

**Marija Marković<sup>1\*</sup>, Dejan Pljevljakušić<sup>2</sup>, Olivera Papović<sup>3</sup>, Vesna Stankov Jovanović<sup>1</sup>**

<sup>1</sup>University of Niš, Faculty of Sciences and Mathematics, Višegradска 33, 18000 Niš, Serbia

<sup>2</sup>Institute for Medicinal Plants Research „Dr. Josif Pančić“, Belgrade, Tadeuša Koščuška 1, 11000 Belgrade, Serbia

<sup>3</sup>University of Priština in Kosovска Mitrovica, Faculty of Science and Mathematics, Lole Ribara 29, 38220 Kosovска Mitrovica, Serbia

**Марија Марковић<sup>1\*</sup>, Дејан Пљевљакушић<sup>2</sup>, Оливера Паповић<sup>3</sup>, Весна Станков Јовановић<sup>1</sup>**

<sup>1</sup>Универзитет у Нишу, Природно-математички факултет, Вишеградска 33, 18000 Ниш, Србија

<sup>2</sup>Институт за проучавање лековитог биља „Др Јосиф Панчић“, Београд, Тадеуша Кошћушка 1, 11000, Београд, Србија

<sup>3</sup>Универзитет у Приштини са седиштем у Косовској Митровици, Природно-математички факултет, Лоле Рибара 29, 38220 Косовска Митровица, Србија

## **Ethnopharmacological use of burdock (*Arctium lappa*) in the Pirot County**

## **Етнофармаколошка употреба чичка (*Arctium lappa*) у Пиротском округу**

**Abstract:** *The subject of this paper was the investigation of the ethnopharmacological use of burdock (Arctium lappa) in Pirot County (Southeastern Serbia). The research was conducted in the form of surveys among the rural population in four municipalities. It was noticed that fructus and radix were used in the folk medicine of the County for internal and external applications. Fructus was used internally for the treatment of diabetes (1 report), diarrhea*

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\*marijam@pmf.ni.ac.rs

(2 reports), cancer (1 report), and high blood pressure (1 report); externally for strengthening hair roots (1 report), against skin diseases (1 report), and rheumatic pain (1 report). It was mentioned that radix was used for internal application for blood purification (1 report). The results showed that its application for the treatment of high blood pressure, and diarrhea were different and new in comparison with other ethnobotanical surveys in Serbia and the Balkan Peninsula.

**Keywords:** *Arctium lappa*, ethnopharmacological use, Pirot County

**Сажетак:** Предмет овој рада било је истраживање етнофармаколошке употребе чичка (*Arctium lappa*) у Пиротском округу (југоисточна Србија). Истраживање је сprovedено у виду анкете међу сеоским становништвом у четвори општина. Забележено је да су се његов и корен користили у народној медицини округа за унутрашњу и спољашњу употребу. Плод се користио изнутра против дијабетеса (1 изјава), дијареје (2 изјаве), канцерогених болести (1 изјава) и против повишене крвни притиска (1 изјава), а споља за јачање корена косе (1 изјава), против кожних болести (1 изјава) и реуматских болова (1 изјава). Корен се користио за унутрашњу употребу у третману пречишћавања крви (1 изјава). Резултати су показали да је употреба против повишене крвни притиска и у третману дијареје различита и нова у поређењу са другим етноботаничким истраживањима у Србији и на Балканском полуострву.

**Кључне речи:** *Arctium lappa*, етнофармаколошка употреба, Пиротски округ

## INTRODUCTION

According to Gajić (Гајић, 1975), the plant species from the genus *Arctium*, noticed in Serbia, are the following species: *A. tomentosum* Mill. (folk name „čičak veliki maljavi“), *A. lappa* L. (folk name „čičak“), and *A. minus* (Hill.) Bernh (folk names „čičak crveni“, „mali čičak“). All of mentioned three species were used as medicinal plants in Serbia (Сарић, 1989). According to the same author, the root of *A. lappa* (*Bardanae radix*) was used in popular medicine as a diuretic, diaphoretic, cholagogue, against rheumatism, gout, stones in the gall bladder and bladder, liver diseases, and hemorrhoids. Gostuški (Гостушки, 1973) mentioned the use of *A. lappa* against scrofulosis, skin diseases, skin ulcers, and snakebite. Marković et al. (2010) and Marković, Rakonjac and Nikolić (Марковић, Ракоњац, Николић, 2020) mentioned *A. lap-*

*pa* and *A. tomentosum* as medicinal plants of the Pirot County, with the same use as previous authors, and the following local names: „čičak“, „repušina“ for *A. lappa*, while „veliki maljavi čičak“ for *A. tomentosum*. According to the same authors, burdock – *A. lappa* (Figure 1) is considered widespread in the Pirot County.

*A. lappa* is a protected plant species with national legislative (Правилник о проглашењу и заштити строго заштићених и заштићених дивљих врста биљака, животиња и гљива, Прилог 2, Службени гласник Републике Србије, бр. 5/10, 47/11 и 32/16). It can only be harvested with appropriate permits.

The aim of this study was to collect and analyze the traditional knowledge about *A. lappa* in Pirot County and their use in medicinal purposes and to compare the results with previous ethnopharmacological investigations in neighboring regions. The goal of the research was to note the new uses of *Arctium lappa* in Pirot County, which were not previously reported in surrounding territories in Serbia and the Balkan Peninsula.



Figure 1 Burdock (*Arctium lappa*) at locality named „Arbinje“ (atar of the village Dojkinци, municipality Pirot)

Слика 1 Чичак (*Arctium lappa*) на локалитету званом „Арбиније“ (атар села Дојкинци, општина Пирот)

## METHODOLOGY

The investigation of knowledge and use of medicinal plants in Pirot County was carried out in the form of a population survey. The questionnaire about knowledge and traditional use of plants included inhabitants of 144 villages in four municipalities of Pirot County (Pirot, Babušnica, Bela Palanka and Dimitrovgrad). A total of 631 were surveyed, of which 337 were male, and 294 female (Marković, 2019; Marković, Pljevljakušić, Kojičić, Cupara, 2020; Marković, Pljevljakušić, Nikolić, Rakonjac, 2020; Marković, Pljevljakušić, Nikolić, Rakonjac, Stankov Jovanović, 2020; Marković et al., 2021a; Marković et al., 2021b; Papović, Pljevljakušić, Marković, 2021; Stankov Jovanović, Šmelcerović, Smiljić, Ilić, Marković, 2018).

The systematized results were presented in Table 1. The respondents mentioned burdock and its medicinal use in municipalities Pirot, Babušnica and Bela Palanka.

## RESULTS AND DISCUSSION

A total of 9 respondents mentioned the medicinal use of burdock (*Arctium lappa*), of which 7 were male, and 2 were female (Table 1). All of the respondents were of Serbian nationality. In municipality Dimitrovgrad, the species from the genus *Arctium* were not mentioned. The age range of the respondents who mentioned burdock was from 28 to 78 years old.

Table 1 Overview of the burdock (*Arctium lappa*) use survey results in the Pirot County population

Табела 1 Преглед резултата истраживања употребе чичка (*Arctium lappa*) у популацији Пиротског округа

Municipality	Village	Gen.	Age	Partused	Application	Form	Medicinal use
Pirot	Barje Čiflik	M	74	fructus	Internal	Tea	Diabetes
Pirot	Milojkovac	M	66	radix	Internal	Tea	Blood purification
Pirot	Novi Zavoj	F	67	fructus	Internal	Tea	Diarrhea
Pirot	Ragodeš	M	78	fructus	Internal	Tea	Cancerous diseases
Pirot	Trnjana	F	52	fructus	External	Tea	Strengthening hair roots

Pirot	Crvenčevo	F	28	fructus	Internal	Tea	Diarrhea
Babušnica	Kaluderevo	M	76	fructus	Internal	Tea	High blood pressure
Babušnica	Resnik	M	40	fructus	External	Compress	Skin diseases
Bela Palanka	Kosmovac	M	53	fructus	External	Extract in alcohol	Rheumatic pain

Two informants mentioned the internal use of the fructus of burdock in the treatment of diarrhea in the form of tea. One respondent each mentioned internal use of burdock fructus against diabetes, cancer, and high blood pressure, and one respondent each mentioned external use of burdock fructus in the form of tea for strengthening hair roots, in the form of compress in the treatment of skin diseases, and the form of extract in alcohol against rheumatic pain. One respondent mentioned the internal use of burdock radix for blood purification.

Our results were compared with other ethnobotanical studies in neighboring regions of Serbia and the Balkan Peninsula.

– Jarić et al. (2007) found that the population of Kopaonik Mt used burdock in the treatments of ulcers, and festering wounds (leaf directly on wound), which were different uses in comparison with our study.

– Šarić-Kundalić, Dobeš, Klatte-Asselmeyer and Saukel (2010) in middle, south, and west Bosnia and Herzegovina mentioned the use of tea of burdock against mouth infections, digestive ailments, increased diuresis, internal ulcers, rheumatism, blood purification, and urinary bladder stone, the use of fresh plant against worms, and the use of syrup in the treatment of urinary bladder stones. The same authors mentioned the use of mixtures with burdock against stomach ulcers, fluid unction for hair loss, and increased growth of hair and dandruff. The mentioned uses were mostly different in comparison with our study.

– Menković et al. (2011) found that the population of Prokletije Mountains in Montenegro used burdock in the form of herbal tea for cleansing blood, and diabetes, which was the same uses as in our study, and in the form of compress in the treatment of sprained legs.

– Pieroni, Giusti and Quave (2011) found that the population of the Pešter Plateau, Sandžak, was used *A. lappa* against headache, fever, cough, bruises, hair loss, and enuresis (children), which were all different uses in comparison with our study.

– Rexhepi et al. (2013) mentioned the use of burdock to improve health in general and against urinary tract disorders, which were all different uses in comparison with the present study.

– Pieroni et al. (2014) in Eastern Albania noted the use of burdock tea as a cardi tonic and appetite stimulant, which were also different uses than in our study.

– Zlatković, Bogosavljević, Radivojević and Pavlović (2014) mentioned the use of burdock in the treatment of cough and cold, and that uses were also different in comparison with our study.

– Jarić et al. (2015) found that the population of Suva Planina Mts was used burdock in the treatments of rheumatism (the leaf is applied to the painful area), inflammations, problems with thyroid gland – listed uses were different, and against cancer, and for cosmetic purposes – listed uses were similar as in our study.

– Saric-Kundalic, Mazic, Djerzic, Kerleta-Tuzovic (2016) mentioned internal use of sister species of burdock – *A. tomentosum* for gastrointestinal and urogenital disorders, blood purification, and increased sweating, and external use of the same species for skin rash, ulcers, abscesses and mouth sores. The mentioned uses were mostly different in comparison with our study, except for blood purification.

– Tsioutsiou et al. (2019) mentioned the use in the form of decoction of burdock against joint pain and inflammation, and the use in the form of poultice against wounds and furuncles. These uses were different in comparison with our study.

– Matejić et al. (2020) in the most recent ethnobotanical study for eastern and southeastern Serbia, in the Svrljig and Timok, based on a survey of the local population, noted the use of *A. lappa* for wounds, arthritis, and liver disease in the Svrljig region, which were different in comparison with our study, and the use in the treatment of diabetes in Timok region, which was the same as in our study.

– Łuczaj, Jug-Dujaković, Dolina, Jeričević and Vitasović-Kosić (2021) mentioned *A. lappa* against tumors, and for cleansing the blood, which was the same as in our study, and as the tonic for the liver, which was the different.

The uses of *A. lappa* in the treatment of high blood pressure, and diarrhea, obtained in this study, were not mentioned in previously conducted ethnopharmacological studies in neighboring regions of Serbia and the Balkan Peninsula.

## CONCLUSION

Based on the results of interviews of the local population in Pirot County done in this study, it can be concluded that fructus and root of burdock (*A. lappa*) were used for the treatment of some medical indications. Fructus was used internally in the form of tea for the treatment of diarrhea, diabetes, cancerous diseases, and high blood pressure, and externally for strengthening hair roots in the form of tea, against skin diseases in the form of compress, and rheumatic pain in the form of extract in alcohol. Root was used in the form of tea for blood purification.

The uses of *A. lappa* against high blood pressure, and in the treatment of diarrhea, obtained in this study, were different and new in comparison with previously conducted ethnopharmacological studies in Serbia and the Balkan Peninsula.

The protection of the populations of *A. lappa* should be taken into consideration. Special care in determining contingents for collection from nature is necessary for this species, as well as others from the list of protected species in Serbia.

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## РЕЗИМЕ

У Србији и Пиротском округу је забележено да се као лековите врсте из рода *Arctium* користе следеће биљне врсте: *Arctium tomentosum* Mill., чији је народни назив „чичак велики маљави“, *Arctium lappa* L., чији је народни назив „чичак“ и *Arctium minus* (Hill.) Bernh, чији је народни назив „чичак црвени“, „мали чичак“. Користе се за измокравање, изазивање знојења, против реуматизма, гихта, жучних и мокраћних каменаца, болести јетре и хемороида.

Сеоско становништво у четири општине Пиротског округа анкетирано је о познавању и примени биљака из рода *Arctium* у етно-медицини, а добијени резултати су упоређени са етноботаничким истраживањима у осталим регионима Србије и Балканског полуострва. Два испитаника су поменула унутрашњу употребу плода чичка (*Arctium lappa*) у виду чаја против пролива (диареје). По један испитаник је поменуо унутрашњу употребу плода чичка у виду чаја против шећерне болести, канцерогених болести и повишеног крвног притиска. По један испитаник је поменуо спољашњу употребу плода чичка за јачање корена косе у виду чаја, кожних болести у виду облоге и реуматских болова у виду алкохолног екстракта. Један испитаник је поменуо употребу корена чичка у виду чаја за пречишћавање крви.

Резултати добијени анкетирањем становништва у Пиротском округу о употреби биљака из рода *Arctium* су упоређени са претходним етнофармаколошким истраживањима у Србији и на Балкану. Различите и нове употребе чичка (*Arctium lappa*) у поређењу са осталим етноботаничким истраживањима у Србији и на Балканском полуострву су следеће: против повишеног крвног притиска и против диареје.

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