

Study Effects of Ginseng Under Immobility Stress on Phosphor, Magnesium and ALP of Blood Serum on Male Rats

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The ginseng root has been used for over 2000 years, in the belief that it is a panacea and promotes longevity. Ginseng glycopeptides have pharmacological effects, e.g., immunomodulatory, anti-tumor, anti-ulcer and hypoglycemic activities. Blood is one of the most important biologic fluids of the body in which under physiological and pathologic conditions, its compounds are subject to changes and fluctuations. For this study, 24 adult male rats were randomly selected. Rats were divided into three groups of 8 rats. Treatment and Ginseng treatment groups were transferred daily into the Restrainer and were under Immobility stress for 2 hours per day during 15 days. For ginseng group ginseng 500mg/kg (Ginsin capsule) was given daily after immobility stress. After 15 days, blood sampling was taken on the 15th day from groups and analyzed. There was no significant difference between all groups on magnesium and ALP levels. There was significant difference between treatment and ginseng treatment groups on serum phosphate also there was significant difference between treatment and control groups on phosphate level.

Key words: Ginseng, Blood, Biochemical parameters, rat, stress.

The ginseng root has been used for over 2000 years, in the belief that it is a panacea and promotes longevity. Ginseng (*Panax. sp.*) is valuable in Chinese medicine and plays an important role in folk medicine in East Asia (Anoja *et al.*, 1999). Ginseng glycopeptides have pharmacological effects, e.g., immunomodulatory, anti-tumor, anti-ulcer and hypoglycemic activities

(Saleh, 2012; Takahashi *et al.*, 1992). The pharmacological effects of ginseng have been demonstrated in the central nervous system, the cardiovascular system, as well as the endocrine and immune systems (Shin *et al.*, 2006; Gillis, 1997). In addition, ginseng and its constituents have been ascribed anti neoplastic, anti stress, and antioxidant activity (Gillis, 1997; Benishin, 1992; Yoshikava *et al.*, 1998). As a fluid liquid, blood is one of the most important biologic fluids of the body in which under physiological and pathologic conditions, its compounds are subject to changes and fluctuations. Hence, having normal levels of blood parameters and investigating the manner of their change can be helpful for identifying problems and determining

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organs' health. In this experiment we studied effects of ginseng under immobility stress on Phosphor, Magnesium and ALP of blood serum on male rats.

MATERIAL AND METHODS

For this study, 24 adult male rats (Wistar rats) were randomly selected and weighed (The average body weight 180 to 220 gram). Then the rats were divided into three groups of 8 rats so that the weighted average of the two groups showed no significant differences. During the entire period, feeding was performed on the ad libitum basis. Feed was analyzed and the results are given in Table (1-1). The consumed water was the city tap water which was re-refined using carbon and sand filters. The environment was exposed to 12-hour lighting and 12-hour dark during the experiment for each group. The room temperature was 22±2 Degrees Celsius during the experimental period. In this experiment, the first (group Treatment) and second (group Ginseng treatment) groups were transferred daily into the Restraint and were under Immobility stress for 2 hours per day during 15 days. For ginseng group ginseng 500mg/kg (Ginsin capsule, each capsule contains: Ginseng rhizoma 250mg equivalent to 7mg Ginsenosides as Rg1, produced by Goldaru) was given daily after immobility stress (the drug was given by gavage). The treatment group and control group were given water instead of ginseng by gavage each day.

Blood sampling and serum analysis

After 15 days, blood sampling was taken on the 15th day from groups. The blood was added into the serum tube manufactured by Euro Tube® Company. After clotting, the blood was centrifuged with the speed of 3000 rpm for 10 minutes and the serum was removed. In this study magnesium review was performed using XilidiBlue method, phosphorus using U.V. method and ALP using Kinetik method. All the introducing kits in this study are manufactured by Pars Azmoon Company.

Statistical analysis

All raw data of this experiment was investigated by SPSS software version 15.00. The ANOVA and TUKEY HSD tests were used to analyze the data. Data with 5% level ($p < 0.05$) of significance were considered.

RESULTS AND DISCUSSION

The results of serum biochemical parameters have been placed in Table 1-2 and Blood biochemical parameters statistical analysis Results have been placed in table 1-3. Alkaline phosphatase (ALP) catalyzes the hydrolysis of phosphate esters in an alkaline environment, resulting in the formation of an organic radical and inorganic phosphate (Cowell, 2004; Kerr, 2002). In mammals, this enzyme is found mainly in the liver and bones (Mojabi, 2000; Cowell, 2004). Marked increase in serum ALP levels, a disease known as hyperalkalinephosphatasemia, has been associated with malignant biliary obstruction, primary biliary cirrhosis, primary sclerosing cholangitis, hepatic lymphoma and sarcoidosis (Mojabi, 2000; Kerr, 2002; Nogrady, 2005). Simple, direct and automation-ready procedures for measuring ALP activity in serum are becoming popular in Research and Drug Discovery. There was no significant difference on ALP parameter between ginseng treatment, treatment and control groups. Phosphate (P) is one of the most important ion species in nature. Phosphate is present in all biological systems (Evans, 1996; Kaneko *et al.*, 2008). It is a major constituent in minerals and fertilizers, and is a component of industrial wastewater (Cowell, 2004). Thus accurate determination of phosphate concentration finds numerous applications in pharmacology, biomedical research,

Table 1. Food Analysis and ingredients

Food Analysis	
Crude Protein	13.00%
Crude Fat	4.00%
Crude Fiber	2.00% (Min ^{*1})
Crude Fiber	5.00% (Max ^{*2})
Moisture	12.0%
Calcium	0.7% (Min)
Calcium	1.00% (Max)
Phosphorus	0.78%
Copper	20 mg/kg
Vitamin A	10,000 IU/kg
Vitamin D	1,200 IU/kg
Vitamin E	125 IU/kg

Ingredients: Barley, corn, wheat bran, meal types, oilseeds, sugar beet pulp, other additives/*1 Minimum and *2 Maximum

Table 2. Blood biochemical parameters (Mean \pm Std.Deviation)

Parameter	Ginseng treatment	Treatment	Control
ALP (IU/L)	635.00 \pm 119.236	652.75 \pm 189.222	650.75 \pm 177.125
P (mg/dl)	7.100 \pm 0.6459	5.825 \pm 0.4432	6.325 \pm 0.5751
Mg (mg/dl)	2.100 \pm 0.0756	2.125 \pm 0.1105	2.113 \pm 0.0835

Table 3. Blood biochemical parameters statistical analysis Results

Parameter	(I) Case	(j)Case	Sig	P-value
ALP <i>Alkaline phosphatase</i> (IU/L)	Control	Treatment	0.999	-
	Treatment	Ginseng treatment	0.961	-
		Control	0.999	-
		Ginseng treatment	0.974	-
		Ginseng treatment	Control	0.961
P Phosphate (mg/dl)	Control	Treatment	0.974	-
	Treatment	Ginseng treatment	0.000	0.000
		Control	0.200	-
		Ginseng treatment	0.000	0.000
		Ginseng treatment	Control	0.030
Mg Magnesium (mg/dl)	Control	Treatment	0.030	0.030
	Treatment	Ginseng treatment	0.855	-
		Control	0.961	-
		Ginseng treatment	0.855	-
		Ginseng treatment	Control	0.961
	Treatment	0.961	-	

clinical chemistry, industrial process monitoring and environmental monitoring (Mojabi, 2000; Cowell, 2004). Simple, direct and automation-ready procedures for measuring phosphate concentration in biological and environmental samples are becoming popular. There was significant difference between treatment and ginseng treatment groups on serum phosphate also there was significant difference between treatment and control groups but there was not any significant difference between control and ginseng control groups on serum phosphate levels. The normal range of blood phosphate is 3.11-11.0 mg/dl in rats (Cathy, 1996). All groups' serum phosphate was in normal range. Magnesium (Mg) is one of the most abundant and essential minerals in mammals (Mojabi, 2000). Magnesium is involved in more than 300 biochemical reactions in the body and plays important roles in muscle and nerve functions, heart rhythm, immune system and bone formation (Kaneko *et al.*, 2008; Evants, 1996). Magnesium deficiency may lead to nausea,

fatigue, muscle contractions, hypocalcemia and hypokalemia (Cowell, 2004). There was no significant difference between all groups on magnesium level. The normal range of blood magnesium is 1.6-4.44 mg/dl in rats (Cathy, 1996). All groups' serum magnesium was in normal ranges.

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