

EFFECT OF CORNELIAN CHERRY (*CORNUS MAS L.*) EXTRACT ON SERUM T₃ AND T₄ LEVELS IN RAT MODEL

Mohammad Narimani-Rad and Alireza Lotfi

Department of Sport Science, Ilkhchi Branch, Islamic Azad University, Ilkhchi, Iran
(Corresponding: Mohammad Narimani-Rad, Department of Sport Science, Ilkhchi Branch, Islamic Azad University, Ilkhchi, Iran)

ABSTRACT

The aim of present experiment was to investigate the possible effects of Ip-injected cornelian cherry extract on serum T₃ and T₄ levels of experimental rat model. Animals were assigned into 6 experimental groups; group1 as control 1 or intact group (without any injection treatment), group 2 as control 2 or placebo group (injected with solvent without cornelian cherry extract), and 4 groups with injection respectively with 50, 100, 200, and 400 mg/kg BW cornelian cherry extract. Blood samples were taken from heart after anesthesia. Next, blood samples were centrifuged and serums were analyzed for determination of T₃ and T₄ values. There was no any significant difference for T₃ and T₄ levels among experimental groups, whereas dosage increase had cause minor decline (not significant) in T₃ level. In conclusion, infusion of cornelian cherry extract in different dosages has not any effect on serum T₃ and T₄ levels, during 21 d experimental period. Present findings are in agreement with previous studies with cornelian cherry fruit (supplement) which there was no any considerable effect on thyroid hormones in short-term experimental period.

KEYWORDS: Cornelian cherry, ip-injection, rat, thyroid hormones.

INTRODUCTION

Cornelian cherry (*Cornus mas L.*) is a wild fruit from the *Cornaceae* family (Hassanpour *et al.*, 2011). *Cornus mas L.* is a species of dogwood, native to southern Europe and Asia (Gülyüz *et al.*, 1998; 4). Cornelian cherries are typically olive-shaped single-seeded fruits, and 10-23 mm long, originating from an inferior ovary (Hassanpour *et al.*, 2011; Koyuncu *et al.*, 2007). In Iran, cornelian cherry fruits are consumed freshly, dried whole, and pickled like olives (Hassanpour *et al.*, 2011). 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 (Zargari, 1997). The nutrients contents of CCF are presented as table1.

Table1: Concentrations of some nutrients in cornelian cherry fruit (CCF), based on Craita-Maria *et al.*, (2011) analysis.

Compound	Moisture (% DM)	Ascorbic acid (mg/100g DM)	Carotenes (mg/100g DM)	Total sugar (mg/100g DM)	Total protein (mg/100g DM)
Fresh fruit	327.53	419.08	6.58	48.41	0.5
Dried fruit	9.12	228.82	0.77	63.22	0.27

- DM: dry matter.

Determination of the amount of the thyroid hormones T₃ (triiodothyronine) and T₄ (thyroxine) in the plasma are considered an evaluation of thyroid function. Herbal medicine for treating thyroid dysfunction or disorders is common medical aspect in china (Dharmananda, 2013). Also, in this regard, effect of some medicinal plants extract such as *Dorema aucheri* (Azarneushan *et al.*, 2010), caraway (Dehghani *et al.*, 2010) and is well studied.

Recent studies conducted with dietary form or extract of cornelian cherry were in relation to the metabolic and hormonal responses of laboratory models (Rasoulia *et al.*, 2012; Narimani-Rad *et al.*, 2013; Abdollahi *et al.*, 2014; Lotfi *et al.*, 2014), and there is no any available report on effect of infused cornelian cherry extract on thyroid hormones. In present study, effect of hydro-methanolic extract of cornelian cherry on serum T₃ and T₄ has been studied.

MATERIAL 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 °c temperature. Animals were assigned into 6 experimental groups; group 1 as control 1 or 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, hydro-methanolic extract of CCF were injected to animals due to IP (Intra-Protaneal)-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 kits (Pars Azmoon Kit, Pars Azmoon Company, Tehran) for determination of T_3 and T_4 concentrations.

Obtained data analyzed with SAS software Ver. 9.1 was subjected to Duncan multiple range tests to detection on possible significant differences between means of groups. Experiment was conducted in according to animal ethics.

RESULTS AND DISCUSSION

Data presented in table 2 shows that there is no considerable changes in any groups for any thyroid hormones. Different dosages of CCF extract didn't have effect T_3 and T_4 values.

Table 2. Effect of infused hydro-methanolic extract of CCF on thyroid hormones level

Variable	T_3 ng/ml	T_4 µg/ml
Group 1 <i>Control; intact</i>	0.76	1.06
Group 2 <i>Control; placebo</i>	0.74	0.90
Group 3 <i>50 mg/kg BW CCF</i>	0.64	1.30
Group 4 <i>100 mg/kg BW CCF</i>	0.60	1.08
Group 5 <i>200 mg/kg BW CCF</i>	0.56	1.30
Group 6 <i>400 mg/kg BW CCF</i>	0.80	1.20
P value	0.1041	0.3077
SEM*	0.1301	0.2211

* Standard error of means.

- Different letters (a, b, and c) shows significant difference, $p < 0.05$.

Cornus mass L. is included in herbal mixtures in the article entitled "Treatments for thyroid diseases with Chinese herbal medicine" (Dharmananda, 2013), but its direct effect of CCF extract was not investigated in any published literature.

Only, Lotfi *et al.*, (2014) had a study on dietary supplementation of whole CCF beside daily meals. In Lotfi *et al.*, (2014), the dietary supplementation of CCF has considerable effect on some metabolic and hormonal indices, but there was no any effect on thyroid hormones in CCF-fed hamsters. Our results (table 2), is in agreement with Lotfi *et al.*, (2014) study with whole CCF.

CONCLUSION

In conclusion, peripheral infusion of cornelian cherry extract (in 50, 100, 200, or 400 mg/kg BW dosages) have no considerable effect on T_3 and T_4 hormones in rat model.

REFERENCES

- Abdollahi B., Mesgari Abbasi M., Zakeri Milani P., Nourdadgar A.S., Banan Khojasteh S.M. and Nejati. V. (2014).** Hydro-methanolic extract of cornus mas l. and blood glucose, lipid profile and hematological parameters of male Rats. *Iran. Red Crescent Med. J.* 16(5): e17784.
- Azarneushan F., Karami M., Golizadeh L. and Davary K. (2010).** The effect of Dorema aucheri-Hydroalcoholic extracts on thyroids hormones in adult male rats. *J. Shahrekord Univ. Med. Sci.* 12: 84-88.
- Dehghani F., Panjehshahin M. R. and Vojdani Z. (2010).** Effect of hydroalcoholic extract of caraway on thyroid gland structure and hormones in female rat. *Iranian J. Vet. Res.*, 11: 337-341.
- Dharmananda S. (2013).** Treatments for thyroid diseases with Chinese herbal medicine. Institute for Traditional Medicine, Portland, Oregon state. Available online: <http://www.itmonline.org>.
- Güteryüz M., Bolat I. and Pirlak L. (1998).** Selection of table cornelian cherry (*Cornus mas L.*) types in Çoruh Valley. *J. Agric.*, 22:357-64.
- Hassanpour H., Hamidoghli Y., Hajilo J. and Adlipour M. (2011).** Antioxidant capacity and phytochemical properties of cornelian cherry (*Cornus mas L.*) genotypes in Iran. *Sci. Horticult.* 129(3):459-63.
- Koyuncu T., Tosun İ. and Pınar Y. (2007).** Drying characteristics and heat energy requirement of cornelian cherry fruits (*Cornus mas L.*). *J Food Engine*, 78(2):735-9.
- Lotfi A., Aghdam Shahryar H. and Rasoolian H. (2014).** Effects of Cornelian cherry (*CORNUS MAS L.*) fruit on plasma lipids, cortisol, T₃ and T₄ levels in hamsters. *J. Anim. Plant Sci.* 24(2):459-462.
- Narimani-Rad M., Zendehdel M., Abdollahi B., Lotfi A. and Mesgari Abbasi. (2013).** Cornelian cherry (*Cornus mas L.*) extract affects glycemic status in Wistar rats. *Bull. Env. Pharmacol. Life Sci.*, 2(9):48-50.
- Rasoulia H., Shahryar H.A., Abbaspour R. and Lotfi H. (2012).** Effects of dietary inclusion of cornelian cherry (*Cornus mas L.*) fruit on body weight, insulin level and glycemic status of hamsters. *Pakistan J. Biol. Sci.* 15(11):547-50.
- Zargari A. (1997).** Medicinal Plants. Vol. B, Tehran University Press, Tehran, pp: 643-645.