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The Effect of Cornelian Cherry (*Cornus mas L.*) Extract on Serum Ghrelin and Corticosterone Levels in Rat Model

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ABSTRACT

The aim of present experiment was to investigate the possible effects of ip-injected (peripheral) cornelian cherry fruit (CCF) extract on serum ghrelin and corticosterone levels of experimental rat model. Animals were assigned into 6 experimental groups; group1 as control 1or intact group (without any injection treatment), group 2 as control 2 or placebo group (injected with solvent without CCF extract), and 4 groups with injection respectively with 50, 100, 200, and 400 mg/kg BW CCF extract. Blood samples were centrifuged and serums were analyzed for determination of ghrelin and corticosterone concentrations. There was no any significant difference for insulin and corticosterone levels among experimental groups. In conclusion, infusion of CCF extract in different dosages has not any effect on ghrelin and corticosteroid releasing. Although it may has considerable effect on glycemic status.
KEYWORDS: Cornelian cherry, Ghrelin, Glucocorticoids, Regulatory effect.

INTRODUCTION

Cornelian cherry (*Cornus mas L.*) is a medicinal plant with various functional aspects in traditional medicine (table 1). The cornelian cherry (Cornus mas L.) is a medicinal plant with hypoglycemic effect [1-3]. It has extensive grown in some part of Europe and Asia includes Iran [4]. The analysis of biochemical characterizes cornelian cherry fruit (CCF) obtained from Arasbaran region (northwest of Iran) had shown higher concentration of ascorbic acid content (183.25 to 299.5 mg/100g), phenolic compounds (2695.75 mg galic acid/ 100g fresh fruit) and total antioxidant capacity equals to 82.37% [5]. The vitamin C content of cornelian cherry is two times more than in orange. CCF is listed in Chinese herbal medicine books as analgesic and diuretic herbal drug [6]. The glucose and sucrose contents of fruit are in low concentration, and Fe, Ca, vitamins (α-tocopherol, biotin, riboflavin and ascorbic acid) are in high concentration in fresh cornelian fruit [7]. About mineral contents, K, Na, Fe, Zn, and Mn, the levels noted for CCF juice were higher than in other juices (plum, pear, and apple). CCF juice is rich in various essential elements and might be considered as an important dietary mineral supplementation for individuals deficient in nutritional elements [8].this fruit contents a specific organic sugar acid [9]. CCF is an anti-cancer agent, because its anti-oxidative function can modify free radicals [6].

About medicinal aspects of fruit and its application in ethno-pharmacology or novel medicine, the literatures had listed various and multifunctional specifies for cornelian cherry. The table2 is the summary of results obtained from related studies (table 1):

Table1. The medicinal specifies of cornelian cherry fruit (CCF), based on literature review.

Medicinal effect	Experimental model	Experimental condition	Reference
Antimicrobial, Antihistamine	mouse	*In vivo/ in vitro*	Tural et al., [10]
Antioxidant	-	*In vitro*	Ersoy et al., [11]
Bactericide	Bacillus and E.coli	*In vitro*	Krisch et al., [12]
Fever treatment and bactericide	human	*In vivo*	Dulger and Gonduz. [13]
Fever, diarrhea and kidney and urinary bladder dysfunction treatment	human	*In vivo*	Zargari, [7]
Hypo-lipidemic, hyper-insulinemic effect and weight losing	Obese mouse	*In vivo*	Jayaprakasam et al., [14]
Hyper-insulinemic and hypoglycemic	Diabetic rat	*In vivo*	Shamsi et al., [3]
Hypo-lipidemic	Diabetic rat	*In vivo*	Mirbadal and Shirdel, [2]
Hypo-lipidemic, weight losing, low abdominal fat deposition	Obese mouse	*In vivo*	Seymour et al., [1]

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Based on our internet searches, there is no any scientific note about CCF effects on ghrelin or corticosterone. Only in Chang [15] study, a mixed Chinese herbal drug include CCF could improves glucocorticoids receptors in brain and thymus following long-term physical activities.

The aim of present experiment was to investigate the possible effects of ip-injected (peripheral) CCF extract on serum ghrelin and corticosterone levels of experimental rat model.

MATERIALS AND METHODS

96 wistar rats with 200±20 g body weight were selected for present study. Experiment was conducted in animal room with 40-60 Rh and 22±2 ºc temperature. Animals were assigned into 6 experimental groups; group1 as control 1or intact group (without any injection treatment), group 2 as control 2 or placebo group (injected with solvent without CCF extract), and 4 groups with injection respectively with 50, 100, 200, and 400 mg/kg BW CCF extract.

After one week adaptation period, extract of CCF were injected to animals due to IP (Intra- Peritoneal)-injection. Group placebo had received solution (saline) without CCF. After 48h, the blood samples were taken from heart, following anesthesia. Blood samples were centrifuged and serums were analyzed with ELISA method for determination of ghrelin and corticosterone concentrations.

Obtained data analyzed with SAS software Ver. 9.1 via ANOVA method, and Duncan multiple range tests was used for mean comparisons and detection on possible significant differences between means of groups. Experiment was conducted in according to animal ethics of Islamic Azad University.

RESULTS AND DISCUSSION

Analyzed data for serum ghrelin and corticosterone of animals are presented in table 2.

There was no any significant difference for both of parameters among experimental groups (table2).

Table2. Glycemic status of Wistar rats injected with CCF extract

Variable **Groups**	**Ghrelin** ***pg/l***	**Corticosterone** ***ng/l***
Group 1 ***Control; intact***	329.4	190.2
Group 2 ***Control; placebo***	302.9	200.1
Group 3 ***50 mg/kg BW CCF***	375.5	203.6
Group 4 ***100 mg/kg BW CCF***	389.6	202.4
Group 5 ***200 mg/kg BW CCF***	347.7	181.7
Group 6 ***400 mg/kg BW CCF***	300.0	187.9
P value	0.162 ns	0.790 ns
SEM*	29.885	13.027

** Standard error of means.*
-ns: not significant.

Rasoulian et al., [16] had suggested that dietary CCF supplementation for one or two time/daily had significant effect on glycemic status decreases in glucose level. In present study, injection of CCF extract in four different dosages (50, 100, 200, and 400 mg/kg BW) didn't have any considerable effect on two hormones (ghrelin and corticosterone) which are involved in glucose metabolism. It seems that the hypoglycemic effect of CCF was not correlated to ghrelin or glucocorticoids in healthy animal model. It is possible that CCF can improve sensitivity of cells to insulin, without change in these hormones releasing amount.

In conclusion, infusion of CCF extract in different dosages has not any effect on ghrelin and corticosteroid releasing. Although it may has considerable effect on glycemic status.

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