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Flavonoids Of *Astragalus alopecia* Đàll

**A.K.PATSAYEV*, B.K.MAKHATOV,
A.Y.BUKHARBAYEVA and K.DZH.KUCHERBAYEV**

South-Kazakhstan state pharmaceutical academy, Republic of Kazakhstan, Shymkent
*Corresponding author E-mail: anapia.patsaev@mail.ru

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ABSTRACT

Astragalus alopecia is one of the valuable traditional medicinal herbs that exhibits a line of biological activities. In this research, the content of Astragalus alopecias flavonoids were studied. From the generative and vegetative organs astragalus identified a number of active compounds (flavonoids, polysaccharides, triterpene saponins). We conducted preliminary study the aerial part of Astragalus alopecias showed the presence of the most common groups of biologically active substances, flavonoids, triterpenoids. We identified quantitative content of flavonoids by UV-spectrophotometry in conversion to quercetin from aerial parts, in flowers and in root of plant *Astragalus alopecia*. As a result we found that in leaves and stems appeared highly accumulation of flavonoids. Contents of total flavonoid reached up to 18% and the major ingredient is quercetin.

Keywords: *astragalus alopecia*, spectrophotometry, flavonoids

INTRODUCTION

One of the perspective sources of phyto preparations are medicinal plants containing flavonoids, which is by the wide spread in plants and higher structural diversity now a days is in the center of researchers attention in the field of pharmacy and medicine (Korulkin et al., 2007; Kurkin, 2002; Kurkin, 2007; Makarova and Makarov, 2010; Muraviyeva, 2002; Flavonoids: Chemistry, Biochemistry, and Applications, 2006; The Flavonoids: Advances in Research, 1982; Wagner, 1993). Flavonoids – are more class of natural phenol compounds, which characterized by structural multiplicity, higher various activity. Widely amplitude of biological activity of flavonoids are connected with diversity of their chemical structures and different physical-chemical properties. This interest is connected with circumstance, that flavonoids, which is being evolutional adequate to human organism, stipulates anti-oxidative, vasoprotective, hepatoprotective, cholagogue, diuretic, neurotropic actions (Korulkin *et al.*, 2007; Kurkin, 2002, 2007; Kurkin and Pravdiceva, 2008; Kurkin, 2009). One of the species Asrtagalus membranaceus has been used for more than 2,000 years in China to boost the body's general vitality and strengthening resistance to exogenous pathogens (Fangli Lu, 2014).

Flavonoids variety distributed in nature. As the food-derived cancer preventive compounds, they display potential therapeutic benefit in cancer and may be considered as the candidates for chemotherapeutic agents (Sak, 2014). To improve their biological activities and enhance their anticancer effects, it is also important to chemically modify the structures of natural flavonoids by introducing structural variations into their backbone (Xiaofeng Shi et al., 2016).

The most reported activity of flavonoids is their protection against oxidative/nitrosative stress. Thus flavonoids can scavenge peroxyl radicals, and are effective inhibitors of lipid peroxidation, and can chelate redox-active metals, and therefore prevent catalytic breakdown of hydrogen peroxide (Ergul Belge Kurutas, 2016). Generally, the synthesis of flavonoids is enhanced when the plants face with stress agents, such as strong light and there have been few reports on the MS fragmentation of them (Wang Hui, 2015). Around 840 new isoflavonoids have been reported over last 15 years indicating the increasing interest in search for the natural isoflavonoids (Sharma, 2013).

In terms of the species number, Astragalus L. (Fabaceae), represented by about 10 subgenera, 130 sections, and nearly 2500 taxa, is the richest genus of vascular plants on earth. Erect, caulescent, usually stout, perennial herbs. Stipules free from the petiole, rarely decurrent, linear, lanceolate, linear to lanceolate, triangular, triangular lanceolate, ovate to acuminate, glabrous or pilose, ciliate. Leaves imparipinnate (Hasan Akan and Zeki Ayta, 2014).

More than 40 years ago, research on Astragalus species was initiated in Bulgaria focused on numberous biologically active metabolites. Novel and unusual for the genus, group of compounds named flavoalkaloids were identified in A. monspessulanus subsp. monspessulanus. Flavoalkaloids were previously known only as aglycones (Krasteva *et al.,* 2016).

Four new flavonoids, astragaisoflavans, along with thirteen known ones were isolated from the aerial parts of Astragalus hoantchy. Compound 1 and 4 were evaluated for their antifungal activity against Alternaria solani (Kai Guo *et al.,* 2016).

As a consequence we carried out *Astragalus alopecia* Pall assessment of flavonoids compounds content. The goal of the work is conclude of quantitative determination of flavonoids in plant *Astragalus alopecia* Pall.

Materials and methods

Object of investigation is air-dry aerial part, flower and leaves of plant Astragalus alopecias Pall., harvested in 2015 in South-Kazakhstan oblast (Ordabassy region, Kozhatogai village) during blossoming period of the plant and roots collected in fruiting period. To avoid any destruction of chemical components, the collected materials were dried in the shade. The plant was identified by candidate of biological sciences T.S.Ibragimov from South-West scientific-industrial Center of agricultural holdings.

UV spectra were recorded using spectrophotometer SPh-2000 by LOMO. For determination of flavonoids is used in complex formation reaction with aluminum chloride solution exclude the deposit in account optical density of other group of compounds in conversion to quercitin (Muraviyeva *et al.,* 2002).

Analytical sample of raw material crushed to particles, pervaded throuth sieve with diameter ports 1 mm. About 1g (precisely weighted amount) raw material put in the flask with volume 150 ml added 30 ml 90% ethanol, containing 1% concentrated hydrochloric acid, flask connected to diverse refrigerator and heated on boiling water bath during 30 minutes. Then flask cooled till room temperature and filtered through paper filter in volumetric flask with volume 100 ml. Extraction is repeated twice. Then extracts put together, filtered through same filter to the same flask, washed filter with 90% ethanol and add it till mark (A solution).

In volumetric flask with volume 25 ml put 2 ml A solution, add 1ml 1% aluminum chloride solution in 95% ethanol add 95% ethanol till mark. After 20 minutes measured the optical density of solution on spectrophotometry at 430 nm wave length in 10 mm layer thickness cuvet.

As a blank solution used solution containing 2 ml A solution, add 95% ethanol till mark in 25 ml volumetric flask.

Table 1

Content of flavones in conversion with quercetin

Astragalus alopecias	Leaves	Flower	Root
	18%	2,8%	2,0%

RESULTS

Content of flavonoids in conversion to quercetine and absolute dry raw material in percentage (Õ) is calculated by the formula:

$$X = \frac{D \cdot 25 \cdot 100 \cdot 100 \cdot 100}{764.6 \cdot m \cdot 2 \cdot (100 - W)}$$

where,

D – optical density of investigated solution at wave length 430 nm;

764.6 – indicator of absorbance of quercetin complex with 1% aluminum chloride solution at wave length 430 nm;

m – mass of raw materials in g;
W – mass lost while drying.

Obtained results may suggest the presence of anti-oxydative activity of plant *Astragalus alopecia* Pall.

CONCLUSIONS

Flavonoids have the main significance in treatment of different disease. One of the flavonoid containing plant is a *Astragalus alopecia* show interest for studying. Study of chemical composition of astragals is show presence of flavonoids, phenylcarbonic acids, oxycorich acids, polysaccharides and other compounds. Pharmacological investigations show, that one of the group of acting substances equal with polysaccharides are phenol compounds, and in particular, flavones.

By the UV- spectrophotometry method was determined the quantitative content of phenolic compounds in plant *Astragalus alopecia* Pall. Results of investigations can be used on making determined tarts of analytical documents on medicinal plant raw materials and to form new phytoproducts.

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