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Ethnopharmacological use of Black locust (*Robinia pseudoacacia*) in the Pirot District

Етнофармаколошка употреба багрема (*Robinia pseudoacacia*) у Пиротском округу

Abstract: *The subject of this paper was the study of the ethnopharmacological use of Black locust – Robinia pseudoacacia in the Pirot District (south-eastern Serbia). The study was conducted in the form of surveys among the rural population, and the Black locust was mentioned in municipalities Pirot, Babušnica, and Bela Palanka. The uses of R. pseudoacacia flower for the treatment of cough, bronchitis, common cold, and against hyperacidity, and the seed against high cholesterol and in nutrition, were mentioned. The mentioned ethnopharmacological uses of R. pseudoacacia flower against hyperacidity, and R. pseudoacacia seed uses against high cholesterol and in*

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nutrition are different and new in this study in comparison with previously conducted ethnobotanical studies in Serbia and Balkan Peninsula. However, it is known that the seeds of this plant species contain toxic compounds, so the ethnopharmacological use is not recommended. New and detailed chemical and pharmacological studies are needed so that the active ingredients of the flowers and seeds can be used for the development of new medicines.

Keywords: *Robinia pseudoacacia, ethnopharmacological use, Pirot District*

Сажетак: Предмет овој рада било је истраживање етнофармаколошке употребе багрема *Robinia pseudoacacia* у Пиротском округу (југоисточна Србија). Спроведено је истраживање у виду анкете међу руралним становништвом, а бајрем је именуи у околишима Пирои, Бабушница и Бела Паланка. Поменуи је употреба цветова *Robinia pseudoacacia* против кашља, бронхијиса и против хиперацидитетиа, а семена против повишеној холестерола и у исхрани. Наведене етнофармаколошке употребе цветова *Robinia pseudoacacia* против хиперацидитетиа, а семена против повишеној холестерола и у исхрани су дугачије и нове у овој ситуацији у поређењу са ранијим етноботаничким истраживањима у Србији и на Балканском полуострву. Међуи, познато је да семе ове биљне врсте садржи токсична једињења, па се етнофармаколошка употреба не препоручује. Потребна су нова и детаљна хемијска и фармаколошка истраживања како би активни састојци цветова и семена моли да буду искоришћени за израду нових лекова.

Кључне речи: *Robinia pseudoacacia, етнофармаколошка употреба, Пиротски округ*

INTRODUCTION

Robinia pseudoacacia (Black locust) is honey-bearing tree that grows spontaneously (Figure 1). In ethnopharmacology only flowers are used for their antispasmodics, anti-tussives, sedatives effect, while other parts of the plant especially bark and seeds are toxic (Călina et al., 2013).

In Serbian ethnopharmacology the flowers are used against common cold as antitussive agents, the leaves are used for stronger secretion of bile, while other parts of the plant especially bark and seeds are toxic (Марковић, Ракоњац и Николић, 2020; Сарић, 1989; Туцаков, 1990). According to Tasić, Šavikin Fodulović, and Menković (2001), *R. pseudoacacia* has the same medicinal properties, but all parts of the plant contain toxic compounds, especially the bark and fruits, so they



Figure 1 *Robinia pseudoacacia*
Слика 1 *Robinia pseudoacacia*

not recommended for use. Tasić i sar. (2001) mentioned the use of this plant species in homeopathy.

The flowers of Black locust (*Robinia pseudoacacia*) are significant as food for bees (Mustafa, Hajdari, Pulaj, Quave, & Pieroni, 2020). One of the most appreciated unifloral honey is produced out of plant species *R. pseudoacacia* (Giovanetti, 2019).

Kim et al. (2012) suggest that amorphastilbol and its derivatives, isolated from a *Robinia pseudoacacia* var. *umbraculifer* seed extract, after cross-coupling with various aromatic trifluoroborate compounds, is a biologically interesting and potentially useful for treating type 2 diabetes by enhancing glucose and lipid metabolism.

This study aimed to collect and analyze the traditional knowledge about traditional use of Black locust in Pirot District and to compare the results with previous ethnopharmacological studies in surrounding areas. Also, the aim of the study was to record the new uses of this plant species in the Pirot District, which were not previously noted in neighboring regions in Serbia and the Balkans.

METHODOLOGY

The study of the ethnopharmacological use of plants in the Pirot District was carried out in the form of a population survey. The questionnaire about traditional knowledge of herbs for medicinal purposes included inhabitants of 144 villages of Pirot District. A total of 631 informants were surveyed (Marković et al., 2023).

The systematized results about use of Black locust (*Robinia pseudoacacia*) were presented in Table 1 in municipalities of the Pirot District: Pirot, Babušnica, and Bela Palanka.

RESULTS

A total of 11 reports of 4817 (0.29%) were mentioned by 11 respondents about the ethnopharmacological use of Black locust (*Robinia pseudoacacia*), of which 9 were reported from men, and 2 were reported from women (Table 1). All respondents were of Serbian nationality. The gender of respondents who mentioned Black locust was 37 to 78 ages. The folk names of *Robinia pseudoacacia* in the Pirot District were „bagrem“, and „bagren“. All mentioned applications were internal.

In municipality Pirot 7 reports were mentioned by respondents, 1 reports in municipality Babušnica, 3 reports in municipality Bela Palanka.

Table 1 Overview of the plant *Robinia pseudoacacia* use survey results in the Pirot District

Табела 1 Преглед резултата истраживања употребе биљке *Robinia pseudoacacia* у Пиротском округу

Municipality	Village	Gender	Age	Part	Form	Use
Pirot	Barje Čiflik	M	74	flower	Infusion	Cough
Pirot	Blato	M	59	flower	Infusion	Cough
Pirot	Gostuša	M	52	flower	Infusion	Cough
Pirot	Pokrovenik	F	65	flower	Infusion	Bronchitis
Pirot	Rudinje	M	78	seed	Dry seed	High cholesterol
Pirot	Sopot	M	65	seed	Dry seed	In nutrition
Pirot	Sukovo	M	63	flower	Infusion	Bronchitis
Babušnica	Radinjince	F	37	flower	Infusion	Cold

Bela Palanka	Vrgudinac	M	68	seed	Dry seed	In nutrition
Bela Palanka	Donja Koritnica	M	54	flower	Infusion	Against hyperacidity
Bela Palanka	Šljivovik	M	70	seed	Dry seed	High cholesterol

All mentioned applications were internal

Seven respondents mentioned the internal use of *R. pseudoacacia* flowers, in the form of infusion, of which four respondents mentioned the treatment of cough, two respondents bronchitis, and one respondent against hyperacidity. Four respondents mentioned the internal use of *R. pseudoacacia* seeds, of which two respondents mentioned the treatment of high cholesterol, and two respondents the use in nutrition. The medicinal use of seeds against high cholesterol, and especially the use of dry seeds in nutrition, mentioned by respondents in this survey, are very debatable, and must be considered with a degree of caution, considering that the seeds contain toxic compounds, which was mentioned in the introduction of this paper.

DISCUSSION

Šarić Kundalić, Dobeš, Klatte-Asselmeyer, and Saukel (2010) in middle, south, and west Bosnia and Herzegovina noted the use of *R. pseudoacacia* against insomnia and for increased digestion, and the mentioned uses were different in comparison with our study.

Popović, Smiljanić, Matić, Kostić, and Bojović (2012) mentioned the use of *R. pseudoacacia* flowers at Deliblato Sands as expectorant, anti-spasmodic, purgative, and anticonvulsion agent, which were the different uses in comparison with present study.

Mustafa et al. (2015) mentioned in South Kosovo and Metohija the use of *R. pseudoacacia* in the treatment of the skin infection which was also the different use in comparison with our study.

Jarić et al. (2015) noted that the population of Suva Planina Mts used *R. pseudoacacia* flowers against stomach problems, and for strengthening the immune system, which were different uses in comparison with the present study. The same authors mentioned the use against colds, which was the same application as in our study.

Saric-Kundalic, Mazic, Djerzic, and Kerleta-Tuzovic (2016) mentioned the use of *R. pseudoacacia* flowers as expectorant in the treat-

ment of common cold, which was the same use as in our study. The same authors mentioned the use against insomnia and restlessness, which were different uses in comparison to our study.

Janačković, Gavrilović, Savić, Marin, Dajić Stevanović (2019) mentioned the use of *R. pseudoacacia* flowers against cold and cough, which were the same uses in comparison with the present study in Pirot District.

Tsioutsiou et al. (2019) mentioned the use of *R. pseudoacacia* against joint pains and rheumatism which were different uses in comparison to present study.

Matejić et al. (2020) in the Svrljig and Timok regions, based on a survey of the local population, mentioned the use of *R. pseudoacacia* flowers against productive cough, and bronchitis, which were similar uses in comparison with the present study in Pirot District.

Łuczaj, Jug-Dujaković, Dolina, Jeričević, and Vitasović-Kosić (2021) mentioned the use of *R. pseudoacacia* flowers against asthma, which was different use in comparison to present study in the Pirot District.

The uses of *R. pseudoacacia* flowers in the treatment of hyperacidity, and *R. pseudoacacia* seed uses against high cholesterol and in nutrition were not mentioned in previously conducted ethnobotanical studies in neighboring regions of Serbia and the Balkan Peninsula. But, this plant species, except medicinal ingredients, contain also the toxic compounds. In that sense, primarily the further chemical, and pharmacological studies of *Robinia pseudoacacia* flowers are recommended for the potentialy formulation of the new medicines. These studies can be focused for the regulation of increased acid in the stomach, which is a new application of *Robinia pseudoacacia* flower and not recorded in the literature so far, especially if we take into account the literature data that *Robinia pseudoacacia* leaves are used for increased bile secretion, so there is the good reason to investigate the flowers for their effects on the digestive tract.

CONCLUSION

It can be concluded that *R. pseudoacacia* flowers were used in the Pirot District for the treatment of cough, bronchitis, common cold, and against hyperacidity, and the seed against high cholesterol and in nutrition.

The traditional uses of *R. pseudoacacia* flowers, and *R. pseudoacacia* seed against high cholesterol and in nutrition were different and new in comparison with previously conducted ethnobotanical studies in Serbia and Balkan Peninsula. The uses of dry seeds against high cholesterol, and in nutrition, mentioned by respondents in the Pirot District, are under a question mark, considering that the seeds contain toxic compounds. Further chemical and pharmacological studies can be recommended to make as *R. pseudoacacia* flowers the possible candidates for the formulation of new medicinal products for the regulation of increased acid in the stomach.

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РЕЗИМЕ

У раду је приказан преглед етнофармаколошких знања о употреби багрема (*Robinia pseudoacacia*) у Пиротском округу. Сеоско становништво у три општине Пиротског округа (Пирот, Бабушница и Бела Паланка) поменуло је коришћење багрема, а резултати су упоређени са претходним етноботаничким истраживањима у Србији и Балкану.

Једанаест испитаника је поменуло унутрашњу употребу багрема, од чега су седам поменуте употребе цветова за следеће лековите сврхе: против кашља (4 изјаве), бронхитиса (2 изјаве) и против хиперацидитета (1 изјава). Четири испитаника су поменула употребу семена против повишеног холестерола (2 изјаве) и у исхрани (2 изјаве).

Резултати до којих се дошло анкетаирањем становништва у Пиротском округу о употреби багрема су упоређени са претходним етноботаничким истраживањима у Србији и на Балкану. Различите и нове употребе су следеће: употреба цветова против хиперацидитета, а семена против повишеног холестерола и у исхрани. Поменуте изјаве испитаника о употреби ове биљне врсте, пре свега коришћење семена у исхрани су дискутабилне и морају бити узете са дозом опрезности, с обзиром на чињеницу да је доказано да семена осим лековитих састојака садрже и отровне компоненте. У вези са новим етномедицинским употребама цветова багрема, које су поменули становници у Пиротском округу, предложена су нова и детаљна хемијска и фармаколошка испитивања како би активни састојци цветова могли да буду искоришћени за израду нових лекова за регулацију повећане киселине у желуцу.

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