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INVESTIGATION OF THE EFFECT OF ROYAL JELLY SUPPLEMENT ON SOME HEMATOLOGICAL PARAMETERS IN SEDENTARY MEN

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ABSTRACT

The aim of this study was to examine the effect of 1000 mg/day royal jelly supplementation on ALT, AST, creatine kinase and cortisol levels in non- athletes' males with placebo-controlled experimental design. With this purpose, 20 adult healthy males ages 20 – 23 years, participated in the study. The subjects were randomly divided into two groups as 10 subjects who take liquid royal jelly which stored in glass vials in the refrigerator and 10 subjects with placebo-controlled. The subjects had taken the supplement (royal jelly) in every day for fifteen days. Blood plasma samples were analyzed one day before and after the study in order to determine the levels of ALT, AST, creatine kinase and cortisol from the subjects in both groups. 2x2 mixed factor ANOVA and LSD tests were used in the analysis of the data of the experimental and placebo groups. According to the results; AST, ALT and creatine kinase levels of the experimental group were found statistically significant in favor of the post-test ($p < 0.05$). Between groups, AST and Cortisol levels were found to be significant in favor of the experimental group ($p < 0.05$). As a result, it can be concluded that the short-term royal jelly supplementation affects liver enzymes, creatine kinase and cortisol levels in non-athletes' males.

Keywords: Royal Jelly, Creatine Kinase, Cortisol

1. INTRODUCTION

Royal jelly (AS) produced in the hypopharyngeal and mandibular glands of worker bees for feeding queen bees; water (66%), protein (12-15%), sugar (10-16%), fatty acids (3-6%), free amino acids, minerals (0.7-1.2%, iron and calcium) and vitamins (thiamine, niacin, riboflavin) is a food rich (Taniguchi et al., 2003; Okamoto et al., 2003). The content of royal jelly varies according to natural feeding of bees, season and age of larvae and production method. The water-soluble pH of 3-5 royal jelly contains proteins, lipids and carbohydrates. Vigor, vitality, because of the thought that contributes to cell renewal, royal jelly, which is widely consumed by humans, has been reported to contain very low amounts of biologically active substances such as ptrein, neopterin, biopterin, xantopterin and hormones (Rembold and Dietz, 1965). In many studies on royal jelly, it suppresses humoral immunity in rats, stimulates proliferation and antibody production of immune competent cells in mice Sver et al. 1996),

increases hemopoietic origin cell production (Okamoto et al. 2003), and lowers cholesterol levels effects (Taniguchi et al., 2003). In addition to its therapeutic role in skin and hair diseases, it has been emphasized that it has cell repairing and rejuvenating effects along with the effects of regulating sexual functions (Akyol, 2013; Yatsunami and Echigo, 1985). The endocrine system and the hormones secreted from it have important effects on the human brain, physiology and behavior. Therefore, it is thought that disruptions on this system or changes in blood hormone levels may be related to the formation of many diseases by disrupting human behavior and physiology (Kartalcı, 2010). In this study; It is thought that royal jelly, which is a rich and natural food source, will affect liver enzymes, creatine kinase levels and cortisol levels of non-sports individuals.

2. INDIVIDUALS AND METHODS

2.1. Subjects

A total of 20 healthy sedentary men aged 20-23 years participated voluntarily. The study was conducted in accordance with the principles set out in the Helsinki Declaration. The study protocol was approved by the ethics committee of Gaziantep University, and all participants received a consent of voluntary participation prior to the study.

Table 1. Descriptive Parameters of the Participants

		Mean	SD
Experimental group (n=10)	**Age**	21,70	1,16
	Height	177,60	6,13
	Weight	71,53	6,42
	BMI	22,69	1,81
Placebo Group (n=10)	**Age**	23,00	1,16
	Height	174,30	6,53
	Weight	70,06	8,88
	BMI	23,08	2,58

SD, Standard deviation; **BMI,** Body mass index

2.2. Experimental Design

This is a placebo-controlled experimental design. A total of 20 men were randomly divided into two groups. The placebo (n = 10) group received 1000 mg / day corn starch in glass vials between 08.00 and 10.00 am for 15 days; experimental (n = 10) group received 1000 mg / day pure royal jelly supplement at the same time. Both groups received supplements independently and unaware of each other. The royal jelly content and quality standards of high bee farm (Civan, Bee Farm, Bursa) in 1000 mg glass vials in styrofoam boxes were taken in accordance with the cold chain and stored in a ready manner in the refrigerator. The subjects were instructed not to engage in any exercise or activities requiring power for fifteen days. Before and after the study; AST, ALT, Creatine kinase and cortisol levels were evaluated in 5 ml blood samples taken.

2.3. Blood Test Procedure

Before and after royal jelly supplementation, 5 ml venous blood samples were collected from the right arm in the yellow cap tubes between 09: 00-10: 30 in the morning laboratory of Gaziantep University Medical Faculty Hospital. Blood samples were centrifuged in Nüve-NF800 apparatus at 4000 rpm for a total of 7 minutes and their sera were separated. Serum levels of AST, ALT, Creatine kinase and cortisol hormone levels were analyzed by spectrophotometric method.

2.4. Statistical Analysis

SPSS 22.0 package program was used for statistical analysis. Data were presented as mean and standard deviation. Significance level was accepted as $p< 0.05$. For the analysis of the measured data of the experimental and placebo groups, 2x2 mixed factor ANOVA and LSD tests were performed.

3. RESULTS

The pretest and posttest differences analysis of ALT (alanine aminotransferase), AST (Aspartate aminotransferase), Creatine kinase and cortisol levels of the experimental and control groups are presented in the table below.

Table 2. Experimental and Control Group Pre-test and Post-test Differences Analysis

		Experimental Group (n = 10)		Placebo Group (n = 10)	
		Mean	SD	Mean	SD
ALT	Pre test	24,30	3,33	22,70	4,45
	Post test	21,50[a]	4,06	24,10	4,61
	Difference	-2,80	1,48	1,40	4,79
AST	Pre test	24,00	9,68	22,50	8,11
	Post test	19,40[a]	7,46	21,60	8,44
	Difference	-4,60b	5,93	-,90	4,43
Creatine kinase	Pre test	283,70	98,89	178,10	119,22
	Post test	169,80[a]	73,06	192,00	85,98
	Difference	-113,90	80,51	13,90	80,72
Cortisol	Pre test	10,06	2,25	10,80	2,86
	Post test	9,69	1,38	12,02	2,57
	Difference	-,37[b]	1,69	1,22	2,02

a; Significance between pre-test and post-test at p <0.05 **b;** p <0.05 significance between the groups

When the data of experimental group were examined, ALT, AST and Creatine kinase levels were found statistically significant in favor of posttest (p <0.05). No significant difference was found in all four parameters of the control group (p> 0.05). There was a significant difference between AST and Cortisol levels in favor of the experimental group in the analysis of the experimental and control groups (p <0.05).

4. CONCLUSION

It is thought that royal jelly, which is a rich and natural food source, will affect liver enzymes, creatine kinase levels and cortisol levels in non-sports individuals. The endocrine system and the hormones secreted from it have important effects on the human brain, physiology and behavior. Therefore, disruptions on this system or minimal changes in blood hormone levels are thought to be related to the formation of many diseases by disrupting human behavior and physiology (Kartalcı, 2010). In this study, the placebo-controlled experimental design was used to evaluate the effect of royal jelly on AST, ALT, creatine kinase and cortisol levels in sedentary men at a dose of 1000 mg / day and these values were statistically significant in favor of the reinforcement group (p <0.05). When the studies are examined; AST and ALT function in the liver parenchymal cells and the only enzyme that passes into the blood of blood disorders, acute heart muscle and skeletal muscle disorders may occur increase in serum levels again as a result of excessive muscle strain in muscle degeneration of the levels may increase blood levels (Senturk, Canbakan and Hatemi, 2004). It has been shown that at least half of the cause of ALT increase in blood serum level is caused by liver steatosis and it is emphasized that steatosis is more frequent in patients with high ALT altitude. In our study, ALT and AST values of experimental group using royal jelly decreased significantly in favor of posttest (p <0.05). Creatine Kinase (CK) is an enzyme that provides ATP regeneration in contraction or delivery systems. When muscle damage occurs, some enzymes are released, especially Creatine Kinase (CK). Creatine kinase stores are very limited, but they are quickly produced to maintain the ATP levels necessary for the early stages of muscle contraction. Plasma Creatine Kinase levels are indicative of the extent of muscle damage. Even an external stroke can cause increased blood levels of the CK enzyme. The magnitude of serum CK activity in healthy individuals is affected by age, gender, race, body mass status and physical activity (Alibeyoglu, 2008). In our study, it was found that high creatine kinase levels of royal jelly supplementation group decreased in the last test. This decrease is thought to accelerate existing muscle

damage and cell regeneration. In the control group creatine kinase levels were found to be increased, but this increase was not statistically significant (p> 0.05).

Cortisol hormone is a defensive hormone that protects the organism against any change in physiological balances by affecting electrolyte, carbohydrate, protein and lipid metabolism. Its secretion is controlled by ACTH, the pituitary anterior lobe hormone (Kehlet, 1989). Cortisol hormone, known as stress hormone, increases in individuals' thoughts, fear and anxiety; in addition it is expressed that long-term or severe exercise increases blood cortisol levels, while exercise may cause stress in the organism, while mild and moderate exercise does not show much change in cortisol levels (Fox, Bowers and Foss, 1988). In our study, blood collection and response to blood collection in non-sports individuals were considered as a source of stress. It was seen that cortisol levels of royal jelly supplement group decreased in post-test and cortisol levels increased in post-test in control group. The rich content of royal jelly is thought to play a protective role in the organism and alter cortisol levels.

As a result, we can say that the royal jelly supplement given to sedentary individuals at a dose of 1000 mg daily changes the liver enzyme levels, improves the damage on muscle and muscular system and has protective effect on this system, balances cortisol level and reduces stress level.

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