

## Joint effect of exercise and water extract of Cumin on plasma lipids in hyper cholesterolemic male sori rats

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### ABSTRACT

#### Background and objective

These studies were considered the joint effect of exercise and consumption: on of water extract of cumin on plasma lipids in healthy male rats. The objective of this research is considering of the effect of exercise on plasma lipids and lipoproteins in hyper cholesterolemic male rats after consuming water extract of cumin.

#### Methods and materials

The experiential study was accomplished on 60 hyper cholesterolemic sori rats that divided to 4 groups including dissolver , exercise, cumin and exercise +cumin. exercise program was done for 6 weeks(5 days in a week ,each time for 40 minutes with 18m/min speed). Water extract of cumin was prescribed amounting To 0.8 mg as solution in 0.4 ml distilled water at the some time that it used in cumin and exercise + cumin groups in way. Triglyceride (TG) , total cholesterol (TC), HDL-C and LDL-C and body weight were measured before and at the end of the course. data were analyzed by one-way ANOVA statistical method.

#### Findings

The result show that 6weeks exercise joint with consumption of water extract of cumin cause meaningful decreasing of TC density(pretest  $297.7 \pm 37.08$ , post-test  $146.1 \pm 30.8$ ,  $p=0.019$ ) and LDL-C(pretest  $151.8 \pm 14.4$ , post-test  $0.12 \pm 8.7$ ,  $p=0.001$ ). on the other hand the consumption of water extract of cumin leded to meaningful increasing of HDL-C(pretest  $75.9 \pm 12.1$ , post-test  $119.9 \pm 17.9$ ,  $p=0.003$ ). Also the result of this research showed that there was not any meaningful change in body weight in exercise +cumin group.

#### Conclusion

The result show that carrying out of this program effected plasma cholesterol and lipoproteins meaningfully and so it may be useful for preventing heart diseases.

**Key words:** Exercise, Extract of cumin, plasma lipoproteins ,lipids sori rat.

### INTRODUCTION

Increasing of blood fat especially cholesterol is propounded as an important factor of aggravation of heart diseases. Now more than 100 million American suffering from increasing of blood cholesterol and about 50 million of them require remedy. Information indicate that of all the needy patient about 30% of them receive medicine and only 23% of these patients have suitable remedy .in eastern countries of Mediterranean and middle east

including iran heart –blood vessels diseases are the main social and hygienic problem that its aspects quickly in consideration that accomplished as scattered , the ratio of death arised from this disease was in iran in 2 selected city, the fatality arised from various heart diseases was 185 persons of each 100000 persons in1368 that involved 7-15% of all the fatality. according to reported statistics of Tehran s 13 zone ,8.8% of men and 12.7% of women were suffering from heart diseases in 1380. metabolism manner and plasma lipids kind and amount

especially blood lipoprotein play important role in appearing and aggravation of heart diseases. So that there is a linear relation between cholesterol amount and fatality rate arised from coronary heart disease. In the way that by increasing of total cholesterol amounting to 20 mg/dl, the fatality arised from this disease increased 12% so with attention to direct relation at lipids with heart attack, The regulation of blood fats amount is considered as an important factor in hearth and undoubtedly the habit to suitable exercise actively play on important role in this area. Many researches were done in this area. Most of researchers believe that physical actively with intermediate severity. Even if it is done very little lead to decreasing of beta lipoprotein and triglyceride and the actively with severity more than intermediate lead to decreasing of LDL and increasing of HDL. On the other hand, using various medicinal plants for curing many of diseases was prevalent very much in traditional medicine .many researches are done about the effects of medicinal plants on plasma lipids and lipoprotein , for example in alhassan and his colleagues study the blood fat reactions to margarine herbaceous complementary and athletic exercises was considered and the change of enzymes, lipoproteins and blood lipids was reported water extract of caraway seeds that is a plant of *ambelliferae*

Family has decreasing effect on triglyceride blood cholesterol and body weight of nature and diabetic rats and probably it has similar effect on plasma lipids and lipoproteins with physical actively . physical actively has similar effect on plasma lipids and lipoproteins and body weight with caraway seeds , so doubled decreasing effect that arised from physical actively and the consumption of cumin on plasma lipids and lipoprotein is not far from mind .since the cumin that is in iran has many similarity with caraway seeds. It is imagined the same effect with caraway seeds for it. In previous study the joint effect of exercise and water extract of cumin consumption on plasma lipids and lipoproteins of healthy male rats was considered and because using joint exercise and cumin extract consumption did not have meaningful effect on plasma lipids and lipoproteins of healthy rats, in this study the effect of exercise on plasma lipids and lipoproteins of hyper cholesterol limic sample male rats after consuming cumin is considered.

## MATERIAL AND METHODS

### Animals

This experiential research is done on 60 head of albino hyper cholesterolemic Sample male rats with 20-40 gr weight . during the execution of program the food of animals was under control (sgr show in a day for each animal)but they access freely to water. This research project was done according to permission of morals committee of kerman medical sciences university with number k/86/85. The method of creating hyper cholesterolemic. In animals: for producing high cholesterol food , the common food of animals (plates)mixed with a little cornoid (5% cornoil) at much as it become oily and then cholesterol (2%) and colic acid(0.5%) were added to it, for creating hypercholesterolemic in sample rats, animals were under this diet that has 2% cholesterol and 0.5% colic acid phlebotomy was done from animals tail vein before and at the end of 4 week for assuring of hypercholesteromic creation.

### The method of providing and consuming the cumin extract

One gr of cumin fruit (provided of kerman's groceries) was drawn for 10 minutes after being powder and mixing with 100 ml distilled water. Then this mixture was cooled and filtered and freeze drier machine(eyela,made in japan) was used for drying this mixture. Dried sample was kept far from humidity in -20 c. at the time of use 0.8 mg of water extract of cumin (equal to 20 mg foreach kilogram of body weight ) soluted in 0.4 ml distilled water and it feeded to rats by.

### Experimental plan

animals were divided randomly to 4 groups named: dissolver, exercise (EE),cumin(BPEA) and exercise + cumin (EE+BPEA) than there were 15 sample rats in each group. All the groups were under certain remedial plan for 4 weeks. In a manner that cumin group consume 0.8 mg of the extract that was solved in 0.4 ml distilled water for 5 days of each week and other exercise groups settled on animal band conveyer (tec-machine made In france). Exercise and exercise+cumin groups executed 6 weeks exercise program that exercise+cumin group was received related cumin amount 2 hours before execution of actively while exercise group received similar amount of distilled water. Dissolver group

received 0.4 ml distilled water during this time and settled on band conveyer too.

### Exercise plan

The exercise plan of two exercise groups was similar to Al-jarrah and his colleagues . an animal band conveyer with 6 vestibules was used for executing the program. After 1 week acquaintance with running on band conveyer the groups exercise plan started when the rats become able to run with 18 meter in a minute speed. Allocated exercise plan of each animal was 40 minutes running daily for 5 days in a week with 18 meter in minute speed for 6 weeks that was done between 8 to 12 am.

### Weight measurement

The weight body of animals was measured at the beginning and at the end of test and 24 hours after the last weekly session by digital scale(gram precision digital scale, made in Canada).

Plasma lipids and lipoproteins measurement: in order to biochemical analysis and determining serum lipids and lipoproteins amount, the animal's blood sample was taken via tail vein at the beginning and the end of 6 weeks and after 12 hours of being fasting. The determination of total cholesterol density(TC) was done by using human pars azmoon kit with enzyme color measuring method. The method of measuring of triglyceride was similar to the method of measuring of cholesterol. The measuring of HDL-C was done by enzyme direct measurement method and the measuring of LDL-C was done by ferival method. ( $LDL-C = \text{total chal} - [TB/5 + HDL-C]$ ). In these measurements the serum was poured into RA-1000 machine cup(technicom) and the machine analyzed the sample automatically .

### Statistical method

For comparing the difference aavage between groups 16 version of SPSS software, variance analyze statistical test and subsequent to it tok.test(honestly significant difference) were used. p value less than 0.05 was considered meaningful.

## RESULTS

The effect of cumin complementary and

exercise on serum lipids and lipoproteins density was shown in table 100 A NOVA test is indicator of this that there is meaningful difference between pretest averages(before exercise)and post-test averages (after exercise)of total cholesterol ( $p=0.019$ ),HDL( $p=0.003$ ),and LDL( $P=0.001$ ) by using HDS results the existence of following differences became evident : total cholesterol amount in cumin +exercise group (EE+BPEA)was less than dissolver and exercise groups meaningfully( $p=0.0001$ ) that in this relation the effect of EE+BPEA group on decreasing total cholesterol was more evident than other groups HDL-C amount in dissolver and BPEA groups( $p<0.01$ ) and EE-BPEA group was meaningful( $p<0.05$ ). means the prescription of cumin to hyper cholesterolemic rats leads to increasing of HDL amount. Meaningful difference in LDL-C amount in under remedy groups by EE-BPEA was less than other groups . as there is meaningful difference between dissolver and BPEA groups( $p<0.01$ ), dissolver and EE-BPEA( $p<0.05$ ) EE and BPEA( $p<0.01$ )and EE and EE-BPEA( $p<0.05$ ) and cumin consumption with exercise + cumin ( $p=0.032$ ) was shown meaningful that this meaningfulness was in benefit of cumin consumption, means cumin cause increasing of HDL in comparison with other groups.LDL-C changes in different groups of study were shown in graph3. LDL-C changes showed meaningful difference between dissolver groups with cumin consumption ( $p=0.013$ ) dissolver with exercise +cumin ( $p=0.044$ ),exercise +cumin ( $p=0.007$ ) and exercise with exercise+cumin( $p=0.024$ ) LDL-C in comparison with dissolver and exercise and LDL decreasing in exercise +cumin group was more than dissolver and exercise groups.

## DISCUSSION

The result of this study show that doing exercise after consuming cumin lead to meaningful decrease in plasma density of T Cand LDL-C although the difference is not meaningful in plasma density of TG and HDL-C the consumption of cumin extract is with meaningful increase f HDL-C density and decrease of LDL-C. the result of this research about compiled exercise is similar to most of human research finding and animal findings. The result of this study is similar to results of ravikiran and his colleagues that propounded that swimming for 4

weeks (6 day in a week) in 20, 40 and 60 minutes make meaningful change in lipid profile including decreasing TC, TG and LDL-C density and increasing HDL-C density. Although decreasing of TG density did not observe in this research Ravikiran and his colleagues know the decreasing of LDL-C because of probable.

### Stress

In their study exercising for 40 minute in a day cause decreasing of cholesterol density that is similar to time exercising of this research. On the other hand exercising with high severity is incapable of creating meaningful changes in lipid profile that this subject is emphasized with Alen and his colleagues studies. They reported that exercising under.

Threshold cause meaningful increasing of HDL-C that this matter is true for the results of this study. Asha Devi and his colleagues that reported similar results with the results of this study about lipid profile, are mentioned that the reason of plasma LDL-C density change as the result of exercising is changing in LDL-C synthesis and also changing in repelling amount of LDL-C from plasma to tissues. Present results are not similar to Kist and his colleagues results in their study 16 weeks.

### Exercise did not have meaningful effect on LDL-C

Feeded by natural food. Van Oovert and his colleagues did not report meaningful results about lipid profile after 8 months exercise courses. These researchers in expressing the reasons that may explain non changing of lipids and lipoproteins, express non changing of body weight because on the basis of obtained information from human studies its suggested that decreasing of body weight may reinforce the effects of exercise on lipoproteins, although these conditions is not essential for changing resulted from exercise. So non changing of body weight in this study could not change the decreasing of lipid profile. Consumed food can be another factor of non changing of lipoproteins that this factor was controlled in this research. About the effect of cumin on lipid profile it should be mentioned that the results of this research agree with Dhandapani and his colleagues research. They put the rats under cumin extract diet for 6 weeks and

concluded that cumin consumption cause meaningful decreasing of TG and TC in diabetic rats. Although in this research decreasing of TC is showed only. The meaningful decreasing of LDL-C density was observed too that in Dhandapani and colleagues research the measurement of these parameters was not done. Furthermore cumin extract consumption cause increasing of HDL-C density. The decreasing effect of cumin on lipid may be as the result of direct decreasing in blood glucose. On the other hand, it is stated that cumin has antioxidant property and so it may decrease lipids tend for oxidate and decrease oxidated stress by fixing mainbrane lipids. Also Eddouks and his colleagues reported that the level.

Control has important role in plasma LDL-C and TB levels. Furthermore the results of this research is similar to results of Lemhadri and his colleagues. They considered the effect of caraway seeds on healthy and diabetic rats and reported meaningful effects on TC and TG of both groups. They did not consider HDL-C and LDL-C and in expressing the reasons of these results stated that the main test for lipoprotein decreasing actively of caraway seeds is not clear but they propounded some probable mechanism for explaining these results. Including decreasing of absorption of cholesterol from small intestine via connection to biliary acids and increasing of biliary acids excretion decreasing of the actively of 3-hydroxy (key enzyme of reconstructing cholesterol). Decreasing of required NADPH for cholesterol and fat acid synthesis to resin thesis of cholesterol. It is also reported that caraway seeds may improve the increase of blood cholesterol by adjustment of lipoprotein metabolism, that is more consumption of LDL-C via increasing its recipient or by increasing LCAT actively that may be share in blood lipids regulation.

LCAT plays an important role in mixing free cholesterol with HDL-C and it sir ever transferring to VLDL-C or LDL-C in order to returning to liver cells. Caraway seeds may accelerate quick catabolism of LDL-C. It is supposed in another part of this research that in animals that use caraway seeds and then their lipid profile improved, the exercise can have doubled effect on the improvement of lipid profile. With attention to this

that the effect of caraway seeds on lipid profile (TC, LDL-C and HDL-C) in cumin group was meaningful. The results on this research showed that exercise has a meaningful effect on lipid profile in the exercise+cumin group. So doing exercise after consuming cumin extract has a doubled effect on lipid profile. Since no study is accomplished about this subject, the comparison of it is impossible. The results obtained from another part of this research showed that exercise and cumin consumption did not have any effect on body weight. These findings are similar to Ravikiran *et al.*, and Mela *et al.*, results. These researchers mentioned that insufficient exercise stress is the reason for non-changing of body weight. On the other hand, present study results are contrary to Asha Devi and his colleagues' research. Because in their study rats' weight increased after 2 months. The main task that changes energy balance during exercise is consumed energy at the moment of activity. In a study that Donnelly and his colleagues did by exercising without food limitation for more than 16 months, no weight decrease was reported. In Mohammadnia Ahmadi's study, non-existence of food limitation introduced as one reason for non-decreasing of body weight of animals, but this reason is not acceptable in this study because of controlling

of consumed food of animals. The exercise severity that was used in this study helped to keep body weight of animals during the exercise course. Proposed exercise severity of American Medicinal Institute for keeping body weight is 60 minutes in a day with middle severity that can justify none meaningful decreasing of body weight in this research. Keeping body weight by using cumin is contrary to Lakhadri and his colleagues' results since body weight showed a meaningful decrease in their study. Furthermore, the results of present study are contrary to Dhandapani *et al.*'s results that reported increasing of body weight by cumin consumption. So the results of this study show that cumin extract can be used for keeping body weight.

### CONCLUSION

Totally, this study showed that exercising for 6 weeks (5 days in a week for 40 minutes with 18 m/min speed) after consuming cumin has a meaningful decrease in TC and LDL-C density and also it is effective in keeping body weight. So it may be useful to execute this program by the goal of preventing heart diseases. Although complementary studies are suggested for determining the task of cumin function.

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