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Determination of rutin content in henbane seeds, collecting from three different regions of Iran

Alaghemand, Atena*, Ghorbanpour, Mansoor, Eradatmand Asli, Davood and Moghaddasian,Behnaz

Department of Horticulture, Faculty of Agriculture, Saveh Branch, Islamic Azad University, Saveh, Iran

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ABSTRACT

Seeds of plants belonging to Solanaceae family are well known for their alkaloidal secondary metabolites. But there exists some non-alkaloidal secondary metabolites which are less explored. The objective of the present study was to determine the amount of bioactive non-alkaloidal secondary metabolites which is called Rutin in the seeds of the ***medicinal plant****, Hyoscyamusniger, which is commonly known as henbane .In this study ,the amount of rutin content was quantitatively determined in H.niger seeds which was collected from three different regions of Iran in july, using high performance liquid chromatography (HPLC) . The amount of rutin on dry matter was 25/76(mg/g) for Kermanshah ,24/71(mg/g) for Black grove kandovan and 11/22(mg/g) for Karaj.Rutin content in seeds provided more importance tohenbane as a medicinal plant.*

Keywords :hyoscyamusniger, rutin, HPLC

INTRODUCTION

While the poisonous henbane is well known for its alkaloidal content, the occurrence of non-alkaloidal metabolic constituents is not well explored. The anti-cholinergic plants species also produce non-alkaloidal secondary metabolites like lignans, coumarinolignans, withanolides, lignanamides, glycerides, saponins, flavonoids and its glycosides[2]Phytochemical reports explore the occurrence of flavonoids like rutin, spiraeoside and 3',5-dihydroxy-3,4',5',6,7-pentamethoxyflavone in the seeds of H. niger [1][13].

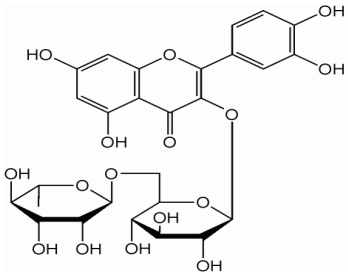

Fig.1: structure of rutin

Rutin is a bioflavonoid with the strong antioxidant properties which has been found to occur abundantly in someplants and may help prevent the oxidation of vitamin C and have some positive lipid effects. Rutin is found in

many plants, especially in Fagopyrum esculentum Moench, family Polygonaceae[5]Sophorajaponica, Eucalyptus macrorrhynca[6]and capparis spinosa[10][9] But only small number of plant materials contain quantities sufficient for industrial extraction[6]. Rutin's structural formula is presented in fig1.

The objective of this study was determination of rutin content in henbane seed in three different regions of Iran.

MATERIALS AND METHODS

The henbane seeds were collected from Kermanshah/Iran with an altitude of 1750-2310m, Black grove kandovan /Iran with an altitude of 1900 m and Karaj with an altitude of 1300 m in July at seeding stage and then were dried at ambient temperature in the shade.

Rutin determination by HPLC:
An amount of 0.1-0.5 g of ground plant material was extracted with 10 ml of solution (methanol-acetic acid- water 100:2:100) for 1 hour on a shaker at laboratory temperature.2ml of the extract were centrifuged for 10 min at 2000 rot/min. Then solution was filtered through a micro filter with a regenerated cellulose membranes of the pore size 0.22 .The filtrate was applied for HPLC. Detection with UV detector was carried out at 355nm. Rutin was eluted at 6.72 min and the peak area were compared to the standard.

RESULTS AND DISCUSSION

The results of this study showed that rutin content significantly was affected by the environmental conditions and altitude. Seeds of Kermanshah with an altitude of (1750-2310 m)contain the highest amount of rutin content (25.76 mg/g) and followed by seeds of Black grove kandovan (24.71 mg/g) and Karaj(11.22 mg/g) (table 1).

Although rutin content in henbane seed is less in comparison to rue (86.6mg/g) and flower of buckwheat (53.5 mg/g), but its amount is comparable to other plants like leaves of thyme (24.9 mg/g), leaves of buckwheat (20.0 mg/g) and flower of dog rose (14.0 mg/g)[12].

Table 1: Rutin content in henbane seeds

Seeds location	Altitude(m)	Rutin content(mg/g)
Kermanshah	1750-2310	25/76
Black grove kandovan	1900	24/71
Karaj	1300	11/22

According to secondry metabolites with antioxidant properties are very sensitive to environmental condition[4]. In our experiment the influence of location was significant as to the rutin content in henbane seeds. The biogenesis of rutin depends on light conditions especially UV radition[14]described an increase in rutin concentration by UV-B radiation desiccation treatment in Tartary buckwheat leaves. Hence we can suppose that the rutin content in seeds is considerably influenced by the weather during the first stages of seed development. An appropriate low temperature and a great temperature differences between daylight and night were beneficial to flavonoid formation. Recent progresses showed that the principal environmental factors influencing flavonoid content were latitudes, annual mean precipitation, annual mean sunshine percentage and annual mean temperature [3].

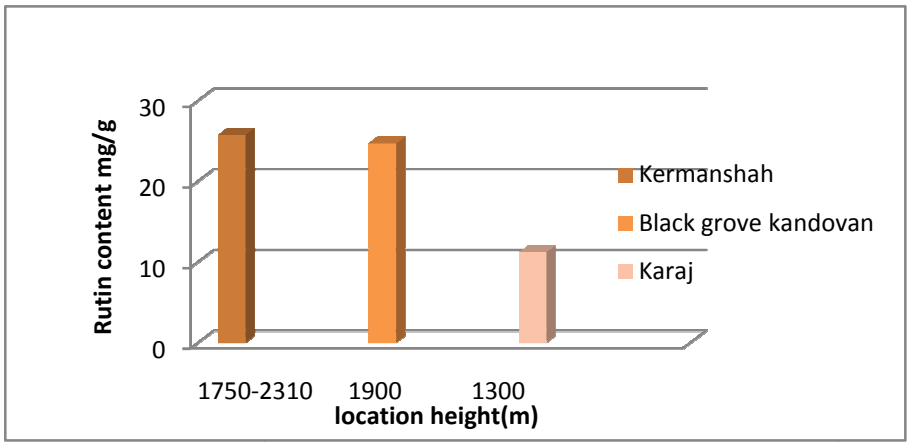

Fig.2 Rutin content in the seeds of henbane, collecting from different locations

COCLUSION

It can be concluded that there is a close relationship between rutin content and altitude in the seeds of henbane .Increasing in altitude enhanced rutin content of seed.Also this study offers seeds of henbane as a source of rutin.

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