

## **Ethnopharmacological application of chamomile (*Matricaria chamomilla* L.) in the Pirot County of Southeastern Serbia**

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### **Summary**

Chamomile (*Matricaria chamomilla* L.) is a herbaceous plant from family Astereaceae, that has a long history of use in traditional medicine. The first written report of chamomile was found in Ancient Egypt: crushed chamomile flower-heads were used to relieve skin inflammation, prevent dermatitis, and in cosmetic preparations. The subject of this study was to examine the ethnopharmacological application of chamomile in the Pirot County of Serbia. The study was conducted in the form of a population survey on the population of four municipalities: Pirot, Babušnica, Bela Palanka, and Dimitrovgrad. This study shows that chamomile has been one of the ten best known medicinal plant species in Pirot County. The most common way of the application was a herbal tea for oral use against cold, stomach diseases, throat infection, and mild sedation. Externally, in the form of compresses, it has been used against eye swelling, skin inflammation, and infections, while the oily form was used in the treatment of wounds and burns.

**Key words:** chamomile, medicinal plant, Pirot County.

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## Introduction

Herbal medicinal products can be used as a useful complement to modern pharmacotherapy or disease management, in which safety is based on the experience gained through years of use in traditional medicine (1). Medicinal plants have been found to constitute on average 10% of the total flora of Serbia (2). Plant parts contain various compounds with medicinal properties. Therefore, herbal drugs have been considered as a raw material in drug production.

Pirot County in southeastern Serbia includes the region that comprehends the following municipalities: Babušica, Bela Palanka, Dimitrovgrad, and Pirot evaluated as a source of medicinal plants (3-8).

Chamomile (*Matricaria chamomilla* L., synonym: *Matricaria recutita* L.) is an annual plant of the Asteraceae family that is about 10 to 60 cm tall, has a thin, spindly, branched root and an upright stem, that is most commonly branching. The leaves are alternate, many times finely divided. The flower heads are heterogamous, with handles. The central flowers are tubular, golden yellow, and the outer flowers are white. It blooms in May and September (9). It contains a valuable essential oil, but also flavonoids, coumarins, and other compounds (7, 8).

The first written reports on the use of chamomile were in Ancient Egypt. It was used to relieve skin inflammation, prevent dermatitis, and as an ingredient in cosmetic products. Ancient Egyptians used chamomile not only for treatment but also in religious practices and for embalming dead bodies (10).

The chamomile flower-heads (*Chamomilae flos*) have been used internally or externally in the Serbian folk medicine (8,11). The chamomile flower-heads have been used internally for disorders of the digestive organs (gastritis, enteritis, colitis, bloating, cramps, diarrhea, dyspepsia), as well as in the treatment of hemorrhoids, irregular menstrual cycle or mastitis. External use involves the treatment of various skin and mucous membrane inflammations (11), irrigation of ulcers, wounds, burns, or eczema (12). Chamomile flower-heads may cause a cross-allergic reaction to the people otherwise allergic to any of the Asteraceae species (8,12). A frequent use during pregnancy and lactation should be avoided (12).

Chamomile essential oil, as well as its isolated compounds, show antiphlogistic effect, due to which they have been used in the treatment of inflammatory skin and mucosa processes of different etiology. Besides, chamomile essential oil shows fungistatic and fungicidal action against various dermatophytes (13). The antiseptic properties and anti-inflammatory effects of chamomile have also been confirmed by the latest scientific research (10,14). According to European Union herbal monograph on *Matricaria recutita* L., flos, there are five indications in traditional use **1)** gastro-intestinal complaints such as bloating and minor spasms, **2)** common cold, **3)** minor ulcers and

inflammations of the minor mouth and throat, **4)** irritations of skin and mucosae in the anal and genital region, **5)** inflammation of the skin (sunburn), superficial wounds and small boils (furuncles) (15).

This study evaluates the common traditional use of chamomile in ethnomedicine and ethnoveterinary medicine and it was conducted as a population survey in Pirot County. The presented data may help to focus on future chemical and pharmacological research in the development of new pharmaceutical preparations against human or domestic animal diseases.

### **Methodology**

The population of the rural areas belonging to the municipalities of Pirot, Babušnica, Bela Palanka, and Dimitrovgrad completed a questionnaire, which contained general data on respondents and specific questions, related to the knowledge and manner of medicinal plants' administration. The population of 144 villages of the Pirot County was included. A total of 631 people were interviewed, 337 of which were male and 294 were female (1,2). The results of the surveys have been listed with ethnomedical data, that include the form in which the medicinal plant has been used and the actual use of a medicinal plant in human (Table I,III) and veterinary (Table II) ethnomedicine.

### **Results and Discussion**

The species *Matricaria chamomilla* has been known among the local population of the Pirot County by the names: bela rada, podrumče, titrica, and kamilica. A total of 383 participants reported that chamomile was a medicinal species, while 380 of these participants mentioned its use in human ethnomedicine and only four people in ethnoveterinary medicine. One of them reported that chamomile was used in both human and veterinary ethnomedicine.

**Table I** Frequency of reported indications and forms of application for the traditional use of chamomile in human ethnomedicine in Pirot County.

**Tabela I** Učestalost prijavljenih indikacija i oblici primene za tradicionalnu upotrebu kamilice u ljudi u Pirotskom okrugu.

Indication	Pirot	Babušnica	Bela Palanka	Dimitrovgrad	Total
cold	71	25	32	15	143
stomach diseases	42	15	13	9	79
sore throat	17	5	10	2	35
gargle	14	2	8	2	26
eyewash	11	5	5	3	24
sedation	8	3	4	1	16
inflammation	8	2	6	0	16
cough	6	2	4	1	13
skin problems	0	1	3	0	4
other	12	4	5	3	24
Form of application					
herbal tea	187	62	87	35	371
compress	3	1	2	1	7
oil	0	1	0	0	1

**Table II** Awareness of chamomile (*Matricaria chamomilla* L.) use in ethnoveterinary medicine in the Pirot County – overview.

**Tabela II** Korišćenje kamilice (*Matricaria chamomilla* L.) u etnoveterinarskoj medicini u Pirotskom okrugu - pregled

Municipality	The village	Nationality	Gender	Age	Form	Use
Pirot	Dojkinci	Srb.	F	69	tea	stomach problems
Bela Palanka	Čiflik	Srb.	F	31	tea	cold
Dimitrovgrad	Željuša	Bug.	F	49	tea	cold
Dimitrovgrad	Željuša	Bug.	F	49	tea	stomach problems

The largest number of participants confirmed the use of chamomile in the form of tea against colds (143 subjects) and stomach problems and different stomach diseases (79 subjects). Many participants confirmed its use against throat infections (34 subjects), while 29 subjects specified the use as mouth and throat gargle, 25 of them mentioned mouth gargling (14) or throat gargling (11). Four participants emphasized specific external use: gargling of gums (1), tooth inflammation lavage (1), throat infection lavage (1) inflammation of the gums lavage (1). A total of 19 people mentioned the use of

chamomile for eyewash, 16 people mentioned the use for sedation, and 13 people mentioned the use against coughing (Table III).

**Table III** Therapeutic groups with frequency of reported indications of application for traditional use of chamomile in four municipalities in Pirot County.

**Tabela III** Učestalost prijavljenih indikacija za tradicionalnu upotrebu kamilice po organskim sistemima u četiri opštine Pirotskog okruga

Therapeutic group	Indication	Bela			
		Pirot	Babušnica	Palanka	Dimitrovgrad
Respiratory	cold	71	25	32	15
	gargle	14	2	7	2
	cough	6	2	4	1
	sore throat	18	5	10	2
Digestive	stomach diseases	42	15	13	9
	diarrhea	1	-	-	-
	digestion	-	-	1	-
	increased acid production in the stomach	-	-	1	-
Nervous system	sedation	8	3	4	1
	insomnia	1	-	-	-
Inflammation	eyewash	7	5	5	2
	inflammation	3	2	5	-
	eye inflammation	3	-	-	-
	face wash	2	-	-	-
	inflammation of the gums	1	-	-	-
	rinsing of the oral cavity and gums	1	-	-	-
	gargle (tooth inflammation)	-	-	1	-
	mucosal inflammation	1	-	-	-
Urinary	bladder and kidney disease	-	-	-	2
	diuretic	1	-	-	-
Infectious	eye infection	1	-	-	-
	influenza	-	-	-	1
Preventive	disease prevention, coffee replacement	2	-	-	-
	strengthening the immune system	1	-	-	-
Dermatology	skin diseases	-	1	1	-
	hair washing	1	-	-	-
	vaginal flushing	1	-	-	-
	wounds and burns	-	1	-	-
	fixing hair roots (balm for blond hair)	-	-	2	-
	for a nicer skin complexion	-	-	2	-
Various	swelling of the eyes	-	-	-	1
	lung diseases	-	1	2	-
	unknown use	1	1	1	-
	high temperature	2	-	-	-
	detoxification	1	-	-	-
	blood purification	-	1	-	-
	nausea	-	-	-	1

The use of chamomile against various inflammations in the ethnomedicine of the Pirot County confirmed 9 people, while the use in the stomach diseases and eye inflammation was confirmed by 6 and 3 people, respectively. Not specifying the particular way of use, 3 people confirmed the chamomile use. Two people mentioned the use of chamomile tea as a face wash, in the prevention of various diseases, and also against bladder, kidney and skin diseases, against different stomach ailments, against fever, as a coffee replacement, use for strengthening the hair roots of light hair and for enhancing skin complexion (in the form of compress). One person mentioned the use of chamomile in the form of tea for blood cleansing, detoxification, vaginal lavage, strengthening of the immune system, against respiratory diseases, against influenza, against hyperacidity (elevated acid), against nausea, against insomnia, against lung disease, against diarrhea, against various infections, against inflammation of the mucous membranes, in urinary problems, hair washing and for enhanced digestion. Also, one person mentioned the use of chamomile in eye swelling treatment as well as against eye infection. One person mentioned using its oily form against wounds and burns.

A total of four participants in the Pirot County confirmed that chamomile was used as an infusion in ethnoveterinary medicine, two participants confirmed its use against colds and two participants confirmed its use against stomach problems in domestic animals (Table II).

We observed that our results are similar to the ones obtained in the ethnobotanical study on the medicinal use of chamomile in Serbian ethnomedicine by Dajić Stevanović et al. (2014) (16). They found that the population of Serbia used chamomile flower-heads in the form of tea against inflammation and spasms in the intestinal tract, coughs, bronchitis, fever, and colds, and externally against inflammation of the skin, larynx and pharynx inflammation, as well as wounds and burns. Jarić et al. (2017) provided similar data in the study of the different applications of medicinal plants growing on the mountain Kopaonik in Central Serbia (17). They referred to the chamomile as an antiseptic, anti-inflammatory and sedative agent, specifying that its external use included treatment of skin and mucous membranes, burns, wounds, sores, and vaginal flushes. They confirmed its internal use in abdominal pain, dyspepsia, and constipation, as well as for inhalation during sinusitis. Zlatković and Bogosavljević (2014) analyzed the taxonomic and pharmacological evaluation of medicinal plants of the Svrljiški Timok canyon in eastern Serbia (18). They also referred to chamomile as an antiseptic, carminative, mild sedative, and antiphlogistic, against abdominal cramps, cough, bronchitis, fever and cold, inflammation of the skin, larynx and pharynx inflammation and against wounds and burns. Besides, Janačković et al. (2019) in the most recent ethnobotanical study for eastern Serbia, in the Negotin Krajina, based on a survey of the local population, noted the use of chamomile against digestive disorders, vaginal problems and for eye rinsing

(19). These authors reported also the use of chamomile flower-heads in the preparation of skin care products such as domestic creams and shampoos.

We found a similar ethnopharmacological application of chamomile in human ethnomedicine in Pirot County. The following seven therapeutical applications are different and new from well-known in Serbia **1)** bladder and kidney disease (2 reports), **2)** blood purification (1 report), **3)** disease prevention, coffee replacement (2 reports), **4)** diuretic (1 report), **5)** detoxification (1 report), **6)** lung diseases (3 reports) and **7)** nausea (1 report).

In addition to the use of chamomile in ethnomedicine, during the population survey in the Pirot County, by four respondents, the use in ethnoveterinary against colds and stomach problems in domestic animals was also mentioned.

### **Conclusion**

Based on the results of a population survey in the Pirot County, it was confirmed that chamomile has been often used in the traditional medicine of the rural population of this county as well as in other regions of Serbia. Chamomile flower-heads have been used most often in the form of herbal tea (infusion). The main internal indications were cold, cough, stomach, and digestive problems, sore throat, various body inflammations, and sedation. Externally, it was mainly used for mouth, throat, and face washes. Other uses included prevention of various diseases, coffee replacement, against bladder, kidney and skin diseases, fever, for the hair roots strengthening of the light hair and skin complexion enhancement. The most common way of the application was as a tea in a form of infusion for oral use, but also the infusion was used as compresses against the skin and mucous membrane inflammation, eye infection, and swelling, as well as oil in the treatment of wounds and burns. The main indications in the ethnoveterinary medicine were colds and digestive ailments of domestic animals.

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# **Etnofarmakološka upotreba kamilice (*Matricaria chamomilla* L.) u Pirotskom okrugu u Jugoistočnoj Srbiji**

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## **Kratak sadržaj**

Kamilica (*Matricaria chamomilla* L.) je zeljasta biljka iz familije Asteraceae, koja ima dugu istoriju upotrebe u tradicionalnoj medicini. Prvi pisani izveštaji o kamilici nalazi se u starom Egiptu: zdrobljeni cvetovi kamilice korišćeni su za ublažavanje upala kože, za sprečavanje dermatitisa i za izradu kozmetičkih preparata. Predmet ovog istraživanja bio je ispitati etnofarmakološku primenu kamilice u Pirotskom okrugu. Istraživanje je sprovedeno na osnovu anketiranja stanovništva u četiri opštine: Piroto, Babušnica, Bela Palanka i Dimitrovgrad. Zabeleženo je da je *Matricaria chamomilla* jedna od deset najpoznatijih lekovitih biljaka u okrugu. Najčešće se koristi u vidu čaja protiv prehlade i protiv stomaćnih tegoba, protiv upale grla i za smirenje. U vidu obloga koristi se protiv upala, infekcije i otoka očiju, a u vidu ulja protiv rana i opekotina.

**Ključne reči:** kamilica, lekovita biljka, Pirotski okrug

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