference, it has not unit root and are stationed.

As mentioned earlier, the VAR approach will be used to analyze the relationship Trade Liberalization on agricultural section production.

Furthermore, in these models, explanatory variables exhibiting strong multicollinearity with each other, and so, T statistic relating to individual coefficients, does not count as a reliable tool for deletion or reducing variables.(ENDERS, 2004, P.270).

It should be noted that, in this research to determine the optimal interruption length**,** AIC and FPE has been used. According to these two Tests ,model should be possessed two interrupt. Considering the number of optimal interruption, VAR model is estimated as follows:

$$\log AGRI = -1.054 + 0.062\log AGRI(-1) - 0.077\log AGRI(-2) + 00.097\log GDC(-1)$$
$$+ 0.04\log GDC(-2) + 3.693\log AP(-1) - 2.412\log AP(-2) - 0.166\log CGE(-1) - 0.243\log CGE(-2)$$
$$+ 0.005\log TL(-1) + 0.004\log TL(-2) - 0.727\log K(-1) + 0.656\log K(-2)$$

The effect of Shock on the variable of added value of agricultural sector on each of variables AGRI ,GDC , CGE , TL Using Impulse response function .

By using VAR estimation ,can be gained the Impulse response function , in the form of following diagrams and tackles to description each of them. Note that can be seen in the Impulse response function graphs, shows Variance **Decomposition numerically, based on Cholesky (d.f. adjusted) One S.D. Innovations .**

The Effect of an incoming shock logAGRI variable on LogTL

If a shock, enter in the logAGRI variable, according to following shape , its effect were positive and its effect in the first period is about 0%. The effect of this shock is increased about 0.01% at the third periods. In other words, Trade liberalization in the early period possess negligible effect on the agricultural growth section . The effect of this shock at the third period until the tenth period is very negligible and zero.(0.002%)

The Effect of an incoming shock logAGRI variable on LogGDC

If a shock, enter in the logAGRI variable, according to following shape and table A10 appendix , its effect were positive and remains until three periods. So that, its effect in the first period is about 0% and in the second period is about 0.012% and in the third period, will be about 0.010% . And for the fourth period later in the effect became negative and this effect remains negative one percent.

The Effect of an incoming shock logAGRI variable on LogCGE

If a shock, enter in the logAGRI variable, according to following shape and table A10 appendix , its effect were negative .So that, its effect in the first period is about 0% and in the second period is about -(0.012%) and in the third period, will be about –(0.014%) and until the end of the tenth period has negative value and approximately fixed equal to 1%.

Vector Error Correction Model (VECM)

The concept of error correction mechanisms, first, has been used by Phillips in 1957. In his interpretation, the Error correction model is method of adjusting policy tool, in order to approaching target variable to its desirable amount. In other words, these models can determine the method of adjusting control variable with regard to error deviation or imbalance in situation's variable. The last interpretation of ECM, by Granger and colleagues is presented based on accumulation's analysis. ECM, shows the adjusting system variables, in the short term (relating to imbalance) for achieving long-term equilibrium relationship. Indeed, if no mechanism are there, that variables with regard to imbalance (deviation from long-term balance relationship) be adjusted, such relationship in long-term doesn't establish between variables, so, integration needs ECM.

Indeed ,VECM model is a VAR model with restriction. These restrictions, in fact are phrase relating to the long-term relationship of Johnson.

For analyzing long-term impacts of present variables in model, one Vector Error Correction Model (VECM) for this economic model has been estimated, to support, the impacts of variables in short-term and long-term are compared . Based on the obtained results of Test of Number of Cointegrating Relations, the numbers of 2 to 3 co integrated vector are confirmed for VECM model. So we can say that at least one co integrated vector is used in the estimation of the VECM model.

consequently, the VECM model is estimated, that the estimation's results based are as follows:

$$\log AGRI = 0.321\log GDC + 1.189\log AP - 0.564\log CGE - 0.029\log TL + 0.352\log K$$

(13.8) (14.14) (18.21) (6.63) (7.13)

RESULTS

In this section the results of long-term estimation and error correction relationships, that respectively, has been analyzed.

Trade Liberalization

The results of long-term analysis can be indicative of negative and also the less effects in trade liberalization on agricultural section production. It can be said clearly: The institute of agriculture doesn't influence Iran's trade balance, therefore, the liberalization effects in negative form affect on the agricultural products. In other words, Trade Liberalization has been more beneficial to agricultural product's import; consequently, this situation in the long run will undermine the agricultural section.

Current government expenses

The current government budget is more related to urban areas because much of it actually being spent on salaries and expenses of personnel and equipment. On the other hand, increased current government budget, in Iran, is inflationary, thus, practically, increased current expenses will cause negative impact on agriculture.

Government development Costs

Government development costs possess positive impact on the added value of agriculture section. It Seems that, government expenditures in the field of enjoying agricultural section and also investment on the mechanization of agricultural living and also the development of communication ways, infrastructure, and also to facilitate irrigation and ... will lead to increased agricultural production in the long run. It should be noted that, all values coefficient at 99%level has been meaningful.

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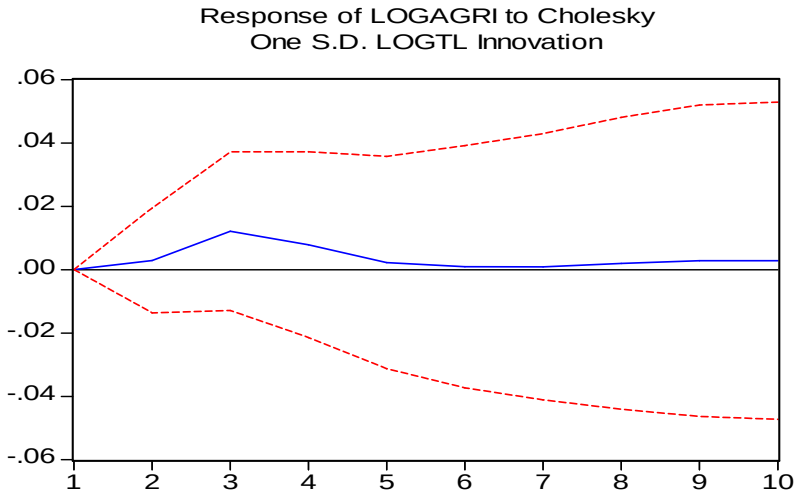

Figure: 1

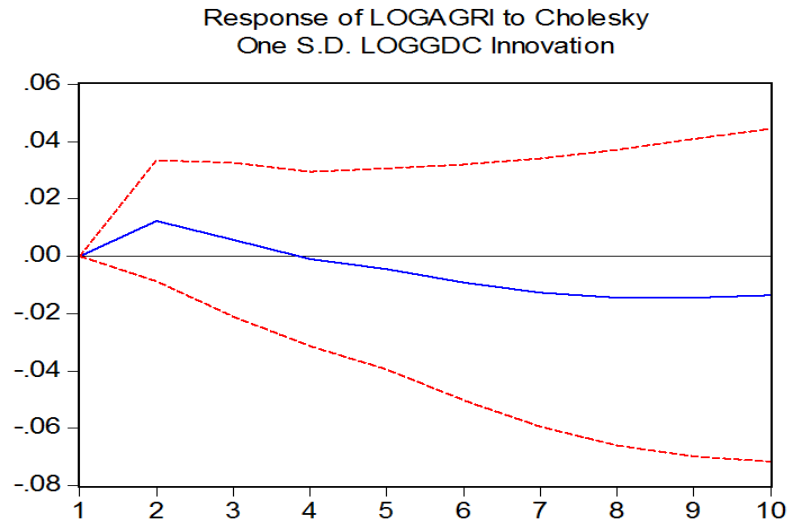

Figure: 2

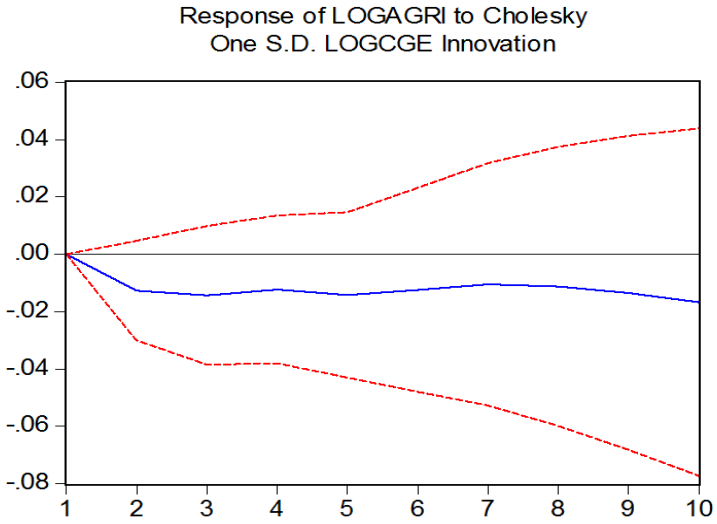

Figure: 3

Table: 1

Dependent Variable	CointEq1	D(LOGGDC)	D(LOGAP)	D(LOGCGE)	D(LOGTL)	D(LOGK)
D(LOGAGRI)	-0.700	1.290	0.031	0.098	-20.890	0.167
Se	0.158	1.098	0.054	0.541	5.300	0.101
t	[-4.432]	[1.175]	[0.568]	[0.182]	[-3.941]	[1.646]

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RESEARCH ARTICLE

Examination of the Effect of Various Diets on some Growth Indexes and the Resistance Percentage in Piranha Fish (*Pygocentrus nattereri*)

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ABSTRACT

Many various factors affect the growth of fishes. In this case, the type of the consumed food is no doubt one of the most influential factors. In this study the effect of 17 different diets was studied on indexes of mean weight of fish, percentage of weight growth, percentage of specific growth, extent of consumed food and the rate of survival of Piranha fish in a 12-week period in a completely random trial. Each treatment had 3 repetitions, for this, we used aquarium with the same dimensions. All variables were designed the same for all treatments. Results showed that the type of the diet has a considerable effect on the indexes of mean weight, percentage of weight growth, percentage of specific growth, extent of consumed food and the percentage of survival, and the maximum of these parameters was found in live worm treatment (100%) and the minimum was related to the cow manure nutritious treatment (100%).

Key words: Piranha, food diet, live worm, cow manure.

INTRODUCTION

Nutrition is a key and vital point in rearing, care and multiplication of aquatics, and annually wide studies are done by the experts in fishery and followed by that many scientific solutions are provided for the workers in the growing and rearing aquatics industry. Now many of these studies are done regarding the replacement of herbal food with an expensive animal food. As you know, there are many foods in the market today that are not cost-worthy regarding the protein percentage and added materials, and this has revealed itself in the aquarium grown fishes industry in a considerable way.

The long term constancy of water environment is threatened by its over-dependence on fish food and fish oil (FAO, 2002), one of the most costly food sources for fish is no doubt the protein. (Lovell, 2002). Thus, during the last decade

many efforts were made to evaluate the potential of the substitute sources for fish nutrition. Today many studies are done for replacing the fish food by herbal materials in the diets, but the possible use of alga as diet is incorrect. (Valente 2006; wahbeh, 1997-davies 1997; elsayed, 1999).

Sea alga has many proteins and is considered as a diet with hidden benefits. Abdolghobadian et al (2010) reported in investigating the effect of food diets on specific growth indexes and percentage of weight growth of the baby of angelfish, the use of blood dry worm diet instead of peeled cysts. Including 5% of Ulva spp to the diet of the baby snake-head fishes had the increase of growth rate and food consumption. (hashim, 1992). Studies showed that use of Gracilaria cornea in the diet should be decreased by 5%. (Valente, 2006). Including high levels of 16% and 32% Porphrra purpurea as the constituting factor of the diet of Chelon labrsus caused the stoppage of growth and less consumption of food. (davis, 1997).

Gracilaria cornea is a protein source belonging to red alga species. These have A and B chlorophyll. The Gracilaria type is a sea type and has 4 varieties. Its living place in Iran is Bandarabbas, Bandarlange, Gheshm, Hormoz Island and Boshehr. The alga tested in this study as the protein source substituted for the growth of piranha fish belongs to green alga. Ulva rigida has a dark green color with a certain maintaining base, inside rigid leaves with a break in frizzy wings, wavy tail margins, height of tail with 7-10 cm. these alga are sea-living and are found in shores of Iran as well.

The Ulva rigida for this test was prepared from the shores of big sea of Chabahar. The herbal materials due to having protein and being cheap and accessible have attracted wide attention as a substitute for animal proteins as the food source of aquatics. In this study, the food source of lettuce was also used.

Lettuce with scientific name of Lactuca sativa is form the family of one-year Asteracea. Historical evidence shows that lettuce was planted 4500 years BC in Egypt and was used as food for the herds and also oil extraction from seeds. In 100g of lettuce, there is 1.5g protein, 1g mineral agents and 9% mg karoein. (vogel, 1996). It also has abundant phosphate, iron, sodium and calcium. (nonnecke, 1989).

The earthworm tested is from type of Eisenia foetida that is known in Farsi as rain red earthworm and internationally as red worm California. This worm with weekly reproduction and 70% proteins compared with red meat, 3 times more and also omega 3 is one of the rare creatures of god regarding nutritious value. As said, due to having 70% protein as human protein, regarding the culture of many countries is used for food, and also regarding overpopulation and need for healthy protein food in the growing of herds, birds and fishery, has a main role in providing the needs of humans and strengthening the economic capacity of producers. In a way that the feeding of the ranch, birds and aquatics with this worm, due to having high proteins, increases the quality of products and increases need for import of complimentary food, and earth worm can be considered a source of animal protein.

Earthworm eats more than its weight daily and changes 60 to 90% of that to excreta known as compost worm muck, that increases the quality and quantity of agricultural products comparing with chemical muck.

Piranha fish with scientific name of *Pygocentrus nattereri* belongs to family of karesins that live mainly in Amazon River. Piranha is one of the most dangerous meat-eating fish in the world that has various types. One is red-belly that we used in this study, has a less combative degree, and only attacks the wounded or dead fish. However, it needs to be mentioned that it also attacks aquarium fish as well. Piranha is an insatiable fish that uses most of the food in aquarium and so, has a considerable growth compared with others. The most common diseases of this fish are mildew and protrusion of eyes. Although it uses plant foods as well, but is mainly carnivore and the best for it is protein foods, and the growth of the fish with this food is evident from the first week.

This study was done with the aim of comparing the various treatments in form of different food diets for determining the proper substitute for the growth of Piranha fish.

MATERIALS AND METHODS

This study was done in a workshop with 70m space at the Azad University of Bam in 2013. In this study 17 treatments were examined with 3 repetitions in a completely random trial and each aquarium was a test unit with same dimensions with 12 Piranha fish with same primary weight and all the variables were the same conditions in all experimental units with the goal of studying the different diets on some growth indexes of Piranha fish including: mean weight, percentage of weight growth, percentage of specific growth and extent of consumed food during 12 weeks. The treatments were:

T_1: live worm (100%)
T_2: dry worm (100%)
T_3: Gracilaria worm (20-80%)
T_4: Gracilaria worm- lettuce (4-18-78%)
T_5: Gracilaria worm (30-70%)
T_6: Gracilaria worm- lettuce (25-25-50%)
T_7: Gracilaria worm lettuce (20-20-60%)
T_8: worm- lettuce (30-70%)
T_9: worm- Ulva- Gracilaria (25-25-50%)
T_{10}: Gracilaria (100%)
T_{11}: worm- Gracilaria- lettuce- Ulva (40-20-20-20%)
T_{12}: lettuce (100%)
T_{13}: Gracilaria- Ulva (50-50%)
T_{14}: Ulva (100%)
T_{15}: processed cow manure (100%)
T_{16}: fish excreta (100%)
T_{17}: cow manure (100%)

Those were fed to fish twice a day. The required alga types were gathered from the living place of species before the sunset or sunrise at places where sea root was most. Piranha fish with the same length and width were purchased in Tehran.

For The treatments of t_2 to t_{14} , first the composing materials were dried and grinded and then by digital balance regarding the required proportions, were completely mixed and for preparing of a pallet of each one, the pallet making device from the herbal production Bam Adonis company was used. In t_{15} to t_{16} treatments, cow manure and fish excreta were placed in especial baskets exposed to the worms for 2 weeks and the obtained excreta was used as the experimental treatment. The method and extent of feeding the fish was in this way that beforehand all fish were rated from mean weight by a digital balance with two digits decimal as the primary weight was registered (all had the same weight at first of the experiment). For calculation of the given food to the fish, 2% of their primary mean weight was fed to them in two intervals in the morning and afternoon, and after 30 minutes the extra food was collected from the water surface or bottom of aquarium depending on the food, and the food amount to each was then based on the weight increase of the fishes, in this way that 2% of the mean weight of the fish in each aquarium was multiplied in 12 and then fed to them. (in case of deaths, the number would be reduced). For measuring the fishes weight a digital balance and for the length and width of the fishes a colis was used, and the number of the victims in each treatment was registered during the experiment. The formulas that were used regarding growth increase or growth evaluation are as following:

(Growth rate) = *100

final weight –primary weight/primary weight

Specific Growth Rate(SGR) =*100

Ln (^{final} weight) –Ln (primary weight)/period of the experiment

Survival percentage= number of fish at end of the period/number of fish at start of the period*100

Statistical analysis of the data

For analysis of the data between various diet treatments on the growth of the fish, the MASTAT-C software, and for the examination of the means in diet treatments, Duncan test at 1% possibility was used. The diagrams were designed by Excel.

RESULTS

The results of the variance analysis table showed the effect of various treatments on some indexes of the growth of Piranha fish and all the variables studied were significant at 1% statistical level. The mean weight in t_1 treatment (live worm 100%) was the best diet treatment for growth of piranha among all used treatments, and by mean fish weight of 12.04 had a significant difference with other diet treatments, and from t_1 to t_{17} the decreasing trend of growth with decrease of mean weight was observed. The t_{15}, t_{16}, t_{17} treatments were all in the same statistical group and had the least mean weight. T_{10} treatment (gracilaria 100%) had a higher weight growth compared with lettuce treatment and Ulva treatment (100%). It was found that Gracilaria was probably tastier than lettuce, and lettuce was better than Ulva alga, and in treatments with Gracilaria and worm, a relatively better growth was seen. (table 1 and diagram 1).

The percentage of weight gain

The results of the variance analysis table showed that various diet treatments were significant in the growth indexes of weight gain percentage at 1% statistical level and there was a significant difference between all treatments from t_1 to t_{17}, in a way that the highest weight gain percentage was for t_1 treatment (live worm 100%) with a mean of 639.26% and t_{15}, t_{16}, t_{17} treatments with the least weight gain percentage were placed in the same group, and were not introduced as proper treatments for weight gain percentage for Piranha fish. (table 1 and diagram 2).

Specific growth rate percentage

The results of the variance analysis table show that the comparison of the specific growth rate in all diet treatments was significant at 1%, and the best diet for this rate was seen for the t_1 treatment (live worm 100%) with a mean of 7.23% and Gracilaria 100% treatment with t_{12} treatment (lettuce 100%) in this index showed the same statistical conditions, and the least specific growth rate was observed in cow manure (100%) in t_{17} treatment. (table 1 and diagram 3).

Food consumption

The dietary indexes of various diets in this test showed that this parameter was significant at 1% statistical level and the most food consumption was observed in t_1, t_2, t_3, t_4, t_5 treatments. Regarding the decrease of the fish weight and the number of dead in these treatments, we also observed the diet change of decrease of food consumption. (table 1 and diagram 4).

Survival percentage in various treatments

The most survival percentage and resistance was seen in treatments that there was a proper diet for Piranha fish and the least is seen in t_{17} (cow manure 100%) treatment, also, t_{15} and t_{16} treatments (processed cow manure) and (fish excreta) didn't show a proper survival rate, which shows the less growth of fishes and improper food and less resistance.

DISCUSSION

The results found in this study showed that the type of food diet is effective on indexes of mean weight, increase percentage, survival percentage and food consumption. The highest indexes seen were related to t_1 treatment of live worm and the least related to cow manure, t_{17}, and the survival percentage in this treatment was also 100% and the highest consumed food was seen in the live worm treatment. Sorgeloos et al (1991) also reported the weight gain and specific growth rate of angelfish with bloodworm treatment. Ina addition, Carolina and Watanabe (2000) reported the consumption of live food as the positive factor of increase of growth and weight of the fish.

100% resistance of Piranha fish and the increase of growth indexes showed that using live worm causes increase of growth and complete consumption of food, which shows a proper meal for this fish. Nutrition by live worm due to high proteins causes increase of energy. Thus, resistance to disease will also increase which causes survival and resistance of 100%. Among treatments of Gracilaria (100%), lettuce (100%), Ulva (100%), Gracilaris (100%) and diets containing that were found generally a better treatment for the increase of growth rates in Piranha fish. this alga has a higher rate of carbohydrate compared with Ulva rigida, and propabbly this causes the more growth of this fish compared with diets of Ulva and lettuce. In mixing treatments where lettuce and Ulva were along the worm diet, the reason of growth was due to worm and Gracilaria and generally we can't regard Gracilaria as a herbal protein source as substitute of animal protein on the growth of aquatics including Piranha fish, while sea alga are the color making agents in fishes. The treatments which showed the highest death rates and decrease of food consumption are not advised for diet of aquatics including Piranha fish. The reason of growth decrease is the lack of tastiness of these foods compared with other food diets which cause weakening of the fish and non- resistance to diseases, and the reason of many deaths in these treatments is improper diet and indigestion of food and probably the attack of stronger fish in aquarium to the weaker ones, which is he quality of Piranha fish and causes more deaths. Regarding these results we can say live worm can be a proper food for growth of Piranha, and alga such as Gracilaria, lettuce and Ulva can be replacements for animal protein, but have less growth comparing animal protein sources, and higher resistance in diets containing Gracilaria is because of carbohydrates. (azami, 2009). It can be used for inducing color and beauty in decorating fish, and also the idea of using cow manure and fish excreta was introduced as improper diets for Piranha fish.

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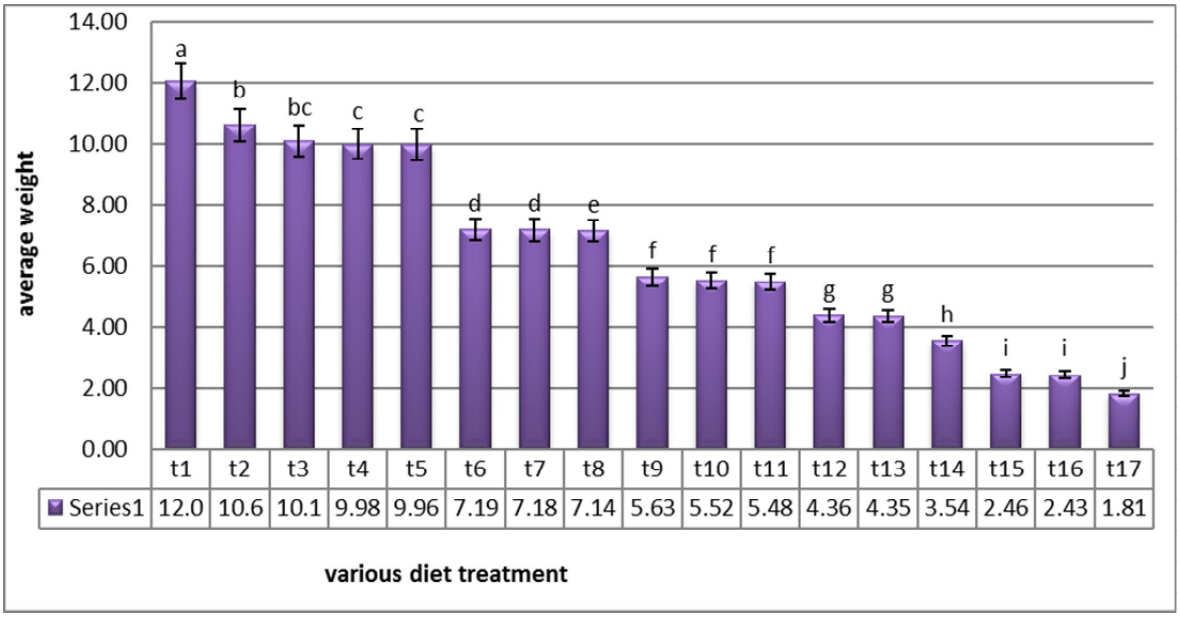

Diagram 1: Effects of various diet treatments on average weight of Piranha

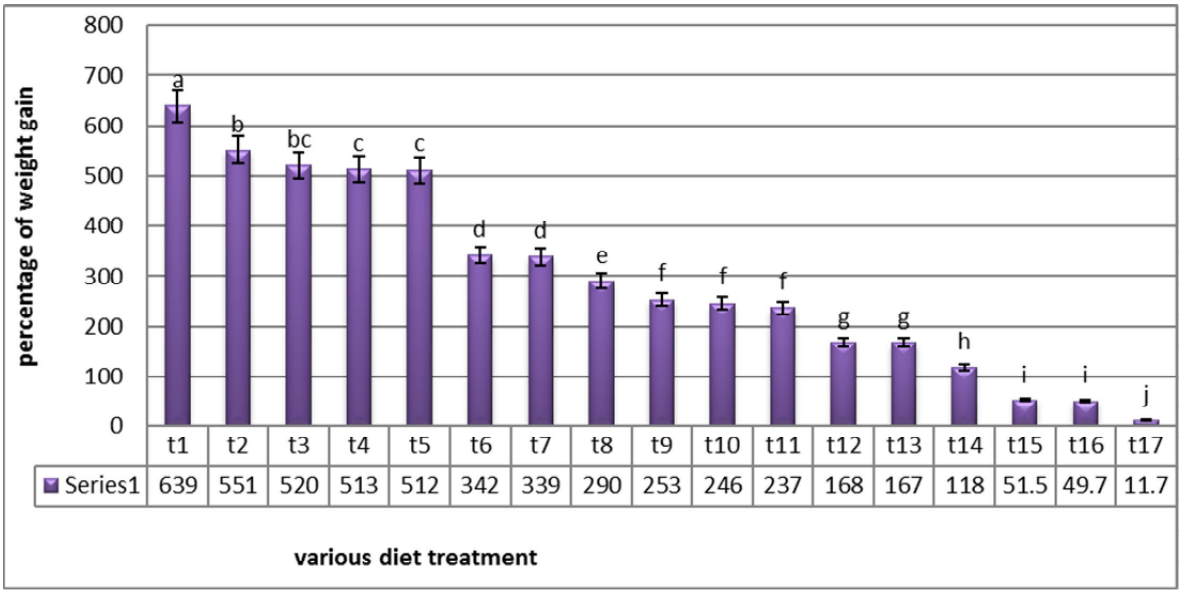

Diagram 2: Effects of various diet treatments on percentage of weight gain

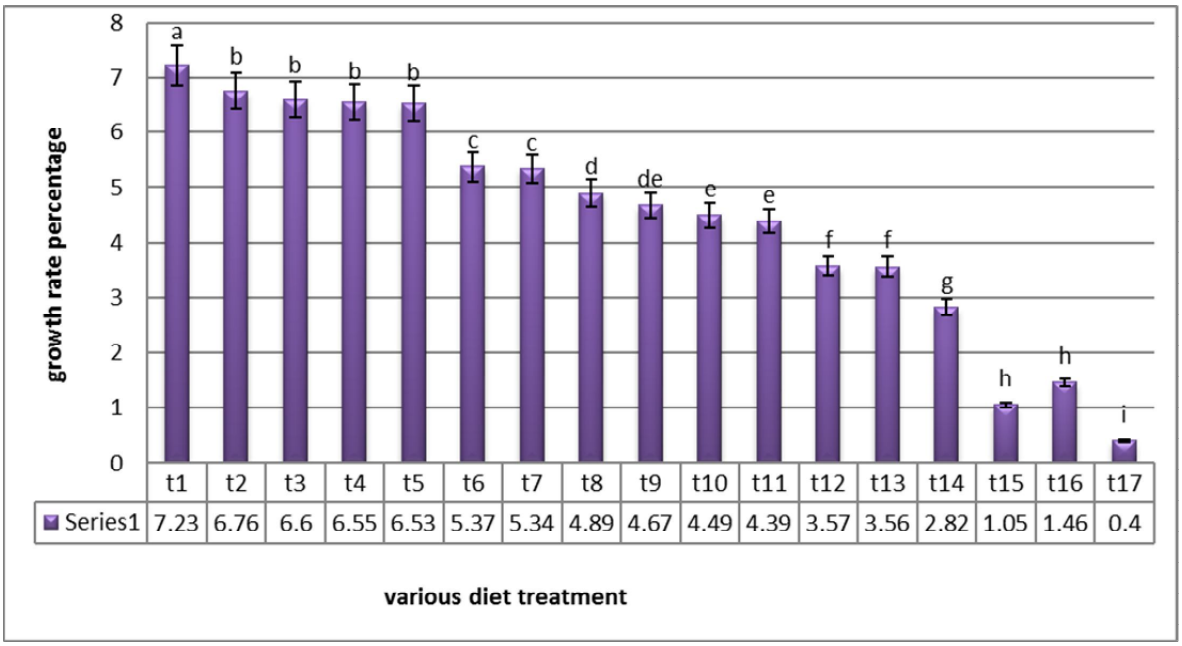

Diagram 3: Effects of various diet treatments on growth rate percentage

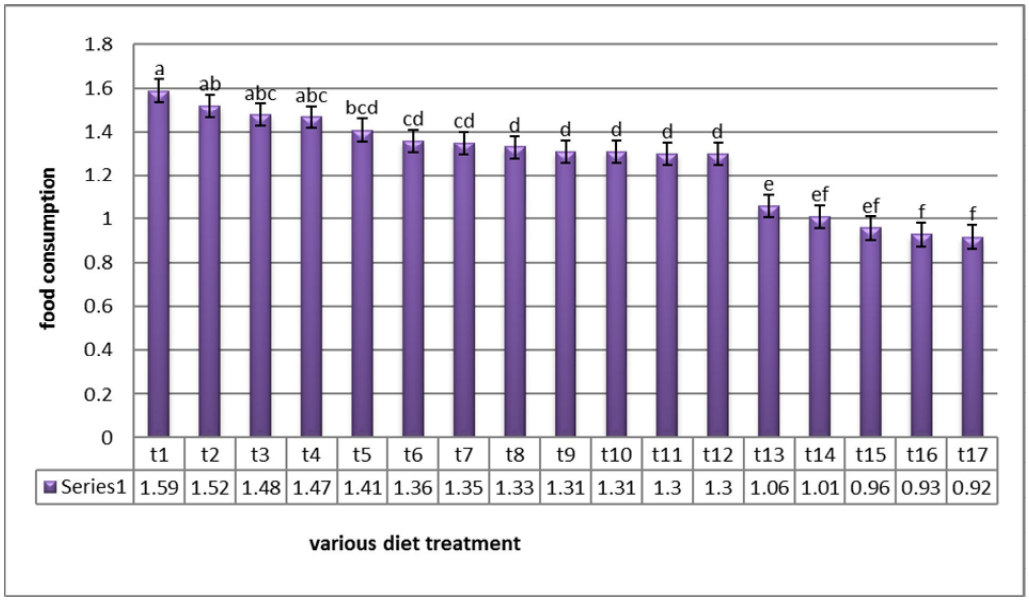

Diagram 4: Effects of various diet treatments on food consumption

Table 1: Variance analysis of various treatments on some growth indexes of fish

Mean squares					
Consumed food	**Specific growth rate**	**Weight gain percentage**	**Mean weight of fish**	**Degree of freedom**	**Sources of change**
0/14**	**13/36****	**120506/50****	**32/01****	**15**	treatment
0/04	**0/002**	**6/40**	**0/001**	**2**	repetition
0/005	**0/04**	**471/42**	**0/12**	**33**	error
5/73	**4/53**	**7/31**	**5/47**		(cv) Change rate
significant at 1% possibility leve **					

Table 2: Survival rate in various treatments

t_{17}	t_{16}	t_{15}	t_{14}	t_{13}	t_{12}	t_{11}	t_{10}	t_9	t_8	t_7	t_6	t_5	t_4	t_3	t_2	t_1
22 %	44 %	50 %	66/6 %	97/22 %	97/22 %	97/22 %	100 %	97/22 %	100 %	100 %	97/22 %	100 %	100 %	100 %	100 %	100 %

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RESEARCH ARTICLE

The Acronictinae of Iran (Lepidoptera:Noctuidae)

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ABSTRACT

A list of Iranian Acronictinae HEINEMANN, 1859 species is provided based on available literature since the begining of the twenteth century. This paper contains a checklist of 23 species and subspecies of subfamily Acronictinae, distributed in different province of Iran. Also, new faunal are mentioned.

Key words: Acronictinae, species, Noctuidae

INTRODUCTION

Species of the subfamily Acronictinae are mainly medium sized, ground-coloured with grey dark-ened wings with luscious and black maculae. Worldwide approximately 400 Acronictinae species areknown (SPEIDEL et al., 1996).Only one species, the polyphagous Acronicta rumicis (Linnaeus, 1758), is a known pest, damaging occasion-ally nurseries of fruit-trees and roses The larvae often feed on shrubs and plants such as Populus, Platana. This paper contain a checklist of 23 species and subspecies of subfamily Acronictinae , distributed in different province of Iran. Original combination type locality and synonymy are given.

MATERIALS AND METHODS

Adult moths were collected using light traps in different locatins of 4 provinces; Kerman, Sistan va Balouchestan, Hormozgan and Fars. Genitalia were dissected and erected following Fibiger`s method (Fibiger, 1997) with a little changes. The genitalia and abdomen then were mounted using either Canada balsam or Euparal.

Checklist

Subfamily ACRONICTINAE HEINEMANN, 1859
Genus: Moma Hubner, [1820]
Type species: Phalaena alpium Osbeck, 1778.

Moma alpium (Osbeck, 1778)
Phalaena alpium Osbeck, 1778, Gotheborg Samhalle Handl 1: 52. L. t.: Sweden.
Distribution: North of Iran (Hacker 1990)

Genus: Acronicta Ochsenheimer, 1816
Type species: Phalaena Noctua leporina Linnaeus, 1758.
Acronicta tridens ([Denis & Schiffermuller], 1775)
Noctua tridens [Denis & Schiffermuller], 1775, Ank. Eines. Syst. Werkes von den Schmett der Wienergegend: 67. L. t.: Austria.
Distribution: North of Iran (Hacker 1990).

Acronicta psi (Linnaeus, 1758)
Phalaena Noctua psi Linnaeus, 1758, Syst. Nat. (Edn) 1: 514. L. t.: Europe.
Distribution: North of Iran (Hacker 1990).

Acronicta psi tehrana Wiltshire, 1946
Acronicta psi tehrana Wiltshire, 1946, Entomologist`s Rec. J. Var. 58: 30. L. t.: Iran, Tehran.
Distribution: Tehran (Wiltshire, 1946)

Acronicta soleimana Draudt, 1938
Acronicta psi soleimana Draudt, 1938, Mitt. Munch. Ent. Ges. 28: 29. L. t.: Iran, Elburz Mountains.
Distribution: Elburz Mountains (Draudt, 1938)

Acronicta aceris (Linnaeus, 1758)
Phalaena Noctua aceris Linnaeus, 1758, Syst. Nat. (Edn 10) 1: 514. L. t.: Europe.
[Synonymys: infuscata Haworth, 1809; var. judaea Staudinger, 1901; var.? taurica Staudinger, 1901; calceara Dannehl, 1929]
Distribution: North and Sowthwest of Iran (Hacker 1990).

Acronicta elaeagni Alpheraky, 1887
Acronicta elaeagni Alpheraky, 1887, Stett. Ent. Z. 48: 167. L. t.: Turkistan.
Distribution: Northeast of Iran (Hacker 1990).

Acronicta pasiphae Draudt, 1936
Acronicta pasiphae Draudt, 1936, Ent. Rdsch. 53: 457. L. t.: Turkey.
Distribution: South of Iran (Ebert and Hacler 2002)

Acronicta megacephala ([Denis & Schiffermuller], 1775)
Noctua megacephala [Denis & Schiffermuller], 1777, Ank. Eines. Syst. Werkes von den Schmett der Wienergegend: 67. L. t.: Austria.
[Synonymys: warpachowskii Krulikowsky, 1908; ankarensis Hering, 1933]
Distribution: Fars (Ebert and Hacler 2002).

Acronicta centralis Ershov, 1874
Acronicta centralis Ershov, 1874, In: Fedtschenko Reise in Turkestan: 37. L. t.: Samarkand.
[Synonymy: ab. persiaca Strand, 1915]
Distribution: North of Iran (Ebert and Hacler 2002).

Acronicta euphorbiae ([Denis & Schiffermuller], 1775)
Noctua euphorbiae [Denis & Schiffermuller], 1777, Ank. Eines. Syst. Werkes von den Schmett der Wienergegend: 67. L. t.: Austria.
[Synonymys: euphrasiae Brahm, 1791; montivaga Guenee, 1852; f. ottomana Draudt, 1931; garbowskii Wojtusiak & Niesiolowski, 1946]
Distribution: North of Iran

Acronicta orientalis Mann, 1862
Acronicta orientalis Mann, 1862, Wien Ent. Monatschrift 6: 370. L. t.: Turkey.
[Synonymy: var. galvagnii Schawerda, 1916]
Distibution: Fars (Ebert and Hacler 2002).

Acronicta saadi Brandt, 1938
Acronicta saadi Brandt, 1938, Ent. Rdsch. 55: 498. L. t.: Iran, Fars.
Distribution: Fars (Brandt, 1938)

Acronicta rumicis (Linnaeus, 1758)
Phalaena Noctua rumicis Linnaeus, 1758, Syst. Nat. (Edn 10) 1: 516. L. t.: Europe.
Distribution: Mazandaran (Ebert and Hacler 2002).

Genus: Carniophora Snellen, 1867
Type species: Noctua ligustri [Denis & Schiffermuller], 1775.

Carniophora ligustri ([Denis & Schiffermuller], 1775)
Noctua ligustri [Denis & Schiffermuller], 1775, Ank. Eines. Syst. Werkes von den Schmett der Wienergegend: 70. L. t.: Austria.
Distribution: North of Iran.

Carniophora ligustri hyrcanica Hacker & Ebert, 2002
Carniophora ligustri hyrcanica Hacker & Ebert, 2002, Esperiana 9: 256. L. T.: Iran.
Distribution: Mazandaran (Hacker & Ebert, 2002)

Carniophora pontica (Staudinger, 1879)
Acronycta pontica Staudinger, 1879, Horae Soc. Ent. Ross. 14: 364. L. t.: Turkey.
Distribution: Fars (Hacker & Ebert, 2002)

Carniophora fasciata (Moore, 1884)
Acronycta fasciata Moore, 1884, Lep. Ceylon 3: 5. L. t.: Ceylon.
[Synonymy: divisa Moore, 1885]
Distribution: South of Iran.

Genus: Simyra Ochsenheimer, 1816
Type species: Noctua nervosa [Denis & Schiffermuller], 1775.

Simyra nervosa expressa Bang-Haas, 1912
Simyra nervosa var. expressa Bang-Haas, 1912, Dt. Ent. Iris 26: 139. L. t.: Austria.
Distribution: South of Iran.

Simyra nervosa lactea Hacker & Kautt, 1999
Simyra nervosa lactea Hacker, 1999, Esperiana 7: 429. L. t.: Iran, Fars.
Distribution: Fars (Hacker & Kautt, 1999) Esfahan, Sistan va Balouchestan.

Simyra albovenosa (Goeze, 1781)
Phalaena Noctua albo-venosa Goeze, 1781, Ent. Beytrage zu des Ritter Linne' zwolften Ausgabe des Naturesystems 3(3):251. L. t.: not given.
[Synonymys: venosa Borkhausen, 1792; atomima Haworth, 1809; var. centripuncta Herrich-Schaffer, [1856]]
Distribution: North of Iran.

Simyra albovenosa cretacea (F. Wagner, 1929)
Arsilonche albovenosa cretacea F. Wagner, 1929, Mitt. Munch. Ent. Ges. 19: 68. L. t.: Turkey.
Distribution: Gilan (Ebert and Hacler 2002).

Simyra dentinosa Freyer, 1839
Simyra dentinosa Freyer, 1839, Neuere Beitr. Schmett. 3: 97. L. t.: Turkey.
[Synonymys: leucaspis Fischer de Waldheim, 1840; zeliha Kornosor & Lodl, 1990]
Distribution: Mazandaran, Tehran, Kerman, Sistan va Balouchestan (Hacker & Ebert, 2002)

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RESEARCH ARTICLE

Effectiveness of Human and Conceptual – Technical Skills of Managers on Conflict Management for Government Organizations

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ABSTRACT

The purpose of this study is to determine the relationship of triple management skills with the level of organizational conflicts in government organizations. This study is a descriptive- correlative research that examines the relationship between organizational conflicts among staff with management skills. The statistical sample is all state employees of State Tax Organization in Qom in 1392. Two questionnaires, one to assess technical skills and the other to assess human and perceptual skills were used to collect data. Cronbach's alpha coefficient was equal to 70/0 and retest coefficient was 49/0, which represents a scale internal consistency and stability of it. In conflict management questionnaire with five subscales (competition, cooperation, avoidance, compromise, forgiveness), The reliability and validity were (82/0 and 88/0) respectively. To test hypotheses, initially, we test the variance by multiple regression analysis to observe the presence or absence of regression model within variables in relation to conflicting organizational aspects Then we determine the regression model for each skill with stepwise regression method. The obtained coefficient for each model represents the percentage of effectiveness on variance changes. The results of this test indicates that there is a significant relationship between management skills and resolving conflicts in the organization and also that human skills of managers is crucially important.

Key words: technical skills, human and conceptual skills, organizational conflicts

INTRODUCTION

State Tax organization is a significant organization, because it is no secret that it is one of the most important sources of national income to provide financial sources and also it can form an economy free from oil income. Moreover, a glance at tax systems in other countries indicates that the most important factor in collecting taxes is human resources not technology or capital equipment, and they cannot replace the human resources but only can support it and make it more effective. (Matin, 1382),

The various human characteristics, needs, beliefs, expectations and perceptions, make conflicts inevitable in organizations. People have different communication methods, ambitions, political and religious views, and cultural background. In different societies such differences lead to conflicts between individuals and groups (Owens, 2007)

Theoretical framework

Conflict is a process in which one side feels that the other side is an obstacle for him to reach his interests. Conrad and Scott (Conrad and Scott, 2002: 134) believe that conflict is the interaction between connecting people who are related to each other, feeling opposite or inconsistent interests. According to Gray and colleagues (Gray, Coleman and Putnam, 2007: 1417)

Conflict is incompatible perceptual activities (goals, values, ideas, beliefs, desires, emotions, etc.), causing interference, damage and injury. According to Robbins definition, conflict is a process in which a conscious attempt is done by "A" to neutralize the results of "B" attempts, so "B" fail to reach his target or "A" increases on his interest rate (Robbins , 2006: 289). Daft also believes that conflict between groups of organizational behavior is that they assume that the other groups are prevented them to reach their goals and purpose. (Daft, 2007: 826)

There is no conflict by itself, but some causes arises them

Individual conflicts (individual differences): the initial origin of the conflicts are individual and personal differences. A conflict can be due to different behavioral and moral characteristics, and value systems of people. Factors such as education, work history, experience and training of each person forms a unique personality and set of values, that distinguishes him from the others.

Structural conflicts: Structural conflicts cause inconsistency in the units of organizations. This conflict occurs when there is no agreement on organizational objectives, decisions, criteria, resources, regulations and rules, and methods. These factors can cause conflicts in organizations; for example, if an organization aims to choose incompatible objectives, People do not know in which direction or goal steps.

Communication conflict: communication conflicts are disagreements that are related to complicated semantics, lack of understanding of messages and differences in communication channels. Intrapersonal conflicts usually are the result of weak relationship but interpersonal conflicts are the result of differences in expectations of organizational roles, characteristics and value systems and are the result of expanding ineffective and insincere relations. (Stephen Robbins, 1385)

Conflict Management Styles

Kenneth Thomas presents five main styles for conflict management: competitive style, Accommodative, compromise, Collaborative and avoidance (Cann, 2008: 133). Each style considers interpersonal and intrapersonal factors. (Dubrin, 2004:193)

Understanding these styles help to manage and resolve conflicts efficiently.

Competitive style: when one Choose this style, it means that he has some kind of priority for his own interests and desires. Selecting this style creates a winner-loser situation.

Accommodative style: People who choose this style neglect their own interests and desires and allow others to achieve their wishes. Many of these people believe that having a good relationship is more important than anything else.

Compromise style

In this style, people are not going to reach to their interests totally and achieving a part of their interests satisfies them. In this style flexibility, communication and negotiation have a special place.

Collaborative style: using this style can provide the demands of both sides. Select this style helps people to work together so that everyone can win. This style leads to win-win cooperation. Using this style helps people to look for solutions that are appropriate for their interests and maintain good and effective communication.

Avoidance style: People, who choose this style, do not engage themselves in conflicts. They pay no attention to their own wishes or to the desires of others. Their motto is: "decide for yourself and excuse me." (Dubrin,, 2004)

Management Skills

Skills are the ability to produce the desired actions by using knowledge. Robert Kats distinguishes three fundamental skills for management. All of these skills emphasizes on what a person does. These skills includes: 1- technical skills 2- humane skills 3- cognitive skills. The importance of each skill depends on the level of management, though all of them are important for all managers. (Human, 2012)

Technical Skills: The ability and efficiency in a particular type of activity that is related to specific methods processes, procedures, and techniques related to that activity is called technical skills. What managers learn during educational courses is indeed a kind of technical skill. Courses such as finance, planning, building, staffing, programming courses, marketing and the like are taught to Manager from the beginning (Hersey and Blanchard, 1385).

Human skills: the ability to manage the staff as a member of the group and to direct efforts of them effectively is called human skill. The distinctive feature of human skills with technical skills is that the former is related to working with individuals but the latter is related to working with objects.

Cognitive skills: cognitive skill is the ability to see the organization as a whole. In the other word, it is recognizing relationships of different tasks in the organization and discovering how changes in one part can affect the other parts

of organization. It is to discover elements and finally select the path that can provide prosperity for entire organization (Griffith, 1388).

The notion of conflict management clarifies the nature and application of conflict in an organization. Conflict management aims to minimize the destructive effect of conflicts and to extract constructive achievements out of the conflicts. So conflict management can apply three management skills (cognitive, human and technical skills) to led the conflicts in a way that is useful for the organization. In this paper, we study the relationship between management skills and conflicts in the Tax Office in Qom city.

Significance of Research

An effective usage of conflicts needs a complete understanding of its nature and its causes; it needs conflict management skills which are one of the most important skills in management today, to control it. The ability to cope with conflicts has an important role in the success of managers in organizations, are a valuable role in the success of organizations.as mentioned above, Robert Katz classify these skills to three managerial skills which are technical, human and cognitive skills. (Reham A. Eltantawy, 2009)

Unfortunately, Iranian managers and employees not only have a negative attitude towards organizational conflict but also fear to discuss about it. Certainly, it is necessary to research more about this issue to identify the scope of it and its effect on organizational behavior and performance.

Moreover, as institutional culture is an important factor in organization, it is necessary to conduct long-term researches relating this variable. The question here is whether is there a significant relationship between organizational conflicts and management skills?

LITERATURE

Hasani (2010) has studied the sources of organizational conflicts between managers and staff of Azad University in Sanandaj. The result show that the members of university have some kind of conflicts in the issues like opposite purposes, obscure rules, incongruent evaluation systems, mental and environmental pressures and information deficiency. There was a significant difference in these variables but no significant difference was in variables such as different value systems, communication problems, contradictions of authority.

Din (2006) has studied conflicts in organization and whether it is always destructive or not; he concluded that people have different view to conflicts but most of them regard it as a negative and destructive feature.

William and colleagues (2007) examine two groups of managers to compare different management skills; this study revealed that the most important skills are information relation and decision making.

Maboodian (2000) has studied the relation between manager's attitude toward conflicts and their styles for management in high schools of Kerman.

A complete positive attitude had a significant relationship with collaborative management style, positive attitude was correlated with neglecting style, moderate attitude was correlated with compromise style, and negative attitude was correlated with avoidance style.

Nasiri (1997) has studied the attitudes of managers in Telecommunication Corporation in Shiraz. The results show that there are four main methods to resolve the conflicts in organizations: 1. Negotiation between involved parties 2. Compromise between involved parties 3. Exertion of power 4. Ignoring conflict

METHODOLOGY

Regarding its goal the current study is an applicable one and data collection implemented via descriptive-survey method and regarding the relation among variables it is considered as a dependent one. The population involved in the research including 221 employees need to be lessen to 136 ones on the basis of Morgan table through the accidental sampling. In order to collect the data technical, human and perceptive questionnaires including 35 questions were posed also to test the stability the Cronbach's alpha method implemented. The Cronbach's alpha coefficient was 0.70 and the retest coefficient equals 0.49 stating the internal stability and convergence of the system (Ahmadi & Doust Mohammad lou, 2009). Having 5 side-scales (competition, cooperation, avoidance, compromise, forgiveness) the controversial management questionnaire has the narrative and stability of 0.82 and 0.88 so the questionnaires are stable and trustable. To test the research hypotheses primarily using the variance analysis of multi-sectional regression model, test the existence or lack of the regression model among the variables and every one of the organizational controversies aspects and in case of confirmation using the step to step regression model determine the regression model of each managerial skills which portraits the percentage extent of impact of modeled variables over the variance changes of the dependent variable regarding the intended model.

Research Hypothesis

- Managerial skills components affect the competition aspect of organizational controversies.
- Managerial skills components affect the cooperation aspect of organizational controversies.
- Managerial skills components affect the avoidance aspect of organizational controversies.
- Managerial skills components affect the compromise aspect of organizational controversies.
- Managerial skills components affect the forgiveness aspect of organizational controversies.

RESULTES AND DISCUSSION

First hypothesis: Managerial skills components affect the competition aspect of organizational controversies

Regarding table no.1 since the probability extent or the meaningfulness level of F equals (0.001) and regarding the fact that it is less than the meaningfulness level of (0.05) therefore the first hypothesis is confirmed i.e. the meaningfulness regression model exists in level of 95% for the competition aspect of organizational controversies through the management also regarding table no.1 the regression model of altruism is determined as below:

Technical skills X 33.0 + Perceptive skills X 42.0 + Human skills X 0.51 = Competitive

Interpreting the coefficients it may be stated for example that keeping stable the coefficient related to other variables, if the human skills variable increases one unit, the competitive variable increases 0.51 units.

Second hypothesis: The managerial skills components affect the cooperation aspect of organizational controversies.

Regarding the table no.1 since the probability extent or the meaningfulness level of F equals (0.02) and regarding the fact that it is less than the meaningfulness level of (0.05) therefore the second hypothesis is confirmed i.e. the meaningfulness regression model exists in level of 95% for the cooperation aspect of organizational controversies

through the management also regarding table no.1 the regression model of cooperation variable is determined as below:

Technical skills X 0.38 + Perceptive skills X 0.39 + Human skills X 0.45 = Cooperation

Interpreting the coefficients it may be stated for example that keeping stable the other variables, if the human skills variable increases one unit, the cooperation variable increases 0.45 units.

Third hypothesis: The managerial skills components affect the avoidance aspect of organizational controversies.

Regarding the table no.1 since the probability extent or the meaningfulness level of F equals (0.01) and regarding the fact that it is less than the meaningfulness level of (0.05) therefore the third hypothesis is confirmed also since the number of the determination coefficient of avoidance regression model equals 0.49, so 49% of avoidance variance regarded as the controversies affected by managerial skills aspects also regarding table no.1 the regression model of avoidance variable on organizational controversies settlement is determined as below:

Technical skills X 0.36 + Perceptive skills X 0.51 + Human skills X 0.54 = Avoidance

Interpreting the coefficients it may be stated for example that keeping stable the other variables, if the human skills variable increases one unit, the avoidance variable increases 0.54 units.

Fourth hypothesis: The managerial skills components affect the compromise aspect of organizational controversies.

Regarding the table no.1 since the probability extent or the meaningfulness level of F equals (0.000) and regarding the fact that it is less than the meaningfulness level of (0.05) therefore the fourth hypothesis is confirmed i.e. the meaningfulness regression model exists in level of 95% for the compromise aspect also since the number of regression model determination coefficient equals 0.46 so 46% of cooperative variance of citizen trainings dependent on managerial skills also regarding the table no.1 the regression model of compromise variable is determined as below:

Technical skills X 0.31 + Perceptive skills X 0.48 + Human skills X 0.32 = Compromise

Interpreting the coefficients it may be stated for example that keeping stable the other variables, if the human skills variable increases one unit, the avoidance variable increases 0.48 units.

Fifth hypothesis: The managerial skills components affect the forgiveness aspect of organizational controversies.

Regarding the table no.1 since the probability extent or the meaningfulness level of F equals (0.000) and regarding the fact that it is less than the meaningfulness level of (0.05) therefore the fifth hypothesis is confirmed i.e. the meaningfulness regression model exists in level of 95% for the politeness and kindness aspect also since the number of regression model determination coefficient equals 0.62 so 62% of legality variance of citizen trainings dependent on training factors also regarding the table no.1 the regression model of legality variable is determined as below:

Technical skills X 0.39 + Perceptive skills X 0.42 + Human skills X 0.64 = Forgiveness

Interpreting the coefficients it may be stated for example that keeping stable the other variables, if the human skills variable increases one unit, the forgiveness variable increases 0.64 units.

CONCLUSION

The findings of current study show that there is a generally positive and meaningful relation between managerial skills and organizational controversies settlement through the controversy management. Regarding the competition aspect of controversy management, the relation affected by managerial skills and having the Beta coefficient of 0.51 the human skills have the most impact over the competition aspect. So the research confirms the Hosseininia's (1996) results stating that having effective human relations and maintaining relations with individuals may lead them to a healthy competition. Therefore forming intra-group collective efforts lead or managed by them, the managers in public organizations cause increasing the self-confidence and competitive spirit among the staff, resulting to the future success of the organization. Most of successful plans generated through initiatives and creating new ideas during occupation and consultation meetings held with the presence of the head manager among the members and managers. Providing incentives, salary increase, grades promotion, participating in organizational consultations, developing an appropriate infrastructure for technology growth may lead to creativity in work environment and finally the product (Hatami, 2012).

Also the cooperation aspect of controversies management was affected by managerial skills that regarding the point all the three mentioned managerial skills lie with an almost equal Beta coefficient and have an equal impression over the cooperation aspect of controversies public management, so considering the findings in order to develop cooperation among the staff the managers need to be able to concurrently implement processes, procedures and related techniques and also as a group member take part in activities and finally have a proper awareness towards the organization different obligations and dependencies and also how change of one section may affect the other ones (Mousavi, 1998). Also the compromise aspect of controversies management affected by managerial skills in staff and managers view of tax organization showing that having the Beta coefficient of 0.48, perceptive skills left the greatest impact over the compromise among staff to resolve the organizational controversies. Also the forgiveness aspect which is one of the most critical aspects on resolving the controversies among the staff affected by managerial skills in this line having the Beta coefficient of 0.64, the human skills left the greatest impact over forgiveness. Management skills are generally effective regarding organizational controversies settlement through controversies management. The findings confirm the Afshari et al., (2010) results so it may be concluded that there is no differences in organizations managers approach with triple skills experts as well as the tax organizations managers' priorities and in most aspects the human skill had the greatest impact. Enjoying such human skills, the managers need to be aware of their weak and strong points, have clear thoughts and beliefs and self-confidence, trust others, respect the staff beliefs, emotions and values, try to understand them, be aware of their words and behavior impression over others and be able to develop a safe and appropriate environment to encourage others cooperation. It needs to be mentioned that having no specific method and technique, human skills are not easily achieved. Nowadays the scientific knowledge on psychology, social psychology and anthropology and making experience in group and social situations indirectly provide the grounds to achieve human skills. In order to be considered as an efficient member of the organization, the managers of different training sections need to enjoy sufficient amount of human skills (Azari, 2001).

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Table 1: Considering the simple relations between controversy management components and the managerial skills of table no.2 the below mentioned results found

Meaningfulness level of Beta coefficient	Beta Coefficient	Confirmed variables in regression model	Meaningful -ness level	F statistics	Determinati -on coefficient	Research variables
0.001	0.51	Managers human skills	0.000	49.249	0,52	Competition
0.02	0.42	Managers perception skills				
0.03	0.33	Managers technical skills				
0.002	0.40	Managers human skills	0.000	33.423	0,48	Cooperation
0.01	0.39	Managers perception skills				

0.011	0.38	Managers technical skills				
0.000	0.54	Managers human skills	0.000	58.512	0,49	Avoidance
0.001	0.51	Managers perception skills				
0.03	0.36	Managers technical skills				
0.001	0.48	Managers human skills	0.0001	31.213	0,46	Compromise
0.01	0.32	Managers perception skills				
0.033	0.31	Managers technical skills				
0.000	0.64	Managers human skills	0.0001	49.987	0,62	Forgiveness
0.001	0.42	Managers perception skills				
0.021	0.39	Managers technical skills				

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RESEARCH ARTICLE

Article of Bankruptcy Possibility in Finite Time for Mixed Poisson Model with Fixed Interest Rate

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ABSTRACT

An insurance company that has started to work with a primary surplus capital of x>0, at the t time and after receiving the insurance right and payment of possible losses, will have a capital of s_r (t). The goal is to study the lateral behavior of possible bankruptcy at t time, meaning the possibility of negation of s_r (t), which under this supposition the distribution of the claim extent is B, and is thick-tailed. In this article we gain several simple asymptotic equations for bankruptcy possibility in finite and infinite times for mixed Poisson model with fixed interest rate and claims of underlying losses when the capital surplus is high. The formula which we gain for possibility of bankruptcy in finite time is adaptable with the known results for the final bankruptcy possibility, and particularly when distribution of claim has a tail with regular changes, it is even for all times.

INTRODUCTION

The bankruptcy theory has always been a vital part of insurance statistics. With this brief view, it seems some of the results in scientific and applied conditions have a limited vastness. Nevertheless, calculation and estimation of bankruptcy possibility are a fixed source of inspiration and development of methods in the mathematics of insurance statistics. The insurer in order to have right decisions for the future of the properties needs to know the bankruptcy possibility of properties. In fact, the bankruptcy phenomenon is transition of a being state into not being. Thus, logically insurers seek to measure this danger and often use a tool named possibilities for measurement of it.

The bankruptcy possibility for the model of classic joined time danger was first discussed in the article of Gerber et al (1987). They used G(u,y) for showing the possibility that bankruptcy occurs with the primary u surplus, and the deduction of surplus at bankruptcy time is less than y. in that article, general equations for G(u,y) were obtained. This was extended by Gerber & Dufresne (1988), in a way that simple solutions were gained when single claim

extents are distributed in a mixture of exponential distributions. Dickson (1989) showed that rough rates of G(u,y) can be calculated by the reverting methods with definition of a relation between survival possibilities and density of G(u,y).

Dickson and Watens (1991) stated a reverting algorithm for measurement of survival possibilities for a model of discrete time danger that can be used for estimation of survival chances in the model of classic joined danger. Dickson and Howard (1992) showed how these methods can be appropriated for calculating rough extents of G(u,y). They also presented a reverting algorithm for rough calculation of bankruptcy in finite time, which was extracted from an algorithm that was stated by Wilder and Goovaerts (1988) for rough calculation of bankruptcy chances in finite time. For knowing a sufficient background of bankruptcy theory, refer to articles of Beard et al (1982), Buhlmann (1970), Kerber (1979) and Sundt (1992).

There are many articles about the calculation of bankruptcy possibility with r interest rate at especial state of r=0. Comparing this, the number of articles with general state is considerably less. One evident reason is that in this case much more complex math is required. Among the general articles we can mention Segerdahl (1942, 1954), Harrison (1977), Haezendonck and Adalbaen (1987) and Crijns and Boogaert (1987).Sandt and Teugels (1995) obtained bankruptcy possibility at infinite time for the process of joined time mixed Poisson when the rate of insurance right and interest rate are fixed. They stated equations for bankruptcy chance and estimations for high and low bounds.

Stsdtmuller and Kluppelberg (1998) obtained an equation for calculation of bankruptcy chances at finite time for the Kramer-Landberg model, under the hypothesis that claim extent belonging to distribution classes is regular with changes, by starting an integral equation from Sandt and Teugels and extension of a changing method of complex L_p. after that Assmussen (1998) and Assmussen et al (2004) obtained a more general result for when the distribution of claim extent belongs to S^2 class.

Konstantinides and Kalashinkov (2000) et al (2002), based on Sandt and Teugels work (1995) but by using a simpler method, studied the result for a state that the balanced distribution of claim extent belongs to A class.In the following Tang (2004) and Tang (2005) respectively extended the work of Konstantinides et al (2002) for the discrete time model and the work of Statsmuller and Kluppelberg (1998)for the ordinary extended model.

Poisson process

It is a random numerator process that is defined around the random events on a time length, or a local distance. In examination of this process, the time between two consecutive events is signified by an exponential distribution and separate time ranges are considered separately. This process is used for modeling decay of radioactive, telephone calls and data transit from internet sites. Poisson process is a joined process in time. As the Bernoli process is discrete. The numerating process of $\{N(t); t \geqslant 0\}$ is called Poisson process with the rate of λ>0, which if we have: N(0)=0

The process has an independent increase The number of occurred events in the time range to the t length is distributed in a Poisson and has λT mean. In fact, for all ts, T≥0.

$$Pr\{N(t+\tau) - N(t) = k\} = \frac{e^{-\lambda\tau}(\lambda\tau)^k}{k!} \qquad k = 0, 1, \ldots,$$

Features

Consider a homogeneous Poisson process with λ parameter. If T_k is a random variable for showing the time of occurrence of kth event, it is obvious that the number of events before t is less than K, if and only if T_k is less than t. if the chances of these events is equal,

$$P(T_k > t) = P(N(t) < k)$$

Consider the time when we expect the first event. That is higher than t, only if the number of events before t is 0. With mixing this rate and the mentioned chance above we 'll have in the fixed range,

$$P(T_1 > t) = P(N(t) = 0) = P[(N(t) - N(0)) = 0] = \frac{e^{-\lambda t}(\lambda t)^0}{0!} = e^{-\lambda t}.$$

As seen the waiting time of the first exponential event distribution has a λ parameter and is thus without memory. It can be shown that this relation is true for the time between both consecutive events. If we consider the time ranges between two consecutive events, regarding the separateness of these ranges the random variables will have same distribution and will be independent, and the math chance of each would be λ^{-1}.

For example if λ=5 minutes, the average time that we wait for an event after another one will be 0.2 minutes.

Statement of the problem and description of the model We consider a mixed Poisson model in which claim extents are K=1,2,...X_k, random variables are non-negative, independent and co-distributed (i.i.d) with a common B distribution, and time waiting's are K=1,2,...,Q_k, which form a homogeneous Poisson process with intensity of x>0. It means:

$N(t) = \text{card}\{k=1,2,\ldots: Q_k \le t\}, \qquad t \ge 0$

We suppose $\{C(t)\}_{r>0}$, is an increasing process from right, joined and random which shows the total insurance right up to t time. In addition, we suppose r>0 is fixed interest rate (in a way that in t time, one dollar changes into e^n dollars). If the insurance company with primary capital surplus of x≥0 has started to grow, then we'll show the total surplus up to t time with $s_r(t)$, in which the below equation would apply:

$S_r(t) = xe^n + \int e^{r(t-s)}c(ds) - \sum^{N(t)} x_k e^{r(1-k)}, \qquad t \ge 0,$

Bankruptcy possibility in finite time In this part, we will gain an equation for bankruptcy possibility in finite time, with a B function from S class and will state the principal proposals.

Main results:

$\psi_r(X,T) - \int \sigma r T \frac{B(y)}{y} dy$

In this state from the above equation, we may conclude that for each T.0, X ∞ →

DISCUSSION AND CONCLUSION

Thick-tailed distributions are a series of statistical distributions that the bounds don't have proper view, and high claims will have more chances in them. These distributions have an important role in the model of equation of events like earthquake, thunder, flood, drought, fire and the like. In these events usually a small number of events in a time period, produce a lot of damage. Thus, for their modeling a distribution is proper that has a heavy tail. In this paper, we studied the bankruptcy possibility in finite and infinite times. At both conditions, the hypothesis is that the claim distribution is a sub-class of thick-tailed distributions.

Hus, we have gained a relation for bankruptcy possibility in infinite time when the claim extent distribution belongs to the class of distributions with regular changes, thus we have gained relations for bankruptcy possibility in infinite time respectively when the claim extent belongs to A and S classes.

The possibility of bankruptcy in infinite time is simpler mathematically. Unfortunately, in many cases the expression of bankruptcy possibilities of time-finite is hard in a closed form. In this article, we gained a simple asymptotic equation for bankruptcy possibility in finite time when the claim extent distribution belongs to class of sub-exponential distributions. We then proved the homogeneity of the equation when the claim extent distribution belongs to the class of distributions with regular changes in two particular conditions.

In the first condition, the claim extent process, waiting time process and insurance right are separate two by two. In the second, only the claim extent process and waiting time are independent and the insurance right process at certain times is true with the given relations.

The second state which there is no need for the condition of independence between insurance right process and claim process, in real issues application gives this possibility for the insurance right rate as an absolute or random function, change from the current surplus, since the insurance right is often depended on the history of surplus process. Having the evenness of the mentioned equation is very useful in this issue. The told results in the given notice show applications of the evenness of the relation. Considering that gaining bankruptcy possibility in finite time is hard and most of the formulas and algorithms for measurement of bankruptcy chances are designed and proved for infinite time, the obtained formulas in this article can have useful applications for the insurance industry, since in many cases insurance companies, for future planning and evasion from bankruptcy need to know information about bankruptcy possibilities in finite time. Also, the mentioned formulas can be useful and proper in designing and compilation of computer algorithms for measurement of bankruptcy possibility in time.

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RESEARCH ARTICLE

Dynamic Economic Dispatch Solving in Power Systems Chaos Artificial Fish Swarm Algorithm

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ABSTRACT

The dynamic economic dispatch (DED) problem is an extension of the conventional static load dispatch problem in the context of electrical power generation. In this paper, issues related to the implementation of the several soft computing techniques are highlighted for a successful application to solve dynamic economic dispatch (DED) problem, which is a constrained optimization problem in power systems. First of all, a survey covering the basics of the techniques is presented and then implementation of the techniques in the DED problem is discussed. The soft computing techniques, namely multi-layered perceptron neural network (MLP NN), dynamic genetic algorithm (DGA), chaos artificial fish swarm algorithm(CAFSA_ICA), particle swarm (PSO) and are applied to solve the DED problem. The Evolutionary Algorithms are tested on power system consisting 3 generating units and the results are compared together. Suggestion is presented to improve techniques.

Keywords: MLP Neural Network, Chaos Artificial Fish Swarm algorithm, Dynamic Genetic Algorithm, Particle Swarm Optimization, Constrained Optimization.

INTRODUCTION

Dynamic economic dispatch (DED) problem is a classical from of optimization problems and has been one of the most important decision making processes in the operation of electrical power systems. Thedynamic economic

dispatch (DED)is a constrained optimization problem and the objective of the problem is to find the most economical schedule of the generating units while satisfying load demand and operational constraints. Problem using Due to the network connection of power systems and the further innovation in the electricity market, the power systems become large scale non-linear dynamic systems. In consequence, conventional techniques become very complicated when dealing with such increasingly complex dynamic system to solve economic dispatch problems, and are further limited by their lack of robustness and efficiency in a number of practical applications.Thus developing a reliable, fast and efficient algorithm is still an active area in power systems. In the last decay, the success of artificial intelligence techniques in broad area of optimization problems and promising research direction in literature pave the way to employ artificial intelligence and Evolutionary Algorithms to solve long standing power system problems.Lots of optimization method including classical and heuristic algorithms was applied to solve DED problem. Due to non-convexity of the DED problem, application of classical methods like lagrangian relaxation and dynamic programing are restricted. In recent years, Maclurin series approximation has been applied to model the valve-point effect but it has been shown that this method leads to non-optimal solution.In this paper, achaos artificial fish swarm algorithm (CAFSA_ICA) is proposed to solve constrained non-convex DED problems. CAFSA_ICA has shown good performance in solving optimization problems in different areas such as template matching, DG planning, optimal design of plate-fin heat exchangers and electromagnetic problems. This algorithm also has been successfully applied topower system problems like as PSS (power system stabilizer) design, linear induction motor design, unit commitmentand model reduction of a detailed transformer model.

The remainder of the paper is organized as follows: Section II covers some recent DED solution approaches. Section III formulates the DED problem for a generator with valve-point effects, generator capacity limits and ramp-rates limits as the constraints imposed on the objective function.Insection IV give proposed method a description of our CAFSA_ICA and description the optimization approached investigated.Insection V simulation results are given. Finally, we end the paper with the conclusions discussion to point out further direction in the implementation of Evolutionary Algorithmsin ED problem in section VI.

REVIEW OF PERVIOUS WORK

More recent works have been around artificial intelligence (AI) methods, such as artificial neural network (ANN), simulated annealing (SA), genetic algorithm (GA), differential evolution (EP), tabu search (TS), and hybrid methods. Optimization methods based on AI have shown better performance in solving the DED problem with capability of modeling more realistic objective functions and constraints. In [11] hybrid EP and sequential quadratic programming (SQP) method has been proposed to solve non-convex DED problem. Chaotic quantum genetic algorithm (CQGA) is used in [12] for solving DED problem considering the effect of wind generation. DE algorithm hasreceived attention in solving DED problems. Other heuristic search methods have been applied to solve DED problems in the past decade. These include GA, quantum GA (QGA) [13],artificial bee colony algorithm (ABC),pso [3, 5], and Imperialist Competitive algorithm[1]. Hybrid methods such as hybridartificial immune systems and SQP [11], hybrid EP and SQP method [11], hybrid seeker optimization algorithm (SOA) and SQP [11], hybrid Hopfield neural network (HNN) and artificial immune system (AIS) are found to be effective in solving complex optimization problems such as DED problem.

POBLEM FORMULATION

The dynamic economic dispatch (DED) is one of the different non-linear programs of the unit commitment problem. Its mil objective is to simultaneously minimize the generation cost and meet the consumers load demand over a given period of time while satisfying three major constraints-load demand balance (equality constraint), generation capacity (inequality constraint) and ramp rates (dynamic constraint):

$$\text{minimize } C_t = \sum_{t=1}^{1} \sum_{i=1}^{n} C_{i,t}\,(Pg_{i,t}) \quad (1)$$

Where, C_T is the total operating cost over the whole dispatch period, T is the number of intervals in time in the scheduled horizon, N is the number of generating units, C_{it} ($Pg_{i,T}$) is the fuel cost of the i^{th}generating unit at time t. For a practical problem involving valve-point loadings effect due to the presence of multiple steam admitting valves, the fuel cost $C_{i,T}(Pg_{i,T})$ is calculated as follows:

$$a_i + b_i pg_{i,t} + c_i pg_{i,t}^2 + |e_i \sin(f_i(pg_{i,t0} - pg_i| \quad (2)$$

Where, a_i ,b_i and c_i are the fuel cost coefficients of thr i^{th} generatingunit, e_i and f_i are the fuel cost coefficients of the i^{th} unit with valve-point effects, $pg_{i,T}$ is the real power output of the i^{th} unit at time t, and t0 is the initial time point.

Power Balance:

$$\sum_{i=1}^{n} Pg_{it} \quad P_{D,t} \quad P_{L,t} = 0 \quad (3)$$

Eq. (3) is the primary constraint relating to power balance, where, t=1,2,3..., t and $P_{D,t}$ is the total system power demand at time; t, and $P_{L,t}$ is the transmission power loss at time t, which is given by:

$$P_{L,t} = \sum_{i=1}^{n} \sum_{j=1}^{n} Pg_{i,t} B_{ij} Pg_{j,t} + \sum_{i=1}^{n} B_{0i} Pg_{i,t} + B_{00} \quad (4)$$

Where B_{IJ} is a matrix of loss coefficients specific to the generating system for a given instantiation of the problem.

Power Generation limit :

$$Pg_i^{min} \le Pg_{i,t} \le pg_i^{max} \quad (5)$$

Where, pg_i^{min} and pg_i^{max} are the lower and upper limits of the ith generating unit, for$i - 1,2,3 \ldots t$.

Ramp-Rate limits

The range of operation of an online generating unit is restricted by its ramp-rate limits. The decision at the current time period will affect the decision at a later time period due to variation in power demands from present time to next time.There exist three possible cases in actual operation of the units. Steady state condition (fig. 1), increasing generation (fig. 2) and decreasing generation condition (fig. 3).

$$Pg_{i,t} - Pg_{i,t-1} \le UR_i \quad (6)$$

$$Pg_{i,t-1} - Pg_{i,t} \le DR_i \quad (7)$$

Where UR_i and DR_i are the ramp-up and ramp-down limits of generating unit i, respectively, for:$i - 1,2,3 \ldots N$and$i - 1,2,3 \ldots t$. With dynamic ramp-rates, constraintof is modified to become:

$$\begin{matrix} max(Pg_i^{min}, pg_{i,t-1} - DR_i) \\ min(Pg_i^{max}, pg_{i,t-1} - UR_i) \end{matrix} \quad (8)$$

Where

$$\begin{matrix} Pg_i^{min} = max(Pg_i^{min}, P_{g_{i,t-1}} - DR_i) \\ Pg_i^{max} = max(Pg_i^{min}, P_{g_{i,t-1}} \quad UR_i) \end{matrix} \quad (9)$$

THE PROPOSED METHOD

In this papers, we proposed CAFSA_ICA method for solve Dynamic Economic Dispatch. We proposed method for which we have improved the cost, ploss. This proposed method based on Economic Dispatch problem is described in as following section and all steps are explained.

CHAOS ARTIFICIAL FISH SWARM ALGORITHM

Artificial fish swarm algorithm (AFSA) is a newly Emerging method for swarm intelligence optimization [14]. Every artificial fish (AF) in the whole swarm can achieve four basic actions: preying, following, swarming and moving. AFSA algorithm begins the iterations with several initial points in the feasible domain of the variables, having the capability of parallel searching and information sharing. Let us assume the number of AFs in the feasible domain is *total*, and ***u*** representsAF and Ø = F (u) is the food Concentration of the current AF position. So Ø is also the objective function of the optimization problem. We define the congestion factor as δ and the maximum test times of AF in every iteration as *try_number*.The moving action helps AF randomly move to a position within its vision scope, defined as follow:

$$U_j = U_i + visual.rand \quad (10)$$

Where U_i is the current position of AF, U_j is the position AF randomly moves to, *visual* is AF's vision scope and *rand* is a random function which values is between 0 and 1.

The preying action impels AF swim to the position where the food concentration is higher. If $Ø_i < Ø_j$, the preying action impels the position of AF update by:

$$U_i = U_i + step.rand\ ((U_j - U_i)) + ((U_{best} - U_i)) / \| (U_j - U_i) + ((U_{best} - U_i)) \| \quad (11)$$

Where $U_{best}$is the best position of all AFs, and *step* means themoving step length. If not, AF randomly selects a new position again and compares the food concentration. This step duplicates until AF find a better position, or it repeats trying up to *try_number* times.

The following action urges AF swim to the best position of all AFs. The best position of all AFs in the swarm is defined as U_b, and there are n_f companions in the vision scope of U_i. If $Ø_j/n_f > \delta\ Ø_i$, the following action makes the position of AF update as follow:

$$U_i = U_i + step.rand\ ((U_b - U_i)) - ((U_{best} - U_i)) / \| (U_b - U_i) + ((U_{best} - U_i)) \| \quad (12)$$

If not, it carries out the preying action.

The swarming action impels AF swim to the center of Companions. The center position of all AFs in the swarm is defined as U_c. If $\emptyset_c / n_f > \delta \emptyset_i$, the swarming action impels the position of AF update by:

$$U_i = U_i + step.rand\ ((U_c - U_i)) + ((U_{best} - U_i)) / \| (U_c - U_i) + ((U_{best} - U_i)) \| \quad (13)$$

Otherwise, it carries out the preying action. Chaos is defined as a random and no uniform phenomenon in the deterministic nonlinear system and the hidden discipline in a complex system can be revealed by chaos theory [14]. Chaos has been found to be very useful and to have great potential in different fields of physics, mathematics, engineering, biology, chemistry, and economics. It has many unique characteristics such as periodicity, pseudo-randomness and sensitivity to initial conditions and control parameters, which are close to permutation and diffusion in cryptography. Chaos searching can traverse all status in a certain range without repeatability.These characters make it a good mechanism that can avoid getting into the local optimum efficiently and reaching the global optimum faster. Logistic mapping can generate chaos variables by iteration.Searching is shown as follow:

$$Z(K+1) = \mu Z(K)[1 - Z(K)] \quad (14)$$

Where *k* is the iteration number,μ=4 is the control parameter, *z (k)* ε [0, 1] is the K^{th} iteration value of the chaos variable *Z*.

CAFSA algorithm combines AFSA algorithm with chaos searching. We defined the current position of AF in the whole swarm as U_i, and its position after any basic action as U_i. Every component of U_i is then mapped to chaos variable according to the follow formula:

$$CU_{i,j} = (U_{i,j} - U_{i,j}^{min}) / (U_{i,j}^{max} - U_{i,j}^{min}) \quad (15)$$

Where j is the dimension of AF definition domain, $U_{i,j}^{min}$ and $U_{i,j}^{max}$ are respectively the minimum and maximum the of U_i' in the *jth* dimension. A new chaos variable $CU_{i,j}$'' can be obtained using logistic mapping on $CU_{i,j}$'. And then, $CU_{i,j}$'' is mapped back to the AF feasible domain by:

$$U''_{i,j} = U_{i,j}^{min} + CU_{i,j}^{min} \cdot (U_{i,j}^{max} - U_{i,j}^{min}) \quad (16)$$

CAFSA_ICA ALGORITHM

The steps of CAFSA_ICA algorithm can be compiled as follows:

1- Transform the m×n dimensional de-mixing matrix ***w*** to the 1×(m×n) dimensional AF position matrix ***uw***, and initialize the AF swarm positions ***uw****(0)* and all dependent parameters, where ***uw***={***uw****i* | i=1,2,…,*total*}.
2- Use (4) to calculate the K^{th} iteration objective function values of all AFs **uwi** (k),especially**y** (t) =**uw**i***x** (t), and record the best value on the call-board.
3- For every AF in the swarm ***uw****i (k)*, execute the four basic actions respectively, getting the corresponding **nw**$_i$' **(k).**
4- Chaos search on **nw**$_i$' **(k)**, substitute the gotten nwi'' **(k)** for **nw**$_i$' **(k)**.
5- Evaluate all results of the four basic actions for every AF, and select the best actions to execute, getting ***uw****(k+1)*;
6- Compare the best position in ***UW*** *(k+1)* with the one in call-board, select the best one to update the call-board.
7- If maximum iterations or minimum error is attained, stop the evolution; otherwise go back to the step 2.
8- Transform the 1×(m×n) dimensional AF position matrix ***uw*** to the m×n dimensional de-mixing matrix **w**' , so y(t)=w'x(t) is the approximation for the source signals ***s****(t)*.

Implementation of soft computing techniques in DED problem

Implementation ofCAFSA_ICA in DED problem

To solve the constrained economic dispatch problem using the CAFSA_ICA, our initial point in the variables set is generated powers of plans. We use from Eq. (19) (10) to evaluate the fitness value of each initial point (full-rank).

Implementation of MLP neural network in ED problem

To solve the constrained economic dispatch problem using the MLP Neural Network, we need training data sets for network. A training set should be constructed by combining the input and target pattern as pairs, i.e. ($O_i$andt_i). Input patternsO_i's are consisting of total power load in

$\sum_{i=1}^{n} P_i$ in Eq (17).

The corresponding target patterns consist of the unit powers constraints $P_i$and the total cost:

$C_T = Min_{P_i} \sum_{i=1}^{n} F_i(P_i)$ (18)

The number of neuron in the input layer of MLP NN in 3 units DED problem is determined by the total load. The number of the neuron in the output layer of MLP is set by the power generated by 3 units and the total operation cost. Therefore, a MLP NN with a structure of 1–10–8– 5 is chosen to solve the3 units DED problem. The MLP NN algorithm is coded in MATLAB using Neural Network functions. For 3 units ED problem, training and test data pairs are produced by using classical method (CM) which is based on sequential quadratic programming and implemented in matlab mfiles.

Implementation of DGA in ED problem

To solve the constrained economic dispatch problem using the DGA, our population is generated power of plans.For the economic dispatch problem, the fitness function, Fit (P), may be expressed as

$Fit(P) = \sum_{i=1}^{m} (a_i + b_i P_i + c_i P_i^2)$ (19)

In order to produce two offspring, an arithmetic crossover operator is used. After crossover is completed, mutation is performed. In the mutation step, a random real value makes a random change in the mth element of the chromosome. After mutation, all constraints are checked whether violated or not. If the solution has at least one constraint violated, a new random real value is used for finding a new value of the mth element of the chromosome. Then, the best solution so far obtained in the search is retained and used in the following generation. The DGA process repeats until the specified maximum number of generations is reached. The DGA is coded in matlab mfiles.

Implementation ofPSO in DED problem

To solve the constrained economic dispatch problem using the PSO,our particle set is generated powers of plans. We use from Eq. (19) to evaluate the fitness value of each particle in swarm (population).

Experimental results

The results of the dynamic economic dispatch problem illustrated in this study are obtained by the techniques given in the literature i.e. MLP neural network, dynamic GA and PSO and CAFSA_ICA are employed to carry out

comparison between the aforementioned approaches.The system tested consists of three thermal units. The cost equations of three units are given below in Rs/h.

$$F_1 = 0.03546P_1^2 + 38.30553P_1 + 1243.53110$$
$$F_2 = 0.02111P_2^2 + 36.32782P_2 + 1658.56960$$
$$F_3 = 0.01799P_3^2 + 38.27041P_3 + 1356.65920$$

The unit operating ranges in MW are

$30 \leq P_1 \leq 205$
$125 \leq P_2 \leq 320$
$125 \leq P_3 \leq 315$

The loss coefficient matrix is

$$B_{mn} = \begin{bmatrix} 0.000071 & 0.000030 & 0.000025 \\ 0.000030 & 0.000069 & 0.000032 \\ 0.000025 & 0.000032 & 0.000080 \end{bmatrix}$$

For the Power demands of 400 MW, 500 MW and 700 MW, all the methods are applied and the solutions obtained are compared in Table.1. From the table.1 is observed that The CAFSA_ICA approach has an ability to provide accurate and feasible solutions for the Economic Dispatch problem within reasonable computation time.

CONCLUSIONS AND FUTURE WORK

In this paper, we have employed fourevolutionary algorithms to solve the economic dispatch problem. Treating is the DED simply as a series of static problems. We have brought our simulation result in table.1. According to this table,CAFSA_ICA has a better answer for the economic dispatch problem than the other methods (dynamic GA and PSO and MLP NN). This method has advantage of being a quick method compared to the iterative optimization methods who considered in this article. DynamicGA and PSO do not require any prior knowledge or space limitations, such as smoothness or convexity of the function to be optimized; they exhibit very good performance on the majority of the problems applied and find near optimal solution in relatively short time. However, main disadvantages of these techniques over traditional methods are (a) their long execution time (b) the fact that they are not guaranteed to converge to the global optimal solution. For future studies, we are interested to improve the cost functions, the emission in power systems, environmental pollutions functions and real power loss with the aid of chaotic Evolutionary Algorithms base on unit commitment problems, and to minimize these function in order to meet the consumers and operational bound.

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Table.1 Comparison between methods

Total	Method	P1	P2	P3	Ploss	Cost
400MW	Mlp NN	87.5491	150.7514	160.6990	7.6222	2.0622
	DGA	67.2614	172.4568	168.0683	7.7493	2.0829
	CAFS	88.5591	154.7707	168.1570	7.4693	2.0612
	PSO	98.2066	143.7908	168.1680	7.5952	2.0714
500 MW	Mlp NN	125.234	202.4910	170.4291	11.7342	2.5113
	DGA	139.340	181.1988	191.0887	11.6274	2.5532
	CAFS	94.1282	286.4844	131.1383	11.7678	2.5111
	PSO	94.1282	289.4844	130.1282	12.4243	2.5596
700 MW	Mlp NN	170.2162	279.8020	247.9114	25.6122	3.3891
	DGA	157.5535	294.5215	271.6186	23.6936	3.5427
	CAFS	162.1199	288.2115	273.4114	24.0126	3.2834
	PSO	173.7999	270.9997	276.7789	27.3722	3.4664

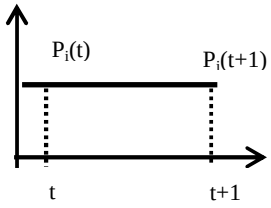

Fig. 1: Steady state condition

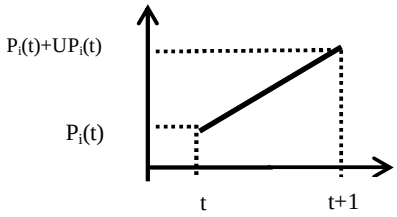

Fig. 2: Increasing generation condition

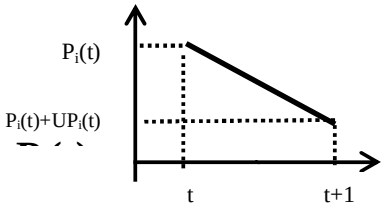

Fig. 3: Decreasing generation condition

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RESEARCH ARTICLE

Optical Natural Sciences of Mercury Sulfide Thin Layers Produced by CBD Method

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ABSTRACT

Mercury sulfide (HgS) Nano crystalline thin layers have been grown onto amorphous glass substrate by chemical bath deposition (CBD) method at 70 °C temperature at different deposition runs. The optimized preparative parameters including ion concentration and pH of the solution are used for fine Nano crystalline layer growth. Optical properties of Nano layers were studied by spectrophotometer analysis in VIS wavelength range. Natural optical properties were obtained by applying Kramers-Kronig relations on reflectivity curves. The optical band gap (Eg), was evaluated from VIS absorption spectra and found to have a mean value of 2 eV. Changing deposition runs affect on all optical properties.

Key words: Mercury sulfide; spectrophotometer; thin layer; optical properties.

INTRODUCTION

HgS exist in two forms in nature that, namely α-HgS (red in color) and β-HgS (black in color) [1]. The α-HgS has a band gap, E_g = 2.3 eV and exhibited trigonal structures with a lattice constant a = 4.149 Å and c = 9.495 Å, whereas β-HgS has a band gap E_g =–0.5 eV with a cubic structure having a lattice constant a =5.851 Å. Out of the two phases of HgS, β-HgS shows interesting properties. Thin layers of mercury (II) sulfide have been prepared by evaporation[2] and sputtering[4] methods. They are useful in ultrasonic transducers, image sensors [5], electrostatic imaging materials [6], and photoelectric conversion devices. There are many different methods for determining the optical constants of materials. Optical constants determined in such calculations are significantly different in various works and, in addition, differ essentially from the corresponding optical constants of massive metals by their values. In this

work we used Kramers-Kronig relations applying on reflectivity curve to calculate natural optical properties of Mercury sulfide thin layers.

METHODOLOGY

Mercury sulfide layers were produced by chemical bath deposited on glass substrates. Prior to deposition, the platelets (50mm * 25mm * 1mm) were cleaned with acetone and then alcohol and dried. The details of the procedure are: appropriate amounts of mercury chloride solution and $Na_2S_2O_3$ were separately prepared. Formed mixture is thoroughly stirring for several minutes in order to dissolve the formed precipitate and solution to become homogeneous. Then in obtaining solution was added distilled water. These solutions were mixed in a beaker and stirred well for a few minutes. The deposition bath was continuously stirred and heated at 70ºC for 1 hour. The substrates were immersed into the deposition bath, by vertically suspending them around the stirrer. The substrates were taken out after 1, 2 and 3 times run deposition. Deposition parameters were: [mercury chloride] = 0.05M; **[**$Na_2S_2O_3$**] =** 0.01 M; pH = 2-3; All samples were annealed in air, at 250ºC for half an hour. The optical constants of our samples were derived on the basis of standard Kramers–Kronig relations using computer techniques.

RESULTS AND DISCUSSION

In this work Kramers-Kronig relations were used to calculate the phase angle θ (E) [7]:

$$\theta(E) = -\frac{E}{\pi}\int_0^{E_2}\frac{\ln R(E) - \ln R(E_0)}{E^2 - E_0^2}dE + \frac{1}{2\pi}\ln[\frac{R(E)}{R(E_2)}]\ln\frac{E_2 + E}{|E_2 - E|}$$
$$+\frac{1}{\pi}\sum_{n=0}^{\infty}[4(\frac{E}{E_2})^{2n+1}](2n+1) \qquad (1)$$

Where E denotes the photon energy, E_2 the asymptotic limitation of the free-electron energy, and R(E) the reflectance. Hence, if E_2 is known, the θ (E) can be calculated. Then the real and imaginary parts of the refractive index were calculated, from which other parameters were obtained. Figure 1 show reflectance curves for mercury sulfide layers produced by chemical bath deposition method in different run deposition, in this work. The spectra's are obtained in visible light wavelength range (400-800 nm). As it can be seen, for 400 nm up to 540 nm wavelengths that belong to violet, blue, green and yellow colors, curves are the same and in straight lines also reflectance is very high , that means mercury sulfide is offended layer in this range, oblique and almost same reflectance observe for 540 nm to 610 nm wavelength range. Orange color belongs to this region. After 600 nm, curves have been separated (red and infrared). In this range of hot colors as red and infrared, by increase the round of deposition, reflectance increases that is because of configuration of more complete layers by each round of deposition.

Figure 2 show real part of reflective index for mercury sulfide layers produced in this work. Real part of refractive index begin from a maximum and as a waterfall reaches to a minimum and continue in a straight line for all layers. As it can be seen, by increasing the round of deposition, n has an increasing trend that is because of formation completed and dense layers by increasing the round of deposition. The result of real part of refractive index is in agreement with reflection curves.

In figure 3 we depict the imaginary part of refractive index (k). These curves are exact agreement with transmittance curves. In the violet, blue, green and yellow wavelength region, extinction coefficient is high and in orange, red and infrared wavelength region, there is a low k for mercury sulfide layers and the value is almost the same. By

increasing the round of deposition in the range of 400nm-600nm, transmittance of layers decreases, therefor absorbance increases.

Figures 4 and 5 show the real part (σ_1) and imaginary part (σ_2) of optical conductivity for layers produced in this work, respectively. By increasing the round deposition, real part of conductivity decreases and imaginary part of conductivity increases. There is a high conductivity for violet, blue, green and yellow colors and low conductivity for orange, red and infrared colors.

We depict the natural optical band gap in figure 6 . By increasing the round of deposition, the present of Hg atoms decreases and the present of HgS molecules increases, there for dielectric property increases and value of band gap also increases.. The value of bang gap calculated 1.6 eV, 1.7 eV and 1.9 eV for samples 1, 2 and 3 respectively.

CONCLUSION

Thin layers of Mercury sulfide have been prepared by chemical bath deposition technique at different run depositions. The layers were grown on glass substrates. The deposition was performed in alkaline media at 70 °C and pH fixed on 2-3 constant value. Optical properties of Nano layers were studied by spectrophotometer analysis in VIS wavelength range. Natural optical properties were obtained by applying Kramers-Kronig relations on reflectivity curves. By increasing deposition runs, Reflectivity, k, and δ_1 decreases and n, δ_2 and band gap increases. The optical band gap (Eg) , was evaluated from VIS absorption spectra and found to have a mean value of 2 eV. Changing deposition runs affect on all optical properties.

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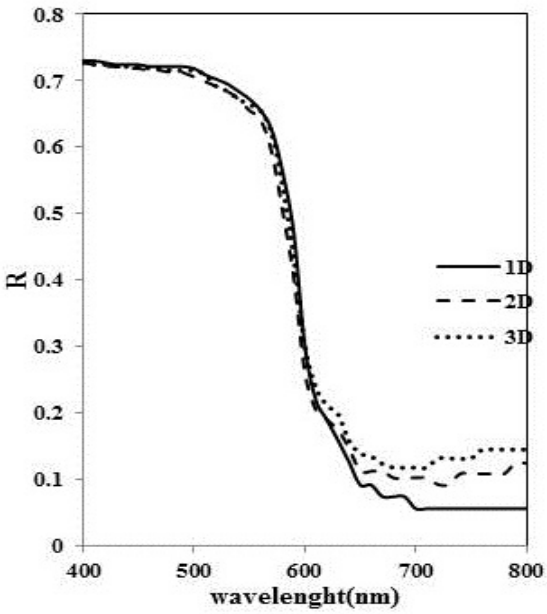

Figure 1: The reflectance of Mercury sulfide layers produced by CBD method at different run depositions.

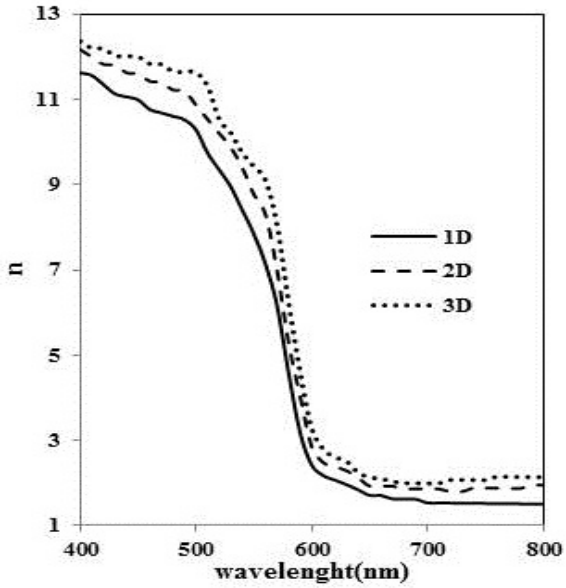

Figure 2: The real part of refractive index of Mercury sulfide layers produced by CBD method at different run depositions.

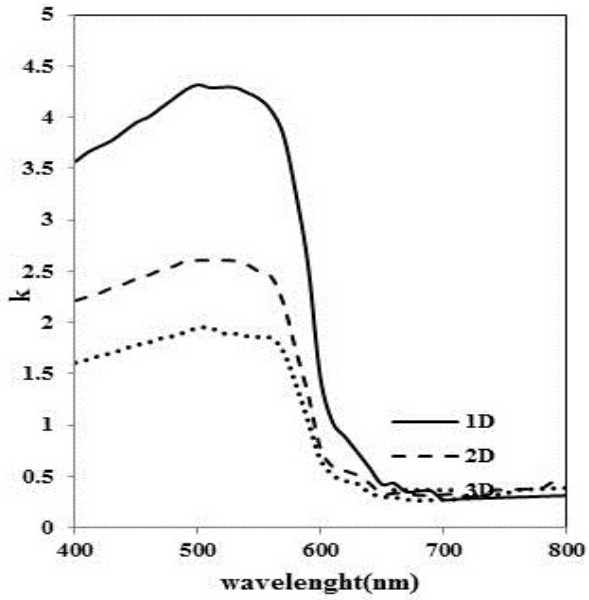

Figure 3: The imaginary part of refractive index of Mercury sulfide layers produced by CBD method at different run depositions.

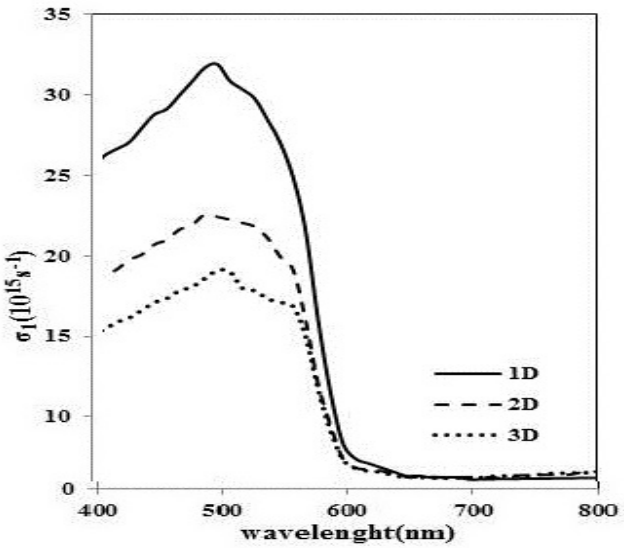

Figure 4: The real part of conductivity index of Mercury sulfide layers produced by CBD method at different run depositions.

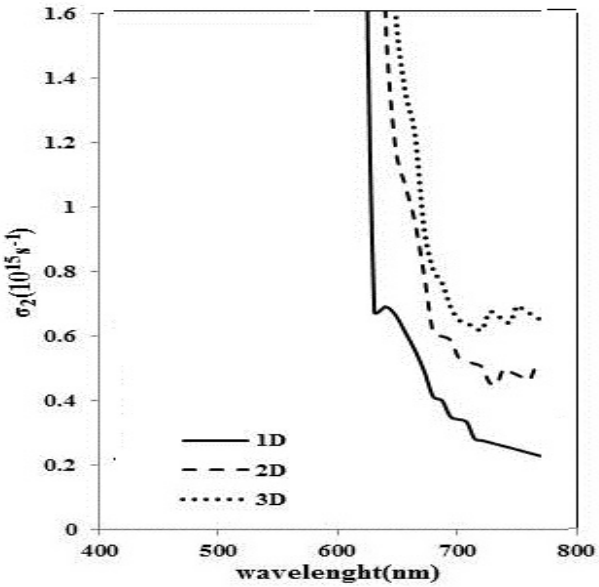

Figure 5: The imaginary part of conductivity index of Mercury sulfide layers produced by CBD method at different run depositions.

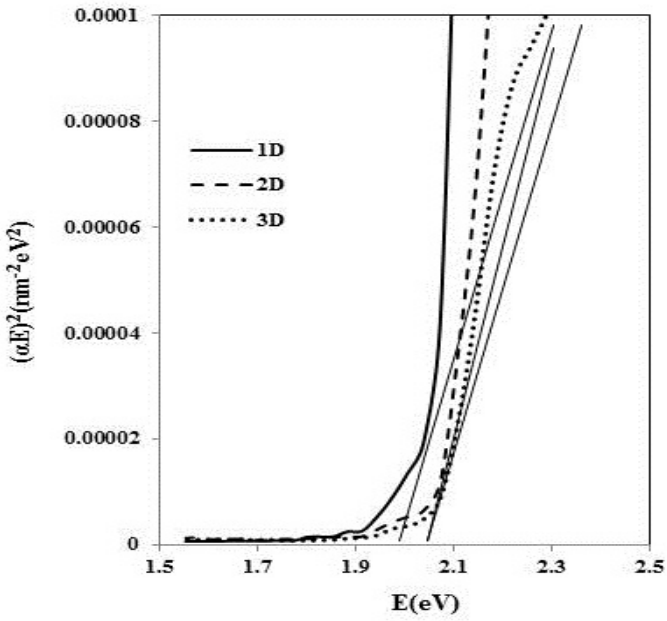

Figure 6: The values of band gap energy of Mercury sulfide layers produced by CBD method at different run depositions.

Table I: Details of produced HgS layers by CBD method.

Sample name	Number of depositions	Total deposition time
1D	1	1h
2D	2	2h
3D	3	3h

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RESEARCH ARTICLE

Effect of Lantana Camara Fruit Extract in Acid Base Titration as a Natural Indicator

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ABSTRACT

In present scenario natural indicators used more widely over synthetic one. Different plant parts such as flowers, fruits, bark etc. used for the preparation of natural indicators which developed the colour during titration at the end point due to presence anthocyanin. In this research work fruit part of *Lantana Camara* extract is used as natural indicator, contains Caryophyllene, 1-α-phellandrene, lantadene A, lantadene B, lancamarone quinine, lantanine, palmitic acid, stearic acid and germacrene-D. *Lantana Camara* is a species of the Lantana genus, belonging to the family Verbenaceae. The present work highlights the use of *Lantana Camara fruit* extract as a acid base indicator in different types of acid base titrations. The equivalence points obtained by the fruit extract coincident with the equivalence points obtained by standard indicators. This natural indicator was found to be a very useful, economical, simple and accurate for the acid base titration.

Keywords: Lanata camara, Acid base and Natural indicator.

INTRODUCTION

The plant *Lantana camara* Linn (Fig. a) family Verbenaceae has been reported by Munir A[1] is available throughout central and south India in most dry stony hills and black soil [2]. *Lantana camara* has various common names like Tantani, Ghaneri (Marathi), Raimuniya (Hindi), Chaturangi, Vanacchedi (**Sanskrit)**, big sage (Malaysia), wild sage, red sage, white sage (Caribbean) and tickberry (South Africa) [3]. Fruits are collected in summer season after it become violet in nature [4]. The fruit is a drupe which is size of small pea with dark purple endocarp [5].

A large scrambling evergreen, strong smelling shrub with stout recurred prickles; leaves are opposite sides, often rugose, scabrid on both sides; flowers are small in nature, normally orange but often white to dark red , in heads which are prominently capitates [6,7,8,9,10]; bracts conspicuous and persistent has been mentioned in review by Ghisalberti EL[11]. Fruits are small, 5 mm diameter, greenish-blue, blackish, drupaceous, and shining with two nutlets almost throughout the year. Seeds germinate very easily and it dispersed by birds[12]. Amongst the traditional use of this plant, the different parts of extract were beneficial in various diseases and disorders such as vulnerary, wounds, malaria, ulcers, diaphoretic, carminative, antispasmodic and tonic, swelling, asthma, epilepsy, tooth ache, tumors and rheumatism and antidote to snake venom, eczema has been reported in Anonymous, The wealth of India, Raw materials [13]. Triterpenoids, naphthoquinones, flavonoids, alkaloids and glycosides isolated from this plant are exerting diverse biological activities including cytotoxic and anticancer properties [14]. A steroid, lancamarone from the leaves exhibited cardiotonic and lantamine, an alkaloid from the stem bark and roots showed antipyretic and antispasmodic properties [15]. Therefore present work aims at studying extract of *Lantana Camara* as an indicator. Present investigations were carried out to justify its uses in the indigenous system of medicine and in analysis as a natural indicator.

MATERIALS AND METHODS

Plant Material

Lantana camara fruits were collected from Kanhapur village, Wardha (M.H.) in the month of March-April. Its identity was confirmed from the department of Botany, RTM Nagpur University, Nagpur. The collected fruits were dried in shade and stored.

Solvent Extraction:

Lantana camara Linn fruits (Fig. b) were washed and dried. The known quantity of fruits was extracted with water. The extract was made in two steps one by simple maceration of ripe fruits and another by crushing. The second extract was freshly made. The extract was centrifuged at room temperature for 15 minutes. The supernatant was separated and filtered by Whatmann filter paper and used as an indicator in several acid base titrations. The experimental work was carried out by using the same procedure for both standard indicator and fruits extract. The equimolar titrations were performed using 25 ml of titrant with three drops of indicator. All the parameters for experiment are given in **Table 1**. A set of five experiments was carried out. The mean and standard deviation were calculated from results and also the solvent extracts were concentrated under reduced pressure and preserved at 5°C in airtight bottle.

RESULTS AND DISCUSSION

The fruit are extracted with different solvents was screened and result of screening compared with the result obtained by standard indicators like methyl red, phenolphthalein and mixed indicator [methyl orange: bromocresol green (1:2)] for strong acid v/s strong base (HCl and NaOH), strong acid v/s weak base (HCl and NH_4OH), weak acid v/s weak base (oxalic acid and NH_4OH) titrations respectively. All these parameters are shown in **Table 1**. For all titrations the equivalence points obtained by the fruit extract matched with the equivalence points obtained by standard indicators. The results of screening were listed in **Table 2**.

CONCLUSION

It is concluded from the data, the *Lantana camara* fruit extract alone can used instead of mixed indicator in weak acid and weak base titration. *Lantana camara* fruit extract gives colored end point at the equivalence point. The results

obtained in all types of acid base titrations lead us to conclude that it was due to the presence of flavonoids and anthocyanin sharp color changes occurred at the end point of the titrations. At last we can say that it is always beneficial to use *Cocculus hirsutus* fruit ext *Lantana camara* fruit extract as an indicator in all types of acid base titrations because of its cost effectiveness, simplicity and availability.

ACKNOWLEDGEMENTS

The authors are very much thankful to Mr. Manoj V. Balpande President and Dr. U.N. Mahajan Principal of Dadasaheb Balpande college of Pharmacy, Besa Nagpur for providing the necessary facilities to carry out the research work. The authors are also grateful to Department of Botany, R.T.M. Nagpur University, Nagpur.

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Table 1: Analyzed parameters and the comparison of color change

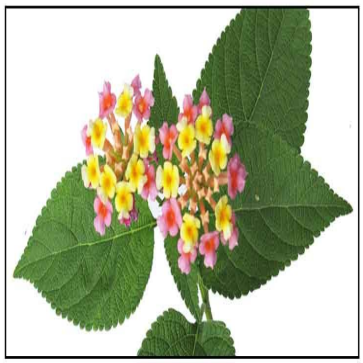
Titrate	Titrant	Indicator Colour Change	
		Standard	Fruit Extract
HCl	NaOH	Red to Yellow	Colourless to Yellow
HCl	NH_4OH	Colourless to Pink	Colourless to Faint Yellow
Oxalic acid	NaOH	Red to Yellow	Colourless to Yellow
Oxalic acid	NH_4OH	Orange to Blue green	Colourless to Faint Yellow

HCl: - Hydrochloric acid, NaOH:-Sodium Hydroxide, NH_4OH:-Ammonium Hydroxide

Table 2: Screening results of various titrations

Sr. No.	Titration (Titrant v/s Titrate)	Strength (Moles)	Indicator	Readings with S.D. (±)
1	NaOH V/S HCl	0.1	Methyl red	24.4±1.13
			Fruit extract	24.7±1.17
		0.5	Methyl red	24.8±1.19
			Fruit extract	25.6±1.14
		1	Methyl red	24.9±1.20
			Fruit extract	24.9±1.21
2	NH_4OH V/S HCl	0.1	Phenolphthalein	20.8±1.13
			Fruit extract	20.6±1.11
		0.5	Phenolphthalein	20.9±1.11
			Fruit extract	19.1±1.20
		1	Phenolphthalein	19.1±1.20
			Fruit extract	19.2±1.13
3	NaOH V/S Oxalic Acid	0.1	Methyl red	16.1±1.22
			Fruit extract	16.5±1.26
		0.5	Methyl red	16.5±1.29
			Fruit extract	16.4±1.31
		1	Methyl red	16.4±1.28
			Fruit extract	16.7±1.26
4	NH_4OH V/S Oxalic Acid	0.1	Mixed indicator	23.8±1.23
			Fruit extract	23.6±1.15
		0.5	Mixed indicator	23.4±1.16
			Fruit extract	23.8±1.18
		1	Mixed indicator	24.5±1.16
			Fruit extract	24.2±1.11

HCl: Hydrochloric acid, NaOH: Sodium hydroxide, NH_4OH: Ammonium hydroxide.



(a)

(b)

Fig. 1. Images of *Lantana camara* fruits: (a) The plant of *Lantana camara* (Verbenaceae) (b) The extract of fruits of *Lantana camara*.

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RESEARCH ARTICLE

Natural Sciences about Optical Properties of CuO Thin Layers Produced by CBD Method

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ABSTRACT

Thin layers of Copper oxide have been prepared by chemical bath deposition technique from different deposition times. The layers were grown on glass substrates. The deposition was performed in alkaline media at 80 °C and pH fixed on 7.5 constant values. Optical properties of Nano layers were studied by spectrophotometer analysis in VIS wavelength range. Natural optical properties were obtained by applying Kramers-Kronig relations on reflectivity curves. The optical band gap (Eg), was evaluated from VIS absorption spectra and found to have a mean value of 2.7eV. Changing deposition times affect on all optical properties.

Key words: Copper oxide; spectrophotometer; thin layer; optical properties.

INTRODUCTION

Copper oxide is one of those advantageous materials and has been studied for photovoltaic applications [l,2]. These layers have low toxicity and good environmental acceptability, and the constituent elements are cheap and plentiful. Copper oxide thin films have been deposited using many techniques such as reactive sputtering [3], ultrasonic spray pyrolysis [4], oxidation of copper sheet [5], and electro deposition [6]. Chemical bath deposition (CBD) is one of the chemical techniques and essentially suitable for the solar cell production, because it is capable of depositing a large-area film at a very low cost. In addition, the theoretical energy conversion efficiency of Cu_2O-based solar cell is about 20% [7]. Optical properties of thin metal films are determined by spectrophotometric, interferometric, and spectro ellipsometric methods. Optical constants determined in such calculations are significantly different in various works

and, in addition, differ essentially from the corresponding optical constants of massive metals by their values. In this work we used Kramers-Kronig relations applying on reflectivity curve to calculate natural optical properties of Copper oxide thin layers.

METHODOLOGY

Copper oxide layers were produced by chemical bath deposited on glass substrates. Prior to deposition, the platelets (50mm x 25mm x 1mm) were ultrasonically cleaned with acetone and then alcohol and dried. The details of the procedure are: amounts of $CuSO_4$ and Na_2SO_3 and NH_3 were separately prepared. Formed mixtures are thoroughly stirring for several minutes in order to dissolve the formed precipitate and solutions to become homogeneous. Then in obtaining solutions were added distilled water. These solutions were mixed in a beaker and stirred well for a few minutes. The deposition bath was continuously stirred and heated at 80ºC for 0.5, 1 and 1.5 hour as deposition times. The substrates were immersed into the deposition bath, by vertically suspending them around the stirrer. The substrates were taken out after 1hour as deposition time. Deposition parameters were: [$CuSO_4$] = 0. 1M,[Na_2SO_3]=0.05M**;** **[**NH_3 **]=** 0.01 M**;** pH = 7.5; All samples were annealed in air, at 250ºC for half hour. Table I shows the detail of deposited layers produced in this work. The optical constants of our samples were derived on the basis of standard Kramers–Kronig relations using computer techniques.

RESULTS AND DISCUSSION

In this work Kramers-Kronig relations were used to calculate the phase angle θ (E) [8]:

$$\theta(E) = -\frac{E}{\pi}\int_0^{E_2}\frac{\ln R(E) - \ln R(E_0)}{E^2 - E_0^2}dE + \frac{1}{2\pi}\ln[\frac{R(E)}{R(E_2)}]\ln\frac{E_2 + E}{|E_2 - E|}$$
$$+\frac{1}{\pi}\sum_{n=0}^{\infty}[4(\frac{E}{E_2})^{2n+1}](2n+1) \qquad (1)$$

Where E denotes the photon energy, E_2 the asymptotic limitation of the free-electron energy, and R(E) the reflectance. Hence, if E_2 is known, the θ (E) can be calculated. Then the real and imaginary parts of the refractive index were calculated, from which other parameters were obtained. Figure 1 show Reflectance curves of Copper oxide thin layers produced in this work. M. Muhibbollah optical curves as a reference are added to all optical curves for comparison. The general trend between our data and M. Muhibbollah data are the same. As it can be seen from figure 1, by increasing the time of deposition, reflectivity curves have increasing trend in general. That is because of configuration more complete layers by increasing deposition time. There is an intersection between optical curves that is because of formation complete layers from one hand and supper saturation property from other hand.

Figure 2 shows the real part of refractive index for layers produced in this work. By increasing time of deposition and formation of complete layers, fraction of voids decreases and denser layers produces, therefor real part of refractive index increases.

In figure 3 we depict the imaginary part of refractive index (k) for the layers produced in this work. Because of formation complete layers by increasing the time of deposition and decreasing the fraction of voids, transmittance increases therefore absorbance decreases, extinction coefficient decreases.

Figures 4 and 5 show the real and imaginary parts of conductivity respectively. By increasing time of deposition, the ratio of copper metallic ions increases on substrate, therefor the real part of conductivity index and the imaginary part of conductivity index increases. The intersection between conductivity curves are discussed before. Also this intersection is a proof of wavelength correlation for optical constants.

We depict the natural optical band gap in figure 6. By increasing time of deposition and increasing the ratio of copper metallic ions increases on substrate, band gap decreases. The value of bang gap calculated 3.65 eV, 3.25 eV and 1.2 eV for 0.5, 1 and 1.5 hours, respectively.

CONCLUSION

Thin layers of Copper oxide have been prepared by chemical bath deposition technique at different deposition times. The layers were grown on glass substrates. The deposition was performed in alkaline media at 80 °C and pH fixed on 7.5 constant values. Optical properties of Nano layers were studied by spectrophotometer analysis in VIS wavelength range. Natural optical properties were obtained by applying Kramers-Kronig relations on reflectivity curves. By increasing time of deposition for copper sulfide, reflectivity, real and imaginary parts of refractive index, real and imaginary parts of conductivity index, increased. The optical band gap (Eg) , was evaluated from VIS absorption spectra and found to have a mean value of 2.7 eV and by increasing time of deposition because of increasing the ratio of copper metallic ions on layers, band gap decreases. Changing deposition time affect on all optical properties.

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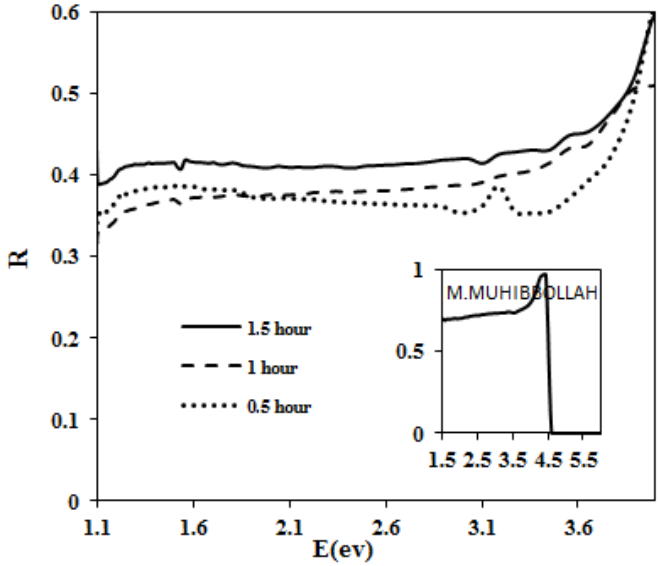

Figure 1: The reflectance of Copper oxide layers produced by CBD method at different deposition times.

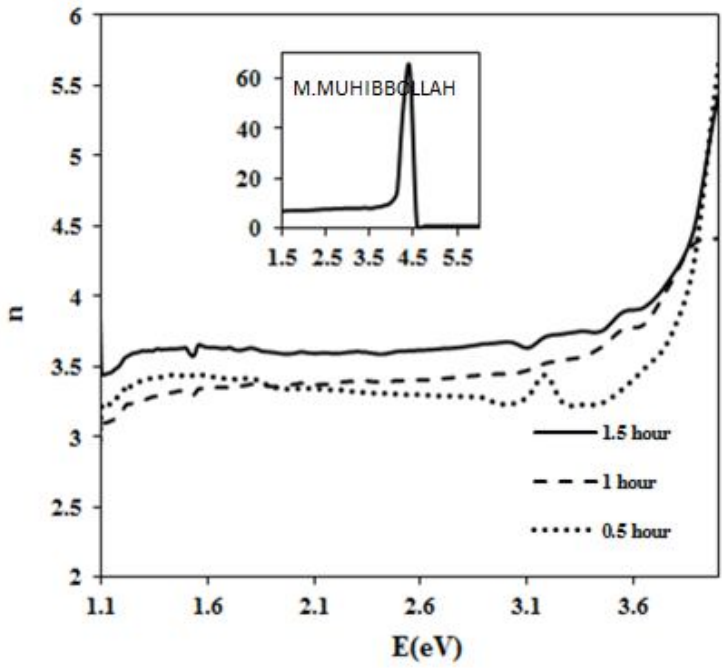

Figure 2: The real part of refractive index of Copper oxide layers produced by CBD method at different deposition times.

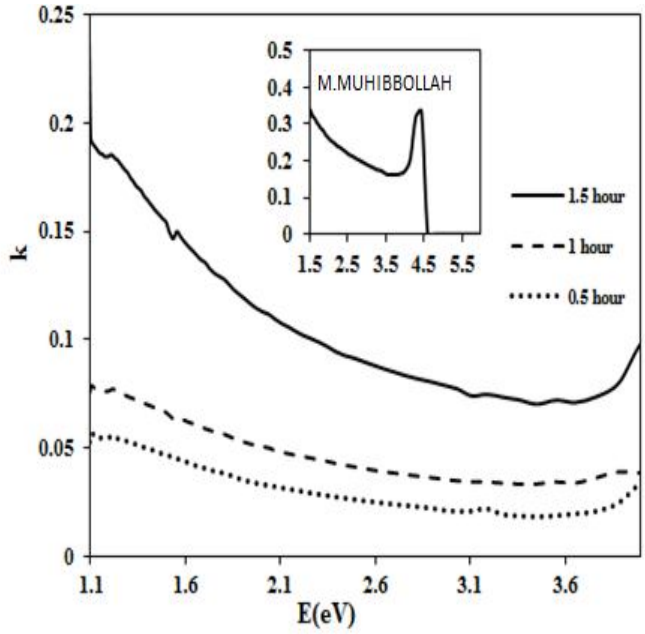

Figure 3: The imaginary part of refractive index of Copper oxide layers produced by CBD method at different deposition times

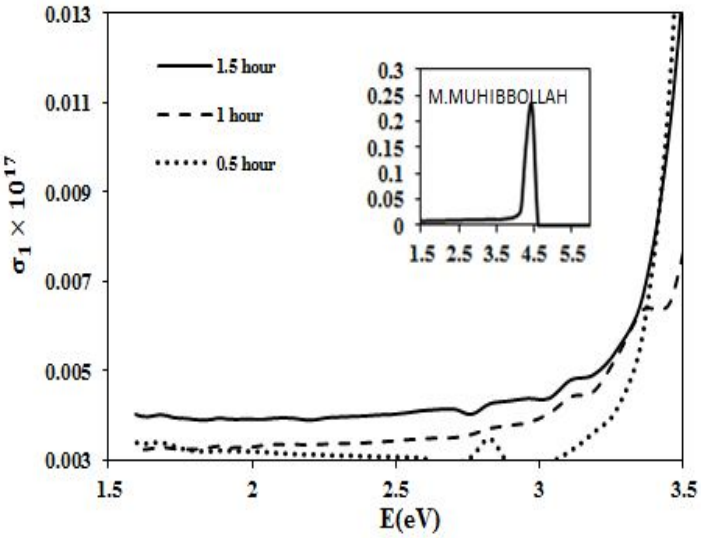

Figure 4: The real part of conductivity index of Copper oxide layers produced by CBD method at different deposition times.

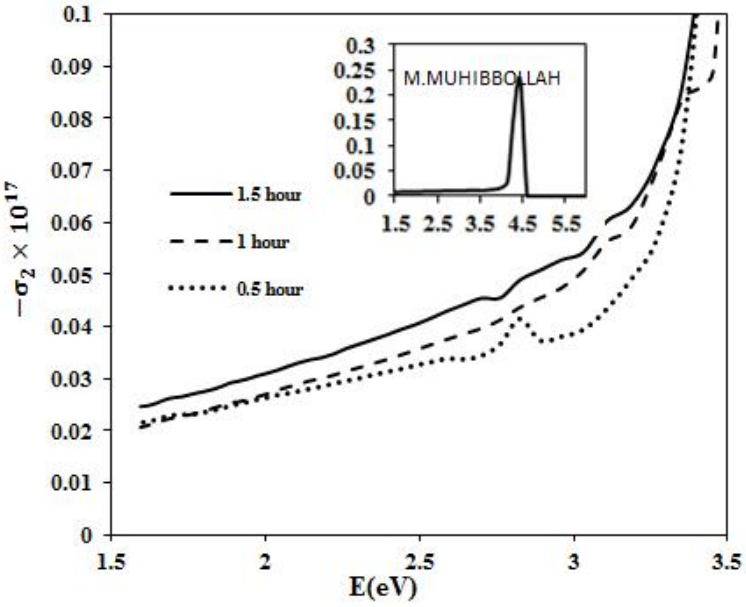

Figure 5: The imaginary part of conductivity index of Copper oxide layers produced by CBD method at different deposition times.

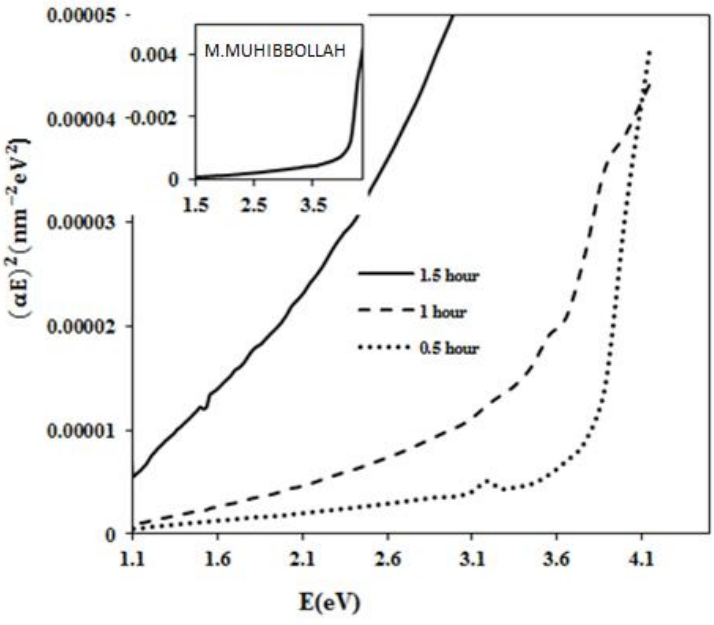

Figure 6: The values of band gap energy of Copper oxide layers produced by CBD method at different deposition times.

Table I: Details of produced CuO layers by CBD method.

Sample name	Deposition time
1	o.5 hour
2	1 hour
3	1.5 hour

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RESEARCH ARTICLE

Development of Validated Hplc Method for Analysis of Atropine Sulphate in Bulk and Marketed Injectable Formulations

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ABSTRACT

A simple and precise reverse- phase high- pressure liquid chromatographic method has been developed for determination of atropine sulphate in bulk drug and marketed injectable formulations. . The elution was isocratic using a column RP C-18 (250 mm X 4.6 mm X 5 micron) and Acetonitrile: Water (60:40, v/v) pH 5.6 as mobile phase. Detection was carried out at 232 nm with a UV-VIS detector. The retention time for standard atropine sulphate was found to be 4.08 minutes. Calibration curve was linear over concentration range 30-100 µg/ml. Linearity was found to be r2 =0.995.The proposed method was validated for linearity, accuracy, precision LOD and LOQ. The active content of atropine sulphate in injectable formulations was determined and also compared with label claim.

Keywords:-Atropine sulphate, HPLC method, Validation parameters.

INTRODUCTION

Atropine is a tropane alkaloid extracted from deadly nightshade (Atropa belladonna), jimsonweed (Datura stramonium), mandrake (Mandragora officinarum) and other plants of the family Solanaceae[1]. Atropine probably doesn't preexist in the plant, but is formed from its isomer Lhyoscyamine by racemization during its extraction process). It is a secondary metabolite of these plants and serves as a drug with a wide variety of effects. It is a competitive antagonist for the muscarinic acetylcholine receptor. It is classified as an anticholinergic drug. Being potentially deadly, it derives its name from Atropos, one of the three Fates who, according to Greek mythology,

choose how a person was to die. Atropine is a core medicine in the World Health Organization's "Essential Drugs List", which is list of minimum medical needs for a basic health care system. Atropine is a racemic mixture of Dhyoscyamine and L-hyoscyamine, with most of its physiological effects due to L-hyoscyamine. Its pharmacological effects are due to binding to muscarinic acetylcholine receptors. It is an antimuscarinic agent[3].The most common atropine compound used in medicine is atropine sulfate (C17H23NO3)2-H2SO4-H2O, the full chemical name is 1α H, 5αHTropan-3-α o1 (±)- tropate(ester), sulfatemonohydrate [4-7]. Chemical structure of atropine sulphate is shown in fig. 1

There are various methods reported for estimation of atropine sulphate by LC-MS enantio separation by capillary electrophoresis, chiral separation , with fluorescence detection, with conductometric detection, by cationexchange using ion-pair chromatography. However, there are very few methods reported for the analysis of atropine sulphate in a pharmaceutical dosage from[8]. Thus, an improved LC-UV method was developed and validated.

EXPERIMENTAL

Chemicals and Material:

All solvents were of HPLC grade. All other materials were purchased of analytical grade E-Merck, Qualigens, and Rankem etc. Distilled water and Whatman filter paper Grade-I were used throughout the experimental work. A standard Atropine sulphate marker compound was received as a gift sample from "Unijules Life Sciences Pvt. ltd." Nagpur, Maharashtra. The marketed formulations were purchased from the local market.

HPLC Instrumentation:

LC-10 AT VP Shimadzu Liquid Chromatography HPLC with Hyper ODS 2 C18 (size 4.6mmx250mm, particle size 5 μm) column was used for the study. SPD-10 AVP Shimadzu UV-Visible is used as a detector and Shimadzu PU 2080 plus was the solvent delivery system. The system control and data processing were performed by ANALCROM software (Table1).

Mobile Phase:

The mobile phase consists of Acetonitrile: water (60:40), pH- 5.6 and the flow rate was 1.0ml/min

Calibration curves of Atropine Sulphate:

Serial standard eight different concentration levels of Atropine sulphate (30-100 μg/ml) were prepared. For HPLC analysis, a 20μL sample volume was injected 5 times. The chromatograms were monitored by UV at 232nm. The peak area of UV chromatograms were plotted versus the concentration and the calibration curve was constructed using a least square regression equation for the calculation of slope, intercept, and square of correlation coefficient.

Analysis of Atropine Sulphate in marketed formulations:

The marketed formulation A (labeled claim: Atropine sulphate 100mg/100ml) and formulation B (labeled claim: Atropine sulphate 100mg/100ml), quantity equivalent to 100 mg was taken and diluted to 100 ml with mobile phase. This final stock solution of formulation A and B was further diluted with the mobile phase to get the final concentration of about 50 μg/ml of Atropine.

VALIDATION OF METHOD[9]:

Precision

Repeatability of sample application and measurement of peak area were carried out using five injections of same sample (50μg/ml of Atropine sulphate). The intra and inter-day variation of the determination of Atropine sulphate was carried out at two different concentration levels.

Recovery studies

The analyzed samples were spiked with50, 100 and 150% of the standard Atropine sulphate and the mixtures were reanalyzed by proposed method. The experiment was conducted three times. This was done to check for the recovery of the drug at different levels in the formulation.

Stability of Atropine sulphate in standard and test solutions

A standard solution was initially prepared (std.no.1) and held under refrigerated condition (4^0 – 8^0 c) for up to 30 days and tested against freshly prepared standard solution (std.no.2). A test solution of two different brands were initially prepared (Test 1and 2) and held under refrigerated condition (4^0 – 8^0c) for up to 30 days and tested against freshly prepared test solution (Test 3 and 4)

.

RESULTS AND DISCUSSION

Development of the optimum mobile phase:

Each mobile phase was filtered through 0.45 μ membrane filter. The mobile phase was allowed to equilibrate phase until steady baseline was obtained. The standard solutions containing Atropine sulphate was run and different individual solvents as well as combinations of solvents were tried to get a good separation and stable peak. From the various mobile phases tried, mobile phase containing Acetonitrile: Water (60:40), pH 5.6 was selected as it shown sharp peak with symmetry and significant reproducible retention time for Atropine sulphate. It is given in table 1 and chromatogram of Atropine sulphate is shown in Figure 2.

Calibration curves:

The linear regression data for the calibration curve as shown in table 2 showed a good linear relationship over the concentration range 30-100 μg/ml with respect to peak area.

Validation of the Method

Precision

The repeatability of sample injection and measurement of peak area were expressed in terms of %RSD and results are depicted in Table 3, which revealed intra and intre-day variation of Atropine sulphate.

Recovery studies

The proposed method when used for extraction and subsequent estimation of Atropine sulphate from marketed formulations after spiking with 50,100 and 150% of additional drug afforded recovery of 99.91-100.35% as listed in table 4.

Stability of Atropine in standard and test solutions

Under refrigerated condition (4^0 – 8^0c) standard and test solutions remains stable for up to 30 days (Table 5, 6).

Analysis of Atropine in prepared marketed formulations

The content of Atropine Sulphate in marketed formulation A was found to be 99.15 with a %RSD of 0.2056 and in formulation B, 100.06% with a %RSD of 0.1953. It may therefore be inferred that the marketed formulations can be analyzed using this new and simple method. The low %RSD value indicated the suitability of this method for routine analysis of Atropine Sulphate in pharmaceutical injectable dosage forms.

ACKNOWLEDGEMENTS

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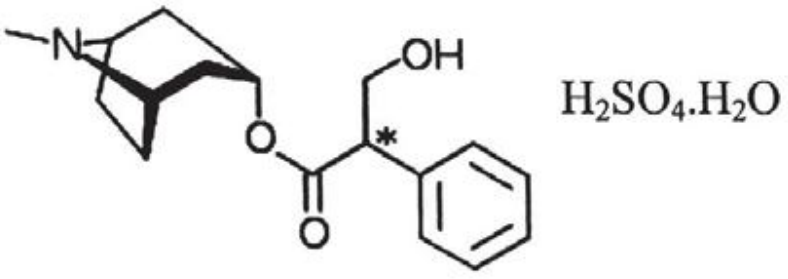

Fig. 1: Structure of Atropine sulphate

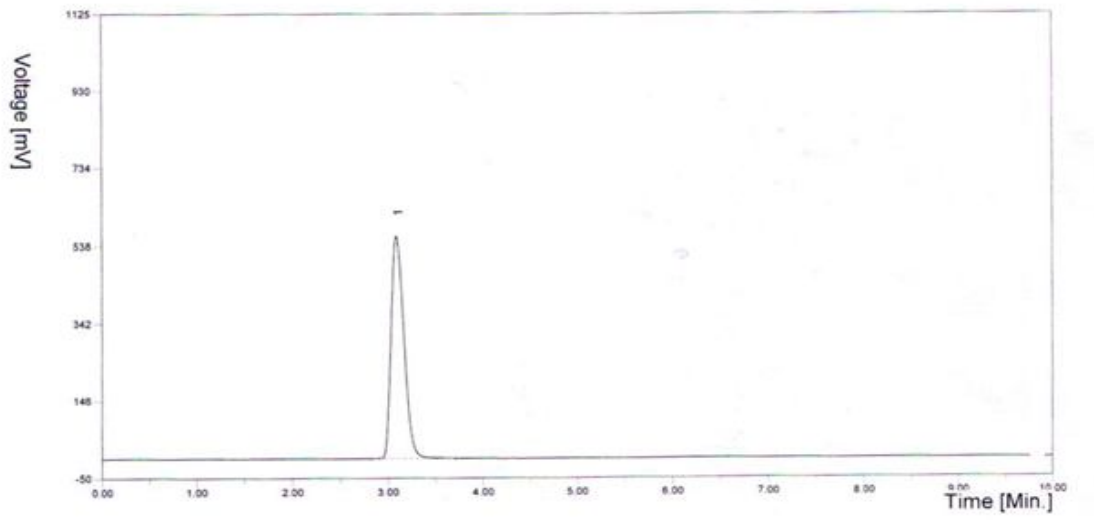

Fig. 2: Chromatogram of Atropine Sulphate standard (50µg/ml)

Table 1: Optimized Chromatographic Conditions:

Parameters	**Method**
Stationary phase (column)	LC-10 AT VP Shimadzu Liquid Chromatograph- HPLC with Hyper ODS 2 C18 (size 4.6mmx250mm,particle size 5 µm) column
Mobile Phase	Acetonitrile: water (60:40) pH 5.6
Flow rate (ml/min)	1 ml/min.
Run time (minutes)	15
Volume of injection loop (µl)	20
Detection wavelength (nm)	232
Drug RT (min)	4.08

Table 2: Linear regression data for the calibration curve

Parameters	**Results**
Linearity range (µg/ml)	30-100
Correlation coefficient	0.9950
Slope ± S.D.	52.13 ± 0.49
Y intercept	0

Table 3: Intra and interday precision of HPLC method

Sr. No.	Sample No.	% Drug Estimation			
		Interday		Intraday	
		Formulation A	Formulation B	Formulation A	Formulation B
1.	I	98.56	99.85	97.94	98.49
2.	II	99.23	100.02	98.63	99.50
3.	III	99.60	99.46	97.80	99.70
	Mean	99.1300	99.7766	98.1233	99.2300
	±S.D.	0.2380	0.3145	0.0048	0.0358
	R.S.D.	0.2132	0.3211	0.0049	0.0364

Table 4: Recovery studies

Formulation A					
Sr. No.	Eq. Qty. of Inj. (ml)	Amount of Pure drug added (mg)	Peak area of standard	Peak area of sample	% Recovery*
1	0.1	0.50	139714.00	209988.23	100.20
2	0.1	1.0	139714.00	280402.52	100.35
3	0.1	1.5	139714.00	349876.23	100.17
				Mean	100.24
				±S.D.	0.2493
				R.S.D.	0.2506
Formulation B					
1	0.1	0.5	139714.00	210305.83	100.35
2	0.1	1.0	139714.00	279396.35	99.99
3	0.1	1.5	139714.00	348987.67	99.91
				Mean	100.0833
				±S.D.	0.1808
				R.S.D.	0.1813

***** Each value is the mean of five observations

Table 5: Results of std. Solution stability

Standard No.	1	2
Concentration	50 mcg/ml	50 mcg/ml
Preparation date	20/03/2015	19/04/2015
Mean area	139950.54	139652.45
RSD	0.1959	0.2308

Table 6: Results of sample solution stability

Test No.	1	2	3	4
Concentration	50 mcg/ml	50 mcg/ml	50 mcg/ml	50 mcg/ml
Preparation date	25/03/20015	25/03/20015	25/03/20015	25/03/20015
Mean Assay	100.03	99.56	99.89	99.58
RSD	0.2302	0.2363	0.0186	0.2578

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RESEARCH ARTICLE

The Effects of Intramuscular Injections of Vitamin B_{12} on Red Blood Cells Parameters of Dairy Cows in Early Lactation Fed Dietary Supplements of Rumen-Protected Methionine

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ABSTRACT

In order to evaluate the effects of intramuscular injection of vitamin B_{12} on the parameters of red blood cells in early lactation dairy cows fed the diet supplemented with rumen-protected methionine, an experiment was conducted and implemented. In the experiment, which lasted for 42 days, 16 Holstein dairy cows in early lactation were used. Design used in this experiment was randomized complete block design with the 2×2 factorial arrangement. In this experiment, there were four treatments, which in each treatment is placed two cows primiparous and two cows multiparous. Treatments included: 1: The group receiving the basal diet, 2: The group receiving the basal diet with vitamin B_{12} injections, 3: The group receiving the basal diet with rumen-protected methionine, 4: The group receiving the basal diet with vitamin B_{12} injections and rumen-protected methionine. A distance of seven days once, the amount of five milligrams of vitamin B_{12} took place. The group receiving the methionine received 15 g rumen-protected methionine in three meals daily. In this study, a diet with forage to concentrate ratio of 35 to 65 for all treatments were formulated. Count RBC analysis showed no significant difference in the use of vitamin B_{12} and supplemental methionine, between the experimental groups has not been established ($P>0.05$). There was a significant effect of time on the number of red blood cells ($P<0.05$) and an increase in the number of cells was observed at the end of the period compared to the beginning of the period (6670000 compared to 6471000; Number per microliter). Hemoglobin levels between experimental groups showed no significant difference ($P>0.05$). The effect of time on hemoglobin concentration was statistically significant ($P<0.05$). Hemoglobin at the end of the period compared to the beginning of the period increased (11 vs. 9.7 g/dl). MCH showed a significant difference between treatments ($P<0.05$). Cows that

received vitamin B_{12} had a MCH higher than the cows that did not receive the vitamin (17.1 vs. 16.2 Pg) respectively. Cows receiving vitamin B_{12}, compared to cows that did not receive the vitamins had a higher MCV (51.8 vs. 48.6 Fl) respectively. Data analysis did not show no significant effect on blood hematocrit in the experimental group ($P>0.05$). The effect of time on blood hematocrit was significant ($P<0.05$) and the cows had a higher hematocrit at the end of the period than in the beginning (33.3 vs. 29.2 %) respectively. Regarding the relationship between vitamin B_{12} and methionine in several metabolic pathways, it seems that in addition to the effects of each one of them, they also have an additive effect. Therefore, was goal of this study investigated the effects methionine and vitamin B_{12} on red blood cells parameters of dairy cows in early lactation as well as their interactions effects.

Abbreviation key: **Hct**= hematocrit, **MCV**= mean corpuscular (cell) volume, **MCH**= mean corpuscular (cell) hemoglobin, **MCHC**= mean corpuscular (cell) hemoglobin concentration, **RBC**= red blood cell, **Hb**= hemoglobin, **5-methyl-THF**= 5-methyl-tetrahydrofolate, **SAM**= Sadenosylmethionine, **THF**= tetrahydrofolate, **B-**= Lack of vitamin B_{12} injections**, B+=** Injection of vitamin B_{12}**, M-=** Non-methionine**, M+=** Receive rumen-protected methionine

Key words: Vitamin B_{12}; rumen-protected methionine; red blood cell; lactation

INTRODUCTION

Vitamin B_{12} has the most complex structure of all the vitamins. The basic unit is a corrin nucleus, which consists of a ring structure comprising four five-membered rings containing nitrogen. In the active centre of the nucleus is a cobalt atom. A cyano group is usually attached to the cobalt as an artefact of isolation and, as this is the most stable form of the vitamin, it is the form in which the vitamin is commercially produced (Mcdonald et al., 2011). In mammals, two enzymes are vitamin B_{12}-dependent. The first enzyme is methionine synthase, and second enzyme is methylmalonyl-CoA mutase (Girard and Matte, 2005). Needs methylmalonyl-CoA mutase to Adenosyl-cobalamin and methionine synthase to methyl-cobalamin as a cofactor (Lesson and Summers, 2001). Methylmalonyl-CoA is formed as an intermediate in the catabolism of valine and by the carboxylation of propionyl-CoA arising in the catabolism of isoleucine, cholesterol, and, rarely, fatty acids with an odd number of carbon atoms—or directly from propionate, a major product of microbial fermentation in ruminants. It undergoes vitamin B_{12}- dependent rearrangement to succinyl-CoA, catalyzed by methylmalonyl-CoA isomerase. The activity of this enzyme is greatly reduced in vitamin B_{12} deficiency, leading to an accumulation of methylmalonyl-CoA and urinary excretion of methylmalonic acid, which provides a means of assessing vitamin B_{12} nutritional status (Murray et al., 2003). The active form of folic acid (pteroyl glutamate) is THF. THF is a carrier of one-carbon units. When acting as a methyl donor, SAM forms homocysteine, which may be remethylated by methyltetrahydrofolate catalyzed by methionine synthase, a vitamin B_{12}-dependent enzyme. The reduction of methylene-tetrahydrofolate to methyl-tetrahydrofolate is irreversible, and since the major source of tetrahydrofolate for tissues is methyl-tetrahydrofolate, the role of methionine synthase is vital and provides a link between the functions of folate and vitamin B_{12}. Impairment of methionine synthase in B_{12} deficiency results in the accumulation of methyl-tetrahydrofolate "folate trap". Therefore there is functional deficiency of folate secondary to the deficiency of vitamin B_{12} (Murray et al., 2003). Pernicious anemia arises when vitamin B_{12} deficiency blocks the metabolism of folic acid, leading to functional folate deficiency. This impairs erythropoiesis, causing immature precursors of erythrocytes to be released into the circulation (megaloblastic anemia). The commonest cause of pernicious anemia is failure of the absorption of vitamin B_{12} rather than dietary deficiency. This can be due to failure of intrinsic factor secretion caused by autoimmune disease of parietal cells or to generation of anti-intrinsic factor antibodies (Murray et al., 2003). Deficiency of folic acid itself or deficiency of vitamin B_{12}, which leads to functional folic acid deficiency, affects cells that are dividing rapidly because they have a large requirement for thymidine for DNA synthesis. Clinically, this affects the bone marrow, leading to megaloblastic

anemia (Murray et al., 2003; Aboamer et al., 2015). The amount of cobalt in the diet is the primary factor limiting the synthesis of vitamin B_{12} by rumen microflora (Mcdowell, 2000). Low serum concentrations of vitamin B_{12} have been observed in the some of dairy cows in early lactation (Girard and Matte, 2005; Assan, 2014; Alameen et al., 2014). In monogastric animals, methionine, choline and creatine in the diet are major sources of methyl groups (Snoswell and Xue, 1987). In ruminants, choline by rumen microflora is destroyed, as well as plant material in their diet contains adequate amounts of creatine or creatinine were not, as a result, these products should be provided through endogenous synthesis, in addition, the supply of methionine in ruminants, especially during lactation is much less (NRC, 2001; Saulawa et al., 2012; Mahesh et al., 2013; Nabila et al., 2014).

Because of the continuing need to replenish red blood cells, the erythropoietic cells of the bone marrow are among the most rapidly growing and reproducing cells in the entire body. Therefore, as would be expected, their maturation and rate of production are affected greatly by a person's nutritional status. Especially important for final maturation of the red blood cells are two vitamins, vitamin B_{12} and folic acid. Both of these are essential for the synthesis of DNA, because each in a different way is required for the formation of thymidine triphosphate, one of the essential building blocks of DNA. Therefore, lack of either vitamin B_{12} or folic acid causes abnormal and diminished DNA and consequently, failure of nuclear maturation and cell division (Guyton and Hall, 2006).

MATERIALS AND METHODS

Cows and Treatments

Sixteen Holstein cows from the dairy herd in a dairy farm in the city of Malard were placed in two blocks. Animals intended, using a computer information system of dairy cattle breeding, cows and heifers with reviews based on the time calving and parity were selected. Block 1 (Primiparous cows), which includes eight head of cattle (body weight: 564 ±30) and block two (second and third calving) of eight animals (body weight: 603 ±30). Four animals in each group the basal diet with the desired treatment received. Cows were randomly assigned to each of the treatments. The cows were kept in a tie-stall barn under 16 h/d of light (0530 to 2130 h) and were milked thrice daily at 8-h intervals. The experiment lasted for 42 days. Animals were grouped on the basis of parity. So that in each experimental group there were two cows calving the first and two cows second calving. Treatments included: 1: The group receiving the basal diet, 2: The group receiving the basal diet with vitamin B_{12} injections, 3: The group receiving the basal diet with rumen-protected methionine, 4: The group receiving the basal diet with vitamin B_{12} injections and rumen-protected methionine. Vitamin B_{12} injection, the amount of five milligrams, the distance took place once every seven days. Vitamin used was a four-ml ampoule which was contains 1000 mg of cyanocobalamin. The group receiving the methionine, 15 g rumen-protected methionine (80% rumen by-pass) on a daily basis, receiving in three meals. At each meal, methionine for each head of cattle, fully manual with concentrates were mixed. In this study, a diet was formulated for all treatments. In all diets, forage to concentrate ratio was 35 to 65. Forage resources in the diet of alfalfa hay were selected. Cows nutrients needs was determined using table feed standards national research council (2001). With the using of diet program software (NRC, 2001), feed rations were adjusted. The ingredients and the chemical composition of the basal diet were shown in tables 1 and 2 respectively.

Sampling Procedure and Measurements

Whole blood was collected by venipuncture of the caudal vein, using blood collection tube, at the beginning of the experiment (d 0) and every two wk thereafter (Girard and Matte, 2005). Number of RBC, Hct, Hb values, MCH (Hb/RBC), MCV (Hct/RBC) and MCHC (MCH/MCV) were determined according to the methods described in Girard and Matte (2005).

Statistical Analysis

Design used in this experiment was a randomized complete block design with 2×2 factorial arrangement. In each group is placed two cows with first calving and two cows with more than once calving. After collecting data in Excel recorded and categorized. SAS (version 9.1, 2003) statistical software was used to analyze the data and analysis. Results are reported as least squares means and SE.

RESULTS AND DISCUSSION

The results of statistical analysis of red blood cell parameters listed in table 3. RBC analysis showed that no significant difference has not been established through the use of vitamins B_{12} and supplemental methionine between experimental groups ($P>0.05$). There was a significant effect of time on the number of red blood cells ($P<0.05$) and an increase in the number of cells was observed at the end of the period compared to the beginning of the period (6670000 compared to 6471000 Number per microliter). Hemoglobin levels between experimental groups showed no significant difference ($P>0.05$). The effect of time on hemoglobin concentration was statistically significant ($P<0.05$). Hemoglobin at the end of the period compared to the beginning of the period was increased (11 vs. 9.7 g/dl). Hemoglobin concentration was increased due to the vitamins B_{12} involved in the synthesis of hemoglobin. Throughout the experimental period, supplementary vitamin B_{12} increased blood hemoglobin (Girard and Matte, 2005). MCH showed a significant difference between treatments ($P<0.05$). Cows that received vitamin B_{12} had a MCH higher than the animals that did not receive the vitamin (17.1 vs. 16.2 Pg) respectively. However, significant differences between the M+ and M- animals was not observed in this trait ($P>0.05$). The effect of time on the statistical analysis of this trait was also not significant ($P>0.05$). Significant effect on measured MCV between the experimental groups was observed ($P<0.05$). Cows receiving vitamin B_{12}, compared to cows that did not receive the vitamins had a higher MCV (51.8 vs. 48.6 Fl) respectively. Significant differences between the M+ and M- animals was not observed in MCV ($P>0.05$). Mean MCV in cows fed experimental diets B-M-, B+M-, B-M+, B+M+, was 49.7, 50.1, 47.4 and 53.5 Fl, respectively. Cows that are both complementary received, had the highest MCV ($P<0.05$). An increase in the MCV is due to increased blood Hb. Hb increase was that affected by vitamin B_{12}, because an increase in the MCV. Due to increased MCV increases the power of transfer of oxygen to the tissues. Data analysis, no significant effect on blood Hct in the experimental group did not show ($P>0.05$). The effect of time on blood Hct was significant ($P<0.05$) and the cows had a higher Hct at the end of the period than in the beginning (33.3 vs. 29.2 %), respectively.

The experiment was conducted in the same width and characteristics such as dry matter intake were measured, although there was no statistically significant difference in dry matter intake between treatments ($P>0.05$), but cows receiving vitamins B_{12} had a higher average dry matter intake of cows B-. The highest dry matter intake was between experimental groups of animals that received only vitamin B_{12} (table 4). In analyzing the data, cows multiparous had higher DMI than cows primiparous. Analysis of variance showed that the experimental groups in the second and sixth weeks showed statistically significant differences in dry matter intake ($P<0.05$). Also on an experiment the effect of vitamin B_{12} on dry matter intake was not significant (Graulet et al., 2007), However, in their study well as group receiving vitamin B_{12}, 700 g dry matter intake was higher. Preynat et al. (2009) observed no significant effect of dry matter intake between experimental groups. According to the results of Preynat and Lapierre (2009) there was no significant effect of the combination of folic acid and vitamin B_{12} and protected methionine on dry matter intake. Girard and Matte (2005) reported a non-significant increase (1 kg) of dry matter intake by injecting B_{12}.

Factors that can affect dry matter intake are role of vitamin B_{12} as a cofactor in methylmalonyl-CoA mutase. It undergoes vitamin B_{12}- dependent rearrangement to succinyl-CoA, catalyzed by methylmalonyl-CoA isomerase. Also succinyl-CoA turn to enter the citric acid cycle is converted to succinate. By adding levels of propionic acid diet, B_{12} vitamin deficiency can be induced. Propionate metabolism in ruminants is important, because of fermentation of carbohydrates; propionate production is increased very much. Propionate normal production continues, but in cobalt

and vitamin B_{12} deficiency is reduced levels usual of propionate in blood and accumulates methylmalonyl-CoA. These circumstances increases the urinary excretion of methylmalonic acid and reduces appetite, because of defects in the metabolism of propionate, leading to higher levels of blood propionate which there is an inverse correlation with feed intake. Due to the high concentrate diets were used in this experiment, increase blood propionate in cows that did not receive the vitamin B_{12}, can be a limiting factor feed intake. One of cause of increased dry matter intake of the use of vitamin B_{12} could be related to efficiency of oxygen, and its effect on feed intake control. DMI can also be affected by oxygen consumption. Animals consume net energy at a rate that optimizes the use of oxygen and minimizes production of free radicals that lead to aging (NRC, 2001). The effects of vitamin B_{12} on the volume of red blood cells were clearly visible. This increase, improves oxygen transport by red blood to cells. On the other hand, vitamin B_{12}, has also increased the amount of hemoglobin, this is also a factor in increasing oxygen transport.

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Table 1: Ingredients composition of the experimental basal diet

Ingredients	%
Alfalfa	35
Barley	28
Corn	6
Cottonseed	6.7
Cottonseed meal	4.4
Soybean meal	8.4
Wheat bran	9.85
Fish meal	0.25
Salt	0.42
Calcium carbonate	0.49
Sodium bicarbonate	0.49

Table 2: Nutrient composition of experimental basal diet

Dry matter (%)	87.5
NEL (Mcal/kg)	1.59
Crude protein (%)	17.6
Methionine (Percent of CP)	1.93
Cobalt (mg/kg)	6.87

Table 3: Effects of intramuscular injections of vitamin B_{12} on red blood cells parameters of dairy cows in early lactation fed dietary supplements of rumen-protected methionine

Effect	Treatment	Hb[1]	RBC[2]	MCH[3]	MCHC[1]	Hct[4]	MCV[5]
Effect of vitamin B_{12}	B+	11.08	6481000	17.1 [a]	33.1	33.4	51.8 [a]
	B-	10.7	6660000	16.2 [b]	33.2	32.3	48.6 [b]
	SEM	0.3	241000	0.27	0.28	0.9	0.9
	P-value	0.48	0.63	0.03	0.74	0.41	0.03
Effect of methionine	M+	10.8	6565000	16.5	32.8	32.9	50.5
	M-	11	6577000	16.8	32.5	32.7	49.9
	SEM	0.3	248000	0.26	0.27	0.9	0.9
	P-value	0.69	0.97	0.5	0.08	0.87	0.67
Interactions of vitamin B_{12} and methionine	B-M-	10.9	6591000	16.6	33.4	32.7	49.7 [ab]
	B+M-	11.06	6563000	16.9	33.7	32.7	50.1 [ab]
	B-M+	10.5	6730000	15.7	33.1	31.8	47.4 [b]
	B+M+	11.1	6400000	17.3	32.4	34	53.5 [a]
	SEM	0.42	343000	0.3	0.39	1.2	1.3
	P-value	0.91	0.63	0.1	0.21	0.39	0.04

1- Expressed in grams per deciliter, 2- Number per microliter, 3- Expressed in picograms, 4- Percent, 5- Expressed in femtoliters, The letters [a-b]: In each column, the letters are dissimilar, there is a significant difference (P<0.05).

Table 4: Effects of intramuscular injections of vitamin B_{12} on dry matter intake of dairy cows in early lactation fed dietary supplements of rumen-protected methionine

Effect	Treatment	DMI (Kg/d)
Effect of vitamin B_{12}	B+	23
	B-	22.6
	SEM	0.2
	P-value	0.17
Effect of methionine	M+	22.8
	M-	22.9
	SEM	0.19
	P-value	0.82
Interactions of vitamin B_{12} and methionine	B-M-	22.6
	B+M-	23.1
	B-M+	22.6
	B+M+	23
	SEM	0.28
	P-value	0.82

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RESEARCH ARTICLE

Explanation of Urban Spatial Structure with Emphasis on Urban Economic Theories; A Transition from Monocentric to Polycentric

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ABSTRACT

The purpose of this study is explanation of transition from monocentric to polycentric with emphasis on urban economic theories. Thespatial economy of cities was considered to comprise of a large concentration of employment in the central business districts in the final decades of the 20th century. Basic spatial structure changes have, however, occurred since then. To put it a main, urban areas have spread out into discrete, without border and center urban forms with a growing number of sub-centres flexible new economic activities. With the development of suburban sub-centers independent or subsidiary to the older CBD, the monocentric model has been criticized recently for its defect to explain the spatial pattern of huge modern urban areas. One of the main criticisms is that cities are polycentric. Polycentric city is one of enclosures of monocentric citymodel, and alternative analytical tools to describe the employment centers in urban areas. In an attempt to address these transformations in urban area form economists have modified the monocentric model. Thepolycentric model to the post-industrial form of urban agglomeration is explained by increasing geographical scales of incidence of specific kinds of agglomeration economies due to evolutions in transport, technologies and communication. In addition, some other models are derived from the fact that sub-centers are formed after the establishment of a dominant center, and develop by a balance between internal economies of production scale and diseconomies of scale in transportation.

Keywords: Urban Spatial Structure, Urban Economics, Location Theories, Monocentric and Polycentric.

INTRODUCTION

Conceptual structure of an urban space can be considered as a partial or total description of distribution of phenomena in the urban geography space (Horton & Reynolds, 1971).Thus, urban spatial structure and function is very complicated.Each city can grow in different spatial structures and functions, which is the objective result of the interactions between land markets and topography, infrastructures, regulations, taxation, industrial development, socio-economic firms distribution, transportation network, decisions of planners and real estate developers and investors, businessmen, and policy makers during different periods of urbandevelopment (Bertaud, 2003; Hall & Pain, 2006; Ding & Zhao, 2014).The complexity of urban structures continued efforts to connect urban policy with urban form (Bertaud, 2003).Before inclusive industrialization development and modernization, living and working places were close together, and people provided their basic needs easily, in a short distance from their residence, and through walking, and rarely had to travel, and cities had compact and centralized form (Pacione, 2005). However,over the time, and under influence of factors such as spatial distribution of population, travel patterns of people from their residence to places anddestinationswhere asocial activity or interaction is taken place, and issues of economic and environmental activities, this structure has changed (Giuliano et al., 2007; Bertaud, 2001), and new urban areas emerged as a polycentric structure.

Theories of urban spatial structure areone of the main themes in urban economy that consider strong economic foundation for urban configurations. Development ofinter urban spatial structure has long been considered by urban economists. Urban economic theories had an important role in explaining the varying nature of urban forms.Traditional urban economic theories argue that the main determinant of urban spatial structure is the interaction between two opposite forces, i.e. the willingness of entrepreneurs to interact and avoidance tocrowding (agglomeration economies).Different combinations of these two forces create uniform or centralized pattern and monocentric or polycentricconfiguration of different spatial distributions of agencies (Papageorgiou and Pines, 2012).On the other hand, urban spatial structures affect the performance of labor markets and consumers.The larger market size and lower transaction costs result in more prosperous economy.A faulty spatial structure categorizes the labor and consumersmarkets to smaller and less efficient markets. Length of trips and their resulting time and cost from residence to meeting locations varies in different types of spatial organizations; and cities with more favorable type of spatial organizations enjoy from more economic competitive advantage than cities withunfavorable spatial structures (Bertaud, 2003).Components of urban spatial structure in large metropolitan areas are associated with general entities includingCentral Business Districts (CBD) and specialized,diverse, and dispersed sub-districts. Central Business Districts are the best available places where workers with different skills are attracted from all locations, and provide the bestaccess to metropolitanvast markets (Alonso, 1964). Central Business Districts also provide important positive side effects that lead to the spatial clustering. Incentral business districts, face-to-faceinteraction reduces costs related to new market opportunities, product innovation, and is searching for skilled labor and technologyprocess. However,CBD have different functions.As of economic activities are decentralized, sub-centers work as the main nodes in the distribution institutions, businesses, commuting, and other trips (Leslie & Ó hUallacháin, 2006).

Cycles of urban growth and economic system

The dominance of the economic system determines the spatial organization, and the economic activities are responsible for spatial organization (Castells &Sheridan, 1977). In this regard, no society will exist without a space organized by itself, and productive forces created geographic space and social content are needed to be identified (Shakoei, 1991). An illustrative examples of the effects of capitalism on city is the spread of consumerism pattern and expansion of suburbia. Expansion of suburbia and growth of countryside actually represents the will of capitalism to meet the growing tendency to reduced the level of consumption in the capitalist economy (Piran, 1991).

There is an important relationship between periods of capitalism, technological innovation, and economic (and urban) growth cycle. The long-term economic cycles were confirmed by Kondratieff cycle, who had detected fifty-

year-old waves of growth and decline in the industrial economies (Smith, 2011). He relates capitalism to the surplus circulation and density, and believes that urban areas are products of such a process during which their space is formed, as well as an order determines the priorities of the role that urban affairs should play in the process of agglomeration and circulation of surplus value. The search for the most profitable business in the city, and creating more economic places, along with adapting technical and social conditions of production with this goal became the most visible urban force (Harvey, 1972).

To create new stages of growth, more innovation is needed. As shown in Figure 1, Perez (2002) described the stages of development as techno-economic patterns, and stated that these patterns determine the main form and direction of profitability growth during the relevant time (Harvey, 2001). On the other hand, industrial capital requirements have increased density and rationality in determining the production place, and all related activities in major urban centers. Harvey (1978b) argues that the simultaneous concentration of capital and labor in metropolitan areas, where communication and transportation systems take place with their incredible complexity, in addition to materials, move ideas and information, and even labor with relative ease. It should be noted that growth is fundamentally dependent on the exploitation of fossil fuels. Techno-economic model point of view is technologically determinant, and is criticized due to reduced state's role in the evolution of capitalism (Tickell and Peck, 1992) and an increased focus on international structures and inequalities explaining the core-periphery relations (Wallerstein, 2011).

Urban development and political economy of urban spaces

In the twentieth century, the political economy governing the cities was considered the foundation of urban issues, so that it was important than social functions in the creation of urban space (Hataminejad & Abdi, 2007). This view sees space as a phenomenon that is generated, then tries to discover the mechanisms that govern the production of space. Harvey (2005) states that the school of political economy of space focuses on the compression of space and time process, as well as geographical and historical evolution of societies. In addition, concepts such as relations of capitalism (Lefebvre, 1976), wealth, class, power (Castells &Sheridan, 1977), rent, surplus (Harvey, 1978a), justice and fair distribution (Harvey, 2010), and the role of government and planners (Harvey, 1978b) are discussed in the framework of this school of thought. The main purpose of political economy perspective in urban geography is to analyze problems of urban society with an emphasis on the dominant mode of production. Thus, by analyzing the political economy of urban issues, only three major factors are emphasized: market economy, Social welfare and the mode of production (Shakoei, 1991). In countries with capitalist system, these three criteria are basis of political economy analysis of urban issues, and urban systems are affected by these factors, and their function is determined based on these factors.

In shaping the built environment, government is considered the symbol of power through its active role in the allocation of space. Planning for locating industries and population, housing and public facilities, transportation and communications, land use, etc. create the overall spatial frameworks to include and simplify the myriad and fragmented decisions that want to shape urban development in other ways. Space division under capitalism makes spatial economic necessary to develop. In addition, spatial economy as division of the land market makes class differentiation deeper and wider through distribution of space and specific spatial forms (Harvey, 1978a). Harvey (1972) argues that capitalism does not only produce space, but also demands requirements for space domination. Harvey's analysis is important in several ways. First, it shows how the urban development and the formation of their physical environment is affected by capital agglomeration and circulation, and in fact, the process of urban renewal depends on the renewal of economic construction. Second, the landowners and urban capitalists play an important role in political and social developments of cities. Third, this kind of urban development is necessarily associated with urban inequality and exacerbated urban crises (Mehdizadeh, 2004). On the other hand, in a capitalist economy, the market is not the only determining factor in economic development, but the socio-political forces out of the market are also involved in this regard (Shakoei, 1991).

Welfare economics of spatial structure

Welfare economics is a branch of economics that seeks to provide a framework for assessing the situations, actions, policies and economic institutions, and tries for efficient allocation of resources, while it also considers its distributional effects. Welfare economists believe that markets cannot always effectively distribute resources. According to them, in such cases, called market failures, political institutions can act as a supplement or alternative market (Tamadon-Jahromi, 1987). According to Pareto's theory, free trade, free investment, competition of consumers to maximize personal gain (only personal), and therefore, the full will and freedom of choice of consumers lead to a situation of "the best condition" (Raesdana, 2000).

In defense of scattered and low density development, that is increasingly known as a characteristic of modern cities, Gordon and Richardson (1996) state that urban spatial structure created by market forces reflects the people's will. Instead, planners have little believe in efficiency of urban spatial structure determined by the market, and support detailed land use planning. To assess differences, Anas (1997) examined the economic welfare of urban land use. They point out that although the agglomeration of the economic activities are the main reason for rise of most cities, their precise nature is uncertain and not completely understood, and current understanding of them is based on some factors such as Smithian specialization, proprietary partnership, interaction, and innovation.

Traditional theories of urban economics

Location theories

The study of urban systems in urban geography, regional science, urban economics, and spatial planning is rooted in location theories, and its origin dates back to the work of Christaller (1933) and Losch (1940) about central place systems.Weber(1909) presented avery production-based view on industrial location that studies how to convert the production inputs to physical commodities. In Christaller'stheory, there will be least need to travel to obtain services.Christaller assumed that the distribution of population in the region equal, and purchasing power is the same. Like Christaller, Losch, began with the smallest residential unit, but passed a different path, and instead of providing goods and services centers, change his focus on production centers (Behforoz, 1985).He also assumed that with increasing distance, will be costs increased, that will result in less demand.In other words, at the edge of the market, demand is the lowest.This causes the demand cones (Bunge, 1966).Although Losch did not approve hierarchical system, he believed in a correlation between the population and the degree of centralization of the central places of an area.

Inspired by the Von Thunen (1826) original model, Alonso(1964) designed a model that connected the neoclassical microeconomic theory to urban land use model.Alonso's model isinspired by a series of urban economics models.In a more advanced version of this model, limiting assumptions, such as competition and full information, orassumption of monocentric city are excluded, and the flow of goods between regions and sectors is added to it (Smith, 2011).
The idea of a hierarchical urban system can be moregeneralized both in theory and practice, and can be enhanced to higher spatial scales (McPherson, 1981).Empirical research originated from theory of urban systems, consider central location studies in a more analytical way and without official restrictions of theories (Burger & Meijers, 2012).One of the reasons id the failure of this model in the face of polycentric spatial organization in the metropolitan areas (Kloosterman and Musterd, 2001; Scott et al., 2001). Moreover, the central place theory emphasized the issues of marketing and services; today, although these basic services are fully presented in small-sized residential centers, due to the diversity welfare facilities in metropolises, people directly to refer the main centers.

Critiques of location theory

Critiques of traditional location theory can be divided into several groups, including objections on the methodological basis, ideological criticism of maximum efficiency and complete market assumptions, and more general challenges of traditional location theory in the contemporary context of global economy.In the methodological term, Webber (1906), Alonso (1964), and Christaller (1933) considered transportation costs, and did not consider facts relevant to modes of transportation, network geography,and density (Smith, 2011).Alonso's model is a sound theoretical foundation in urban economics (Anas et al., 1998). However, this model is not able to analyze the changing factors that createpolycentricforms.This model was developed by Mills (1967)and Muth (1969), and the allocation of resources within the urban area and a detailed analysis of the residential market was added to the model.Alonso-Mills-Muth model has been the most important framework in the urban economic theories, but it has a few deficiencies.The most obvious one is assumption of a business center.This is reflected in a new branch of the new economic geography (NEG) that discussesurban systems (Fujita and Krugman, 2005).Another problem of Alonso-Mills-death model is rooted in the assumption that cities have only one dominant center. The priority of a single center is unquestionably accepted, regardless of the factors generate and maintain the benefits of the center (Smith, 2011). This assumption is in the contrary with facts about most modern cities.Traditional location model only focused on demand aspects of markets, and ignored supply aspects, and considerations related to the planners and builders,as well as features of the places (Henderson & Mitra, 1996).

Monocentric citymodel

Urban economy, especially the theory of modern land use, isthe result of generalized Von Thunen theory about the bid rent is an urban context. In Von Thunen's model, it is assumed that all farmers are the same.This means that as long as the total income is more than the total cost, they will not be willing to other locations.Research by Ricardo is considered as a symbol of current monocentric urban development model.Ricardo (1882) raised valuable concepts like natural productivity of land, scarcity of goods, and good competition, while Von Thunenstressed the importance of place in determining agricultural land use patterns and loading costs for the distance from the market.Alonso-Mills-death established these preliminary thoughts, and developed for exercise in urban areas.Alonso(1964) introducedthe monocentric city model, where business center plays the role of the central city in Von Thunen's model. In this model, combined cost of transportation, agriculture and the rent was changed as the combined cost of commuting and urban land lease.In fact, Alonso proposes urban land market theory based on the theory of rent bid, where it is assumed that users have sufficient knowledge about the structure of the real land lease, and there is a mechanism of market enlightenment which allows land to be occupied by someone who has won the highest bid (Al-Shammari, 2007).

Alonso-Muth-Mills models of urban land market, called as standard or classic modelhave a common analytic basis.They used the same theoretical and methodological frameworks (Miyao, 1987). In this model, Alonso assumes the city as a flat continuous monocentric entity that it is ready to use. Urban central business area represents the only occupational urban area, where households travel to work and buy, and acts as the point of exports of industrial products (Al-Shammari, 2007).According to this model, for different firms that are active in various manufacturing activities, land lease is a production factor with variable replacement ratios (Smith, 2011).In this model, it is assumed that employment is dominant in central business area. In works of several experts, this assumption has not been considered necessary.Instead, they assumed that the employment density declines as ratio of the distance fromcentral business districts, just like population density but in a more concentrated form (Small & Song, 1992; Hamilton& Röell, 1982; Mills, 1972).Therefore, in accordance with the terms rent bid, several studies havedescribed the polycentric phenomena and creating employment sub-centers with the following argument: dueto the cost of density and benefits from advances in transportation and communication technologies, firms have reviewed about the benefits of their current location and tend to move to places where they can maximize profits (McDonald & McMillen 1998).

Development model of polycentric city

In Mills (1967) and Muth (1969) urban models, change in the fixed returns in production scale, that are available only in central business districts, and reducing returns intransportation scale cause residential density gradients and land lease.The negative correlation between population size and density gradient may be due topolycentric structure of large cities (Mills & Tan, 1980).A comprehensive analysis of monocentric models indicate some concepts in change in the decentralization of inter-urban population including population growth, rising incomes, and a reduction in travel costs, leading to urban expansion and flattening of density gradient, and the rent. According to some assumptions, this model refers to reduced population density with increasing distance from the central business districts.According to this model, empirical studies show that employment density tends to decline, and density gradient is larger than population gradient, but drops more rapidly.This monocentric and even polycenter urban models cause limited knowledge of the distribution of urban employment, since these models consider employment density in the central business districts or sub-centers as pre-determined based on modeloutcomes (Sun, 2009).To investigate the changes in urban spatial structure in monocentric or polycentric pattern, models for internal clustering of economic activitiesare required.

Another branch of the urban economy deals with urban structure and system, where economic relations between and within firms is considered with the growing importance of agglomeration economies and activity clusters in the distribution of employment and population, and thus in the pattern of spatial development (Davoudi, 2003).This drew attention to the distributive pattern of employment and especially tendency to economic activities for clustering in some interacting centers, and the basic idea is that in a city, there is always conflict between centripetal forces (agglomeration economies) and centrifugal forces (agglomeration diseconomies) (Parr, 2002).

Economic studies suggest that economies of scale will focus on employment.Economies of scale have two main types: internal economies of scale in a single location and agglomeration economies of activities (Henderson, 1988; Fina, 2000). Agglomeration economies causecentripetal trends in cities that create interaction between man-power and economies.Although the agglomeration economies often consider the economic forces which are active in the whole urban area, agglomeration economies of activities, such as availability, proximity to other sub-centers of employment, special features of the place, and policies of the local government can create employment sub-centers in specific locations within anurban area (Al-Shammari, 2007; McDonald & McMillen 1998).

Scott (1996) and Krugman (1991) state that one feature of the agglomeration economies of activities is that all of them have spatial relationships as well as business transactions. Centripetal agglomerative forces are balanced by centrifugal tendencies, which limits spatial clustering range.The main centrifugal tendencies are resulted from geographical limitations that is reduced supply of land in any place.Other centrifugal tendencies affected bydensity, the high price of land, environmental damages,problems in urban activities such as noise and pollution, and commuting costs distance firms fromurban center in metropolises (Gordon &Richardson, 1996), resulting in a polycenter structure.The polycentric structures in post-industrial agglomerative urban form can be justified by increased geographical scales in connection with certain types of agglomeration economies or specific industries due to changes in production, transportation and communications technologies (Fernández-Maldonado et al., 2014).

CONCLUSION

Importance of monocentric city arises from two aspects: its power and simplicity to predict the spatial arrangement of population density, employment density, income spatial patterns, and so on in urban areas, and their effects on land use theory, housing,and economies of scale intransportation on the one hand, and local public and fiscal policies on the other hand.This model is still one of the most widely used models, and is known as infrastructure of urban economic system in the 1970s, or what later became known as the modern urban economy.Determining the spatial structure of cities is the most important issue of thismodel, and its main tool is bid rent theory, that was the

basis for the central place theory.Premier urban economic theory,that is central place theory, provides a good model in which the relation between scattered residence and travel time of household can be analyzed. Alonso provided economic theory to explain the urban spatial form.This isa static theory based on the assumption thatThe agglomerationeconomiestake all economic activitiesof a city and the surrounding metropolitan area to the inner part andaroundbusiness center of the city.These theories by economists supported ecological analysis of the Chicago school of monocentric urban structure. Later, Harris-Ullman (1945) stated that with the increaseddensity in the urban center, and the expansion of the transportation network in the urban fringe, as well asthe use of comparative advantage of places for economic activities, an independent polycentric are appears, that in turn provides the possibility of urban development.The creation of thesecenters is related with agglomeration economies and large space requirements in manufacturing industries of Fordism style (which encourages the decentralization), and the negative side effects of heavy industries to the residential areas. In this model, central business district is still the largest center.

In the current period, most studies in the field of urban economic theory criticized the monocentricurban model.One of the main criticisms is that cities are becoming polycentric.Model of polycentriccitiesis one of the most important annexes to monocentric urban models, and an alternative analytical tool to explain the employment sub-centers in urban areas.In an effort to adjust to changes in the urban forms, economists reformed and adapted the monocentric model. Relying on the theory of agglomeration economies of activities, urban economists consider urban spatial structure as the result of market forces and reach the conclusion that patterns of urban growth has been undergoing a qualitative change in recent decades. The ongoing decentralization of the cities reflect central a polycentric form, where some centralized centers are apply their effects on the distribution of population and employment.The majority of these centers are secondary branches of an old central business district, and are usually called regional sub-centers. Some other models are derived from the fact that sub-centers are formed after the establishment of a dominant center, and develop by a balance between internal economies of production scale and diseconomies of scale in transportation.

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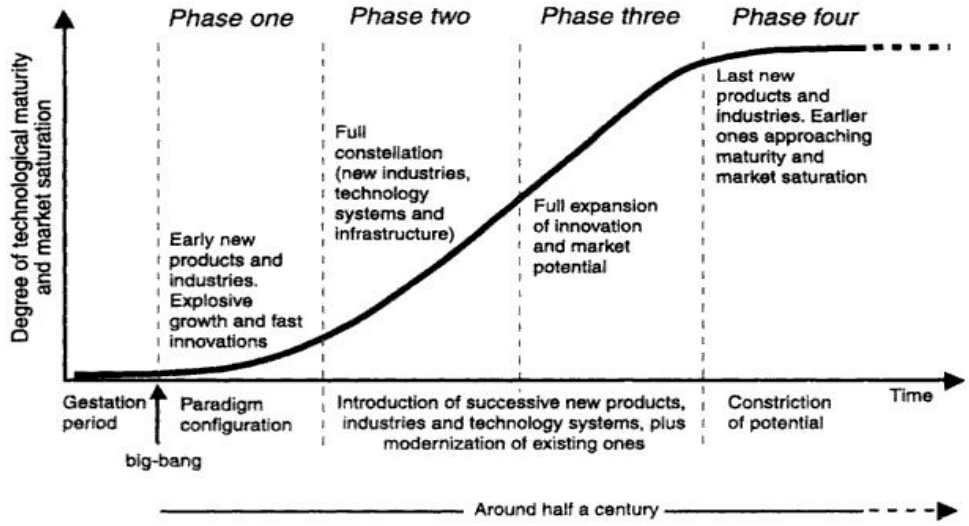

Fig. 1. The life cycle of a technological revolution. Source Perez (2002) adapted from Smith (2011)