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Traditional use of common centaury (*Centaurium erythraea*) in the Pirot District

Традиционална употреба кичице (*Centaurium erythraea*) у Пиротском округу

Abstract: *This study provides valuable evidence on traditional knowledge about the medicinal purposes of common centaury – Centaurium erythraea in the Pirot District (Southeastern Serbia). Based on surveys among the rural population in four municipalities, the above-ground parts of C. erythraea were usually used internally: for stomach, appetite, improving the immune system, diabetes, stomach troubles and diseases, burns, wounds, high temperature, for sedation, as aphrodisiac, cough, for digestion; and externally: against burns, wounds, and rheumatic pain. Common centaury was rarely*

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used internally against gastric bacteria, blood purification, bronchitis, cancerous diseases, cleansing the body, cold, disease prevention, high blood pressure, jaundice, liver diseases, and urinary tract inflammation; and externally against chest pain, hemorrhoids, and for sunbathing. The uses against gastric bacteria, bronchitis, cancerous diseases, cough, jaundice, liver disease, urinary tract inflammation, as well as the externally uses for sunbathing, chest pain, hemorrhoids, burns and wounds were the new uses, mentioned by respondents in this study, which were not previously recorded in neighboring regions in the Balkan Peninsula.

Keywords: *Centaureum erythraea*, traditional medicinal use, Pirot District

Сажетак: Ова студија ијружа вредне доказе о традиционалним сазнањима о лековитој ујојреби кичице – *Centaureum erythraea* у Пиројском округу (Југоисточна Србија). На основу анкејтирања сеоској сјановништва у четри ојшине, надземни делови *C. erythraea* обично су се користиоли за унуирашњу ујојребу: за желудац, айешии, за јоболшање имуној система, шећерну болесии, сјомачне болесии и шејобе, ојкојшине, ране, високу шемјерајтуру, за смирење, као афрогизијак, за кашаљ, варење, а сјоља за ојкојшине, ране, јројив реуматских болова. Кичица се рејко користиоли орално јројив бакјерија у желуцу, јречишћавања крви, бронхијиса, канцеројених болесии, за јрочишћавање ојанизма, јројив јрехладе, у јревенцији болесии, јројив високој крвној јришиска, жујишце, болесии јејре и ујале уринарној тјракјиа, а сјоља јројив болова у јрудима, шујева, за сунчање. Нове ујојребе, које нису раније забележене у суседним јодручјима на Балканском јоуостјрву, а јомењуше од сјране исјшаника у овом исјраживању су следеће: изнујра јројив бакјерија желуца, бронхијиса, канцеројених болесии, кашља, жујишце, болесии јејре, ујале мокраћних јушева, а сјоља за сунчање, јројив болова у јрудима, шујева, за ојкојшине и ране.

Кључне речи: *Centaureum erythraea*, традиционална лековита ујојреба, Пиројски округ

INTRODUCTION

The herbaceous plant species *Centaureum erythraea* Rafin. belong to the family Gentianaceae. The above-ground part has been used in folk medicine as a medicinal plants in Serbia for its better taste, stomach-strengthening, and, tonic properties (Гостушки, 1973; Сарић, 1989; Туцаков, 1990), as well as for its antipyretic, anti-inflammatory effects, and as a mild sedative (Марковић, Ракоњац, Николић, 2020).

Harvesting typically takes place from July to September (Сарић, 1989; Marković et al., 2010). The above-ground parts of plant are cut using scissors, tied in the bouquets, and dried in the shade with proper ventilation (Figure 1).



Figure 1 Centaury drying
Слика 1 Сушење кичице

According to Сарић (1989) and Туцаков (1990) common centaury (*Centaureum erythraea*) was used similarly to yellow gentian (*Gentiana lutea*) to improve appetite and increase gastric secretion, and to address disorders in the digestive system, chronic dyspepsia, fever, and anemia. It is included in preparations for bile and liver, and is also used in the treatment of anorexia (Tasić, Šavikin Fodulović, Menković, 2001).

The habitats of common centaury are mountain meadows at Stara planina Mt. and Vidlič Mt. in the Pirot District (Марковић и сар., 2020). It can only be harvested with appropriate permits, as it is a protected plant species in Serbia under national legislation (Службени гласник Републике Србије, 2010).

This study aimed to collect and analyze the traditional knowledge about the medicinal use of the plant species *Centaureum erythraea* in Pirot District, and to compare the results with previous ethnopharma-

cological studies in neighboring areas. The goal of the research was to identify new uses of this herb that had not been previously recorded in neighboring regions on the Balkan Peninsula.

METHODOLOGY

The local population from villages of the Pirot County was interviewed about use of medicinal plants. A semi-structured questionnaire was answered by 631 respondents from 157 villages (Marković, 2019; Stankov Jovanović, Šmelcerović, Smiljić, Ilić, Marković, 2018).

The answers from the questionnaire regarding the use of centaury were organized by by alphabetization of municipalities and villages in Table 1.

RESULTS AND DISCUSSION

A total of 85 reports of 4817 (1.76%) were mentioned by respondents about the traditional use of *Centaureum erythraea*, with 47 coming from men and 38 from women; 72 were Serbs, and 13 were Bulgarians (Table 1). The age of respondents who mentioned the use of *Centaureum erythraea* for medicinal purposes ranged from 18 to 85.

Table 1 Overview of the survey results on the use of *Centaureum erythraea* in the population of the Pirot District

Табела 1 Преглед резултата истраживања употребе *Centaureum erythraea* у популацији Пиротског округа

Municipality	Village	Folk name	Gender	Nat.	Age	Application	I/E	Form
Pirot	Bazovik	crven kantaron	F	Ser.	63	Disease prevention, instead of coffee	I	Infusion
Pirot	Bela	crven kantaron	M	Ser.	57	Wounds	E	Oil extract
Pirot	Bela	crven kantaron	M	Ser.	57	Burns	E	Oil extract
Pirot	Berilovac	crven kantaron	M	Ser.	60	Aphrodisiac	I	Extract in alcohol
Pirot	Berilovac	crven kantaron	M	Ser.	62	For stomach	I	Infusion

Pirot	Blato	roze kantarion	F	Ser.	58	Diabetes	I	Infusion
Pirot	Blato	roze kantarion	F	Ser.	58	For stomach	I	Infusion
Pirot	Veliki Suvodol	crven kantarion	M	Ser.	52	Stomach diseases	I	Infusion
Pirot	Veliki Suvodol	crven kantarion	F	Ser.	57	Diabetes	I	Infusion
Pirot	Visočka Ržana	crven kantarion	M	Ser.	66	Aphrodisiac	I	Extract in alcohol
Pirot	Visočka Ržana	crven kantarion	M	Ser.	64	Improving the immune system	I	Extract in alcohol
Pirot	Visočka Ržana	crven kantarion	F	Ser.	79	Against gastric bacteria	I	Infusion
Pirot	Vranište	crven kantarion	F	Ser.	52	Jaundice	I	Infusion
Pirot	Gnjilan	crven kantarion	F	Ser.	43	Internal wounds	I	Infusion
Pirot	Gnjilan	kičica	F	Ser.	37	For appetite	I	Extract in alcohol
Pirot	Gostuša	crven kantarion	M	Ser.	56	For stomach	I	Infusion
Pirot	Gostuša	crven kantarion	M	Ser.	59	Improving the immune system	I	Extract in alcohol
Pirot	Gostuša	crven kantarion	M	Ser.	66	For sunbathing	E	Oil extract
Pirot	Dojkinci	kičica	F	Ser.	56	Improving the immune system	I	Extract in alcohol
Pirot	Držina	kičica	F	Ser.	22	Improving the immune system	I	Extract in alcohol
Pirot	Zaskovci	crven kantarion	M	Ser.	79	High blood pressure	I	Infusion
Pirot	Zaskovci	kičica	M	Ser.	18	Stomach troubles	I	Infusion
Pirot	Izvor	crven kantarion	F	Ser.	58	For stomach	I	Infusion
Pirot	Izvor	crven kantarion	F	Ser.	63	Sedation	I	Infusion
Pirot	Jelovica	kičica	M	Ser.	85	Stomach troubles	I	Infusion
Pirot	Jelovica	kičica	M	Ser.	85	Blood purification	I	Infusion
Pirot	Jelovica	kičica	M	Ser.	85	For appetite	I	Extract in alcohol

Pirot	Jelovica	kičica	F	Ser.	56	For stomach	I	Infusion
Pirot	Krupac	crven kantarion	M	Ser.	52	For stomach	I	Infusion
Pirot	Mali Jo- vanovac	crven kantarion	F	Ser.	49	Burns	E	Oil extract
Pirot	Miljkovac	kičica	M	Ser.	66	For appetite	I	Extract in alcohol
Pirot	Oreovica	crven kantarion	M	Ser.	42	For stomach	I	Infusion
Pirot	Pakleštica	crven kantarion	M	Ser.	73	For appetite	I	Extract in alcohol
Pirot	Petrovac	crven kantarion	F	Ser.	55	For stomach	I	Infusion
Pirot	Petrovac	crven kantarion	M	Ser.	46	Burns	E	Oil extract
Pirot	Petrovac	crven kantarion	M	Ser.	46	For stomach	I	Infusion
Pirot	Pokrovenik	kičica	M	Ser.	64	Cough	I	Infusion
Pirot	Pokrovenik	kičica	M	Ser.	64	Digestion	I	Extract in alcohol
Pirot	Pokrovenik	crven kantarion	F	Ser.	47	Diabetes	I	Infusion
Pirot	Ponor	kičica	M	Ser.	77	Sedation	I	Infusion
Pirot	Ponor	kičica	M	Ser.	77	Sedation	I	Infusion
Pirot	Ponor	kičica	M	Ser.	77	Wounds	E	Oil extract
Pirot	Srečkovac	kičica	F	Ser.	53	For appetite	I	Extract in alcohol
Pirot	Staničenje	crven kantarion	F	Ser.	70	Internal wounds	I	Oil extract
Pirot	Staničenje	crven kantarion	F	Ser.	70	For appetite	I	Extract in alcohol
Pirot	Temska	kičica	F	Ser.	71	For appetite	I	Extract in alcohol
Pirot	Topli Do	kičica	M	Ser.	62	For appetite	I	Extract in alcohol
Pirot	Trnjana	crven kantarion	M	Ser.	46	For stomach	I	Infusion
Pirot	Cerova	crven kantarion	M	Ser.	59	Cleansing the body	I	Infusion
Pirot	Crvenčevo	crven kantarion	M	Ser.	63	Uniknown use	I	Infusion
Pirot	Crvenčevo	kičica	M	Ser.	70	Improving the immune system	I	Extract in alcohol
Pirot	Crnoklište	crven kantarion	F	Ser.	52	Cancerous diseases	I	Extract in alcohol

Pirot	Činiglavci	crven kantarion	M	Ser.	44	Burns	E	Oil extract
Babuš-nica	Valniš	kičica	F	Ser.	55	High temperature	I	Infusion
Babuš-nica	Valniš	kičica	F	Ser.	55	For appetite	I	Extract in alcohol
Babuš-nica	Valniš	kičica	F	Ser.	55	Liver diseases	I	Infusion
Babuš-nica	Vučić Del	gorčika	M	Bul.	59	For appetite	I	Extract in alcohol
Babuš-nica	Draginac	crveni kantarion	F	Ser.	54	Hemorrhoids	E	Oil extract
Babuš-nica	Zvonce	crveni kantarion	F	Bul.	52	For stomach	I	Infusion
Babuš-nica	Provaljenik	roze kantarion	F	Ser.	43	For appetite	I	Extract in alcohol
Babuš-nica	Radinjince	kičica	F	Ser.	62	For stomach	I	Infusion
Babuš-nica	Crvena Jabuka	kičica	M	Ser.	67	Bronchitis	E	Oil extract
Bela Palanka	Klisura	kičica	F	Ser.	59	Cough	I	Infusion
Bela Palanka	Kremenica	kičica	F	Ser.	56	High temperature	I	Infusion
Bela Palanka	Novo Selo	kičica	M	Ser.	75	Rheumatic pain	E	Oil extract
Bela Palanka	Novo Selo	kičica	M	Ser.	75	High temperature	I	Oil extract
Bela Palanka	Novo Selo	kičica	M	Ser.	75	For stomach	I	Infusion
Bela Palanka	Novo Selo	kičica	M	Ser.	75	Diabetes	I	Infusion
Bela Palanka	Sinjac	plavi kantarion	M	Ser.	45	Cold	I	Infusion
Bela Palanka	Sinjac	crveni kantarion	F	Ser.	69	Diabetes	I	Infusion
Bela Palanka	Čiflik	kičica	M	Ser.	85	Uniknown use	I	Infusion
Bela Palanka	Čiflik	kičica	F	Ser.	60	Stomach diseases	I	Infusion
Bela Palanka	Čiflik	kičica	F	Ser.	60	For stomach	I	Infusion
Bela Palanka	Čiflik	kičica	F	Ser.	60	For appetite	I	Extract in alcohol
Dimitrov-grad	Banski Dol	crveni kantarion	M	Bul.	62	Digestion	I	Extract in alcohol
Dimitrov-grad	Banski Dol	crveni kantarion	M	Bul.	62	Stomach troubles	I	Infusion

Dimitrov-grad	Boljev Dol	crveni kantarion	F	Bul.	57	For appetite	I	Extract in alcohol
Dimitrov-grad	Vlkovija	crveni kantarion	F	Bul.	61	For stomach	I	Infusion
Dimitrov-grad	Gojin Dol	rozavi kantarion	M	Bul.	60	Chest pain	E	Oil extract
Dimitrov-grad	Dragovita	crveni kantarion	M	Bul.	72	Diabetes	I	Infusion
Dimitrov-grad	Poganovo	crveni kantarion	M	Bul.	74	Uniknown use	I	Infusion
Dimitrov-grad	Poganovo	rozavi kantarion	F	Bul.	47	Urinary tract inflammation	I	Infusion
Dimitrov-grad	Trnski Odorovci	crveni kantarion	F	Bul.	63	Improving the immune system	I	Extract in alcohol
Dimitrov-grad	Trnski Odorovci	crveni kantarion	M	Bul.	45	Improving the immune system	I	Extract in alcohol
Dimitrov-grad	Trnski Odorovci		M	Bul.	56	Rheumatic pain	E	Oil extract

*Nat. – nationality: Ser. – Serbian, Bul. – Bulgarian; Gender: M – male, F – female; I/E: I – internal use, E – external use

Folk names of *C. erythraea* mentioned in all four municipalities (Pirot, Babušnica, Bela Palanka, and Dimitrovgrad) were „kičica” and „crven(i) kantarion”. Apart from these two names, the characteristic names mentioned by municipalities are as follows: in the municipality of Pirot „roze kantarion”, in the municipality of Babušnica „gorčika”, in the municipality of Bela Palanka „plavi kantarion”, and in the municipality of Dimitrovgrad „rozavi kantarion”.

Centuary was most often used in the form of an infusion, and less often in the form of alcoholic extract (internal use), or oil extract (external use) (Table 2). The greatest number of respondents mentioned internal use of the above-ground part of *C. erythraea* for stomach (15) in the form of infusion, and for appetite (13) in the form of extract in alcohol (Table 2). Smaller number of respondents mentioned the use for improving the immune system (7), for diabetes (6), against stomach troubles and diseases (5), against burns (4), internal and external wounds (4), high temperature (3), for sedation (3), as aphrodisiac (2), cough (2), for digestion (2), and rheumatic pain (2). Three respondent mentioned *Centaureium erythraea* but they didn't know how to use it. One respondent each mentioned the use against gastric bacteria, blood purification, bronchitis,

cancerous diseases, chest pain, cleansing the body, cold, disease prevention, foe sunbathing, hemorrhoids, high blood pressure, jaundice, liver diseases, and urinary tract inflammation (Table 2).

Table 2 Medicinal uses of *Centaureum erythraea* with number of respondents, application and form as survey results between the Pirot District population

Табела 2 Лековите употребе врсте *Centaureum erythraea* са бројем испитаника, применом и обликом примене као резултат истраживања међу становништвом Пиротског округа

Medicinal use	Number of respondents	Application	Form
For stomach	15	Internal	Infusion
For appetite	13	Internal	Extract in alcohol
Improving the immune system	7	Internal	Extract in alcohol
Diabetes	6	Internal	Infusion
Stomach diseases / stomach troubles	5	Internal	Infusion
Burns	4	External	Oil extract
Internal wounds / wounds	4	Internal / external	Oil extract
High temperature	3	Internal / external	Infusion / Oil extract
Sedation	3	Internal	Infusion
Uniknown use	3	Internal	Infusion
Aphrodisiac	2	Internal	Extract in alcohol
Cough	2	Internal	Infusion
Digestion	2	Internal	Extract in alcohol
Rheumatic pain	2	External	Oil extract
Against gastric bacteria	1	Internal	Infusion
Blood purification	1	Internal	Infusion
Bronchitis	1	External	Oil extract
Cancerous diseases	1	Internal	Extract in alcohol
Chest pain	1	External	Oil extract
Cleansing the body	1	Internal	Infusion

Cold	1	Internal	Infusion
Disease prevention (instead of coffe)	1	Internal	Infusion
For sunbathing	1	External	Oil extract
Hemorrhoids	1	Internal	Infusion
High blood pressure	1	Internal	Infusion
Jaundice	1	Internal	Infusion
Liver diseases	1	Internal	Infusion
Urinary tract inflammation	1	Internal	Infusion

DISCUSSION

Jarić et al. (2007) at Suva Planina Mt. mentioned the use of *C. erythraea* as tonic for the digestive system, dyspepsia, hepatitis, and improves appetite, which were different uses in comparison with the present study.

Šarić Kundalić, Dobeš, Klatte-Asselmeyer and Saukel (2010) in middle, south, and west Bosnia and Herzegovina mentioned the uses of *C. erythraea* against gastrointestinal ailments, and ague – high temperature, which were similar in comparison with our study. The same authors mentioned the uses against influenza and headaches which were different in comparison with our study.

Menković et al. (2011) found that the population of Prokletije Mountains in Montenegro used *C. erythraea* against dyspeptic complaints, loss of appetite, and diabetes, which were similar in comparison with our study.

Pieroni, Giusti and Quave (2011) mentioned that the population of Pešter Plateau used *C. erythraea* against stomachache, and diarrhea which were different in comparison with the present study.

Zlatković, Bogosavljević, Radivojević and Pavlović (2014) found that the population of Rtanj Mt used *C. erythraea* as antiflatulent, digestive, gastritis, antidiabetic, and stimulant. The mentioned uses for digestion, and against diabetes were similar to our study of the Pirot District, while the other uses were different in comparison with our study.

Mustafa et al. (2015) mentioned the use of *C. erythraea* as an anti-coagulant, antacid, and anti-amemic agent which were different uses in comparison with our study. The same authors mentioned the use of *C. erythraea* as anti-pyretic, appetizing and immunostimulant, which were similar uses in comparison with our study.

Jarić et al. (2015) mentioned that the population of Suva Planina Mt. used internally *C. erythraea* as antidiabetic, antipyretic, for improving appetite, detoxification of the body, and against cold remedy, which were similar uses in comparison with the present study. The externally use against back rheumatic pains in “komovica” (grape pomace brendy) was also similar with our study. The same authors mentioned the uses against stomach ulcers, and laryngitis, which were different in comparison with our study.

Koleva, Dragoeva, Nanova, Koynova and Dashev (2015) mentioned the uses of centaury against hair loss, and for prophylaxis, that was the different uses in comparison with our study, and for prophylaxis, that was the similar use in comparison with present study in the Pirot District.

Saric Kundalic, Mazic, Djerzic, Kerleta-Tuzovic (2016) noted the use of *C. erythraea* for sedation, gastrointestinal ailments, blood purification, and loss of appetite, which were the similar uses in comparison with our study. The same authors mentioned the uses against anemia, which was different in comparison with our study.

Matejić et al. (2020) in the Svrlijig region, mentioned the use of *C. erythraea* against diabetes, stomach pain, and for appetite, which were all the similar uses in comparison with the present study in Pirot District.

Mustafa, Hajdari, Pulaj, Quave and Pieroni (2020) mentioned the use of *C. erythraea* against diarrhoea, which was different use in comparison with our study. The same authors mentioned the use for the treatment of stomachache, and as antipyretic, which were similar uses in comparison with our study.

Łuczaj, Jug-Dujaković, Dolina, Jeričević and Vitasović-Kosić (2021) mentioned the use of *C. erythraea* for stomach, appetite, and against fever, which were similar uses in comparison with present study. The same authors mentioned the use for the treatment of intestines, which was different use in comparison with our study.

Đelić et al. (2021) mentioned the use of *C. erythraea* for better digestion, which was similar use in comparison with present study.

Based on previous comparisons, the traditional uses of *C. erythraea* for medicinal purposes internally against gastric bacteria, bronchitis, cancerous diseases, cough, jaundice, liver disease, urinary tract inflammation, and for disease prevention, as well as the externally uses for sunbathing, chest pain, hemorrhoids, burns and wounds, obtained in our study were different and can be considered as the new uses in comparison with previously conducted ethnobotanical studies in the Balkan Peninsula.

The following should also be emphasized. The protection of the populations of *C. erythraea* in the Pirot District should be taken into consideration, because it is on the list of protected species in Serbia (Службени гласник Републике Србије, 2010).

CONCLUSION

Based on the results of interviews of the population from villages in four municipalities of the Pirot District, done in this study, it can be concluded that above-ground parts of *C. erythraea* were most often used for stomach, appetite, improving the immune system, diabetes, against stomach troubles and diseases, burns, wounds, high temperature, for sedation, as aphrodisiac, cough, for digestion, and against rheumatic pain. Less often, centaury were used against gastric bacteria, blood purification, bronchitis, cancerous diseases, chest pain, cleansing the body, cold, disease prevention, for sunbathing, hemorrhoids, high blood pressure, jaundice, liver diseases, and urinary tract inflammation.

The traditional medicinal uses of *C. erythraea* internally against gastric bacteria, bronchitis, cancerous diseases, cough, jaundice, liver disease, urinary tract inflammation, and for disease prevention, as well as the externally uses for sunbathing, chest pain, hemorrhoids, burns and wounds, obtained in this study were different and new in comparison with previously conducted ethnobotanical studies in Serbia and Balkan Peninsula. Further studies are necessary to make *C. erythraea* a possible candidate for the new pharmacological product.

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РЕЗИМЕ

У овом раду су приказана традиционална знања о употреби кичице (*Centaureum erythraea*) у Пиротском округу. Сеоско становништво у четири општине Пиротског округа је анкетирано о познавању и коришћењу лековитих биљака. Добијени резултати о употреби врсте *C. erythraea* су упоређени са етноботаничким истраживањима која су спроведена у осталим регионима Балканског полуострва.

Народни називи за биљну врсту *C. erythraea*, који се помињу у све четири општине Пиротског округа су „кичица“ и „црвен(и) кантарион“. Карактеристични називи који се осим ова два назива помињу по општинама су следећи: у општини Пирот „розе кантарион“, у општини Бабушница „горчика“, у општини Бела Паланка „плави кантарион“, а у општини Димитровград „розави кантарион“.

Највећи број испитаника навео је оралну употребу надземног дела кичице за желудац (15 испитаника) у облику инфуза, као и за апетит (13 испитаника) у облику екстракта у алкохолу. Мањи број испитаника навео је употребу за јачање имуног система (7 испитаника), против шећерне болести (6 испитаника), против стомачних тегоба и болести (5 испитаника), против опекотина (4 испитаника), унутрашњих и спољашњих рана (4 испитаника), високе температуре (3 испитаника), за смирење (3 испитаника), као афродизијак (2 испитаника), против кашља (2 испитаника), за варење (2 испитаника) и против реуматских болова (2 испитаника). Три испитаника су споменула кичицу, али нису знали за коју сврху се користи. По један испитаник је навео употребу против бактерија желуца, за пречишћавање крви, бронхитис, канцерогене болести, бол у грудима, чишћење организма, прехладу, превенцију болести, сунчање, хемороиде, висок крвни притисак, жутицу, болести јетре и против упале уринарног тракта.

Резултати добијени анкетаирањем становништва у Пиротском округу о употреби кичице су упоређени са претходним етноботаничким истраживањима у Србији и на Балканском полуострву. Различите и нове употребе су следеће: изнутра против бактерија желуца, бронхитиса, канцерогених болести, кашља, жутице, болести јетре, упале уринарног тракта, као и за превенцију болести, а споља за сунчање, против болова у грудима, хемороида, опекотина и рана.

У вези са поменутиим лековитим употребама, које нису поменуте у претходним етноботаничким радовима на Балкану, потребна су даља хемијска и фармаколошка истраживања како би кичица евентуално могла бити узета у разматрање за израду нових фармацеутских препарата.

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