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CONTRIBUTION TO THE RESEARCH OF MEDICINAL AND OTHER PLANTS IN THE MOUNTAINOUS REGION OF ČAKOR, MONTENEGRO

SUMMARY

Inventarisation of medicinal and other plants in the mountainous region Cakor was conducted with the use of professional literature. Abundance assessment was conducted using a combination of the Braun-Blanquet's method and model of the Institute for Medicinal Plants „Dr Josif Pančić“ from Belgrade.

Key words: medicinal plants, endemic plants, drugs, pharmacopeia, pharmacognostic profile, pharmacochemistry

INTRODUCTION

The mountainous region Čakor is located in the north-east of Montenegro and geographically belongs to Prokletije (Bakić et al., 1991). It stretches from North to South, opens up on the East to Metohija through Rugova canyon and on the West towards the Lim valley through large amphitheatric village of Velika. The lowest point is the mountain pass Cakor (1849 m) itself, where the main road Murino –Pec goes across. The mountainous region Cakor is rich with water and represents a divide between Adriatic and Black Sea basins. Cakor is considered to be one of the most beautiful landscapes due to its geographic position, relief shapes, rich and diversified flora, roadless area and wildlife. The highest peak, Vaganici, which is also known among the Velika inhabitants as the Vaganicka kula /Vaganici Tower/ (2112 m), offers beautiful views to all direction.

The analysis of Balkan flora that was conducted at the beginning of the 20th century (Turill, 1929, quote by Stevanović et al., 1995) registered 6753 species, out of which 1730 are endemic. The majority of new taxa have been described so far and many new species have been discovered, therefore, it is estimated by Stevanovic (1999) that the total number of species is much bigger (7500) and that the number of endemic species is close to 2000. It is stated that Montenegrin flora recognizes 3920 species or 4140 with ssp. According to the flora density indicator (number of species/ area, which amounts to 0.844), Montenegro has leading position in Europe (Stevanović et al. 1995). Regarding the Great Yugoslavian (SFRY) territory, strong floristic centers are:

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1. Šarplanina with Korabo has around 1500 plant species, out of which 157 are endemic,
2. Durmitor massif counts around 1300 plant species, out of which 122 are endemic, and
3. Prokletije, in wider and closer sense, have around 1400 plant species, out of which 126 are endemic.

The aim of the research is inventarisation of medicinal and other plants in the area of mountainous region Čakor, in the height range from 1800 m to 2100 m above the sea level. The researches were focused on the plant species that:

- a) have their application in pharmaceutical, chemical, cosmetic and other industries,
- b) have their application in scientific and traditional medicine and thereby are also official domestic and foreign pharmacopoeias, and
- c) are rare, endemic and characteristic for this area, therefore represent a potential source of new medicinal material and are interesting for comprehensive pharmacognostic and chemical researches.

Research and exploitation of medicinal plants is a growing trend in the world. Development of analytic methods, along with intensified pharmacological and clinical researches, have introduced medicinal plants into the rational phytotherapy. Certain pharmacotherapeutic groups have phytopharmaceuticals that in respect to their activities are not lagging behind synthetic derivatives, having at the same time high medication safety (Schilcher et al., 2007).

Dozens of plant species were registered in the area of Prokletije and Komovi that are used in national medicine in different ways (and in different forms) for curing different diseases. Single application of plants is the most common, but sometimes a mixture of medicinal plants is used. Many plants that are used by folks are also used in scholastic (scientific) medicine.

Interesting and diversified flora of Prokletije, in wider sense (Bogićevića, Koprivnik, Čakor, Mokra planina, Hajla, etc...), was subject to botanical researches even during middle and end of XIX century.

The first serious pharmacognostic research of medicinal flora of Plav-Gusinje region commenced at the Institute for Medicinal Plant Research, „Dr Josif Pančić“ in the 60-ies of the last century (Milojević Bojana and Milena, 1966; Tucakov and Milojević, 1970; Lakušić and Milojević, 1972) and at the beginning of this century the researchers from Montenegro got involved (Balijagić et al., 2010; Jovančević et al., 2011; Menković et al., 2011).

MATERIAL AND METHODS

Terrain reconnaissance at the altitude from 1800 to 2100 meters was performed two times in 2010, as follows:

- within pharmacognostic trip conducted at the end of June on the route Čakor – Vreteno – Planinica – Lijepi do – Čakor, and

- at the end of July and beginning of August on the routes Čakor – Đevojački krš – Dio – Čakor and Lijepi do – Vaganica – Lumere – Čakor.

The terrain was observed by march-route method and the march-route was drawn into maps. The team completed terrain mapping of both directions of their route.

Notes were taken on the presence of different medicinal and other plant species; herbarization was performed and potential on-site identification. Gathering and comprehensive photo-documenting of plant material, its habitat and surrounding landscapes were undertaken.

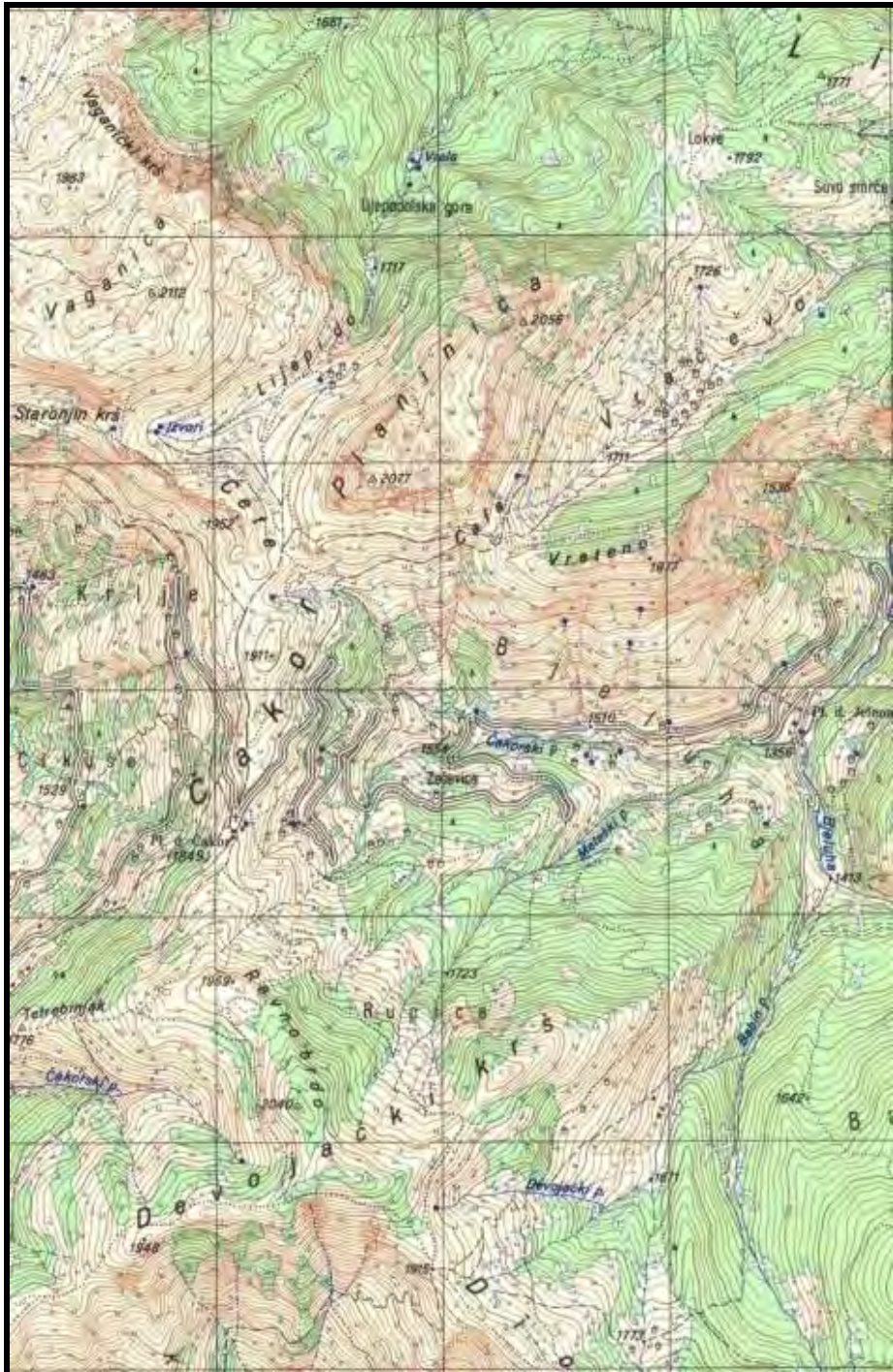
GPS coordinates were measured on noticed and recorded habitats.

Pharmacopeial division of drugs in respect to organic compounds that react in a specific way to human and animal organism was performed according to Lukić (1980) and Kišgecij (2008).

Abundance assessment was conducted using a combination of the Braun-Blanquet's method and model of the Institute for medicinal Plants „Dr Josif Pančić“ from Belgrade (Tucakov, 1960). Samples of certain medicinal and endemic plants were also collected for chemical and other laboratory analysis.

Professional literature was used for analysis and final identification: Flora of Serbia I-X (Josifović et al., 1970-1977), Mountain Plants (Lakušić, 1990), Endemic Plants (Šilić, 1983), Forest Herbaceous Plants (Šilić, 1983) and Guide through the World of Medicinal Plants (Tasić et al., 2004).

During the field researches of Čakor area, as shown on the physical-geographic map (picture 1), the found plants were numerated in Arabic numbers from 1 to 154 (chart 1). Ordinal numbers of species, described in Latin and Native languages, correspond to their respective numbers at the pharmacognostic chart (picture 2) and are positioned according to the location where they were found. Time for collection of drugs, when plants have optimum utilization values, was determined on the basis of own observations and is adjusted for the entire vegetation period and at different locations with the literature data of Tasić et al (2009) and Sarić et al., (1989). Pharmacopeia and medicament-related regulations are given according to Tasić et al.,(2009) and Sarić et al.,1989). All largest countries have their own pharmacopeia: Ross. 10 – Pharmacopeia Rossica; Ross. 9 – Ph Rossica1961.; Ph. Helv VII – Ph. Helvetica; ÖAB 9 – Ph. Austriaca; Ph. Jug – Ph. Jugoslavica; DAB 6 – Deutsches Ph.; DAB 7 – (DDR) Deutsches Ph.; DAC 79 – Deutscher Arznelmittel-Codex; BHC – British Pharmaceutical Codex; BHP – British Herbal Ph.; Dan IX – Denmark Ph.; Ital.VI – Ph. Ufficiale della Repubblica Italiana; Ph. Euro.6.0 – European Ph. 6th edition, 2006; PF – Ph. Francaise; Ned – Nederlands Ph. Zesde Uitgave; NF VIII – The National Formulary; Portug. 46 – Ph. Portuguesa; Csl.4 – Czech ph. 4.



Picture 1. Topographic map (1:25000) of the analyzed area of Čakor

Chart 1. Plants found in the mountainous region of Čakor

	Specie	Latin name of drug	Common name	Collect time - month	Official pharmacopeia
1	<i>Abies alba</i> Mill. (<i>Pinaceae</i>)	<i>Aetheroleum Abietis albae</i> ; <i>Aetheroleum (Oleum) Templi</i> ; <i>Aeth. Abietis albae cort.</i>	Fir	IV-V	
2	<i>Acer heldreichii</i> Orph. Orph. ex Boiss (<i>Aceraceae</i>)	<i>Succus</i>	Mountain maple	IV-V	
3	<i>Achillea abrotanoides</i> Vis. (<i>Asteraceae</i>)	<i>Anchusae herba</i> <i>Anchusae radix</i>	Sipar yarrow	VI-VIII	
4	<i>Achillea clavinae</i> L. (<i>Asteraceae</i>)	<i>Anchusae herba</i> <i>Anchusae radix,</i> <i>herba, flos , folium</i>	Silver yarrow	VI-VII	
5	<i>Achillea lingulata</i> W. et K. (<i>Asteraceae</i>)	<i>Anternnariae herba</i>	Tongue-leaved yarrow	VI-VIII	
6	<i>Achillea millefolium</i> L. (<i>Asteraceae</i>)	<i>Millefolii flos</i> <i>Millefolii herba</i>	Common yarrow	VI-VII	Ph. Helv VII; Jug. II; Ph. Eur. VI; BHP 90; ÖAB 9; AB-DDR
7	<i>Acinos alpinus</i> (L.) Moench (<i>Lamiaceae</i>)		Alpine Calamint		
8	<i>Aconitum vulparia</i> Reich. <i>ssp.</i> <i>pantocsekianum</i> (Deg. & Bolu) Hay (<i>Ranunculaceae</i>)		Wolf's Bane	VI-VII	
9	<i>Aconitum pentheri</i> Hay. (<i>Ranunculaceae</i>)		<i>Aconitum pentheri</i>		
10	<i>Adenostyles alliariae</i> (Gouan) A. Kern. (<i>Asteraceae</i>)		<i>Adenostyles alliariae</i>		
11	<i>Agrimonia eupatoria</i> L. (<i>Rosaceae</i>)	<i>Agrimoniae herba</i>	Agrimony	VI-VIII	Ph. Eur. VI; BHP 83, ÖAB 90. DAC 1979
12	<i>Ajuga pyramidalis</i> L. (<i>Lamiaceae</i>)		Pyramidal Bugle		
13	<i>Ajuga reptans</i> L. (<i>Lamiaceae</i>)	<i>Ajuge reptans herba</i>	Carpet Bugle	IV-VIII	Hagers handbuch der Drogen HAB34

	Specie	Latin name of drug	Common name	Collect time - month	Official pharmacopeia
14	<i>Alchemilla hoppeana</i> (Rchb.) D.Torre (<i>Rosaceae</i>)		Lady's Mantle Hoppeana	VI-VIII	
15	<i>Alchemilla hybrida</i> Mill. (<i>Rosaceae</i>)		Hybrid Lady's Mantle	VI-IX	
16	<i>Alchemilla vulgaris</i> L. (<i>Rosaceae</i>)	<i>Alchemillae herba</i>	Lady's Mantle	V-IX	Ph.Eur. VI ; BHP 83; DAB 10
17	<i>Anternarria dioica</i> (L.) Gaertn. (<i>Apiaceae</i>)	<i>Anternariae flos</i>	Cat's Foot	V-VII	Belg V, Pie de chat PF X.
18	<i>Anthyllis aurea</i> Janka (<i>Fabaceae</i>)		Golden Lady's Finger		
19	<i>Anthyllis jacquini</i> Kern. (<i>Fabaceae</i>)		<i>Anthyllis jacquini</i>		
20	<i>Anthyllis vulneraria</i> L. (<i>Fabaceae</i>)	<i>Anthyllidis herba</i> <i>Anthyllidis flos</i>	Kidney Vetch, Woundwort	V-IX	
21	<i>Arctium lappa</i> L. (<i>Asteraceae</i>)	<i>Bardanae radix</i> <i>Radix Bardanae</i>	Great Burdock	VII-VIII	PF X, DAC 86, BHP 83, Hagers handbuch der Drogen
22	<i>Arctostaphylos uva ursi</i> (L.) Spreng. (<i>Ericaceae</i>)	<i>Uvae ursi folium</i>	Bear's Grape. Bearberry	V-VII	DAB 10; Mar 29; Belg V; Ital 6; Dan IX; ÖAB 90; Helv VII; Ned 5; Jug. IV.
23	<i>Aremonia agrimonioides</i> (L.) DC (<i>Rosaceae</i>)		Bastard Agrimony		
24	<i>Armeria canescens</i> (Host) Boiss. (<i>Plumbaginaceae</i>)		<i>Armeria canescens</i>	VI-VIII	
25	<i>Aster alpinus</i> L. (<i>Asteraceae</i>)		Blue Alpine Daisy	VI-VIII	
26	<i>Aster bellidiastrum</i> (L.) Scop. (<i>Asteraceae</i>)		Daisy Star	VI-VIII	
27	<i>Betula pendula</i> Roth. (<i>Betulaceae</i>)	<i>Betulae folium</i> , <i>Betule gemme</i> , <i>Betule</i> <i>cortexe</i>	Silver Birch	IV-V	DAB 10; Helv VII; PF X; ÖAB 90; AB- DDR; Jug. IV.Jug.II

	Specie	Latin name of drug	Common name	Collect time - month	Official pharmacopeia
28	<i>Botrychium lunaria</i> (L.) Sw. (Ophioglossaceae)		Moonwort		
29	<i>Caltha palustis</i> L. (Ranunculaceae)	<i>Caltha palustris herba et flores</i>	Kingcup	IV-VIII	
30	<i>Campanula glomerata</i> L. (Campanulaceae)	<i>Campanulae radix, C. herba</i>	Dane's Blood	V-VIII	
31	<i>Centaurea nervosa</i> Willd (Asteraceae)	<i>Cyani flos sine calycibus</i>	Plume Knapweed		
32	<i>Cerastium cerastoides</i> (L.) Britton (Caryophyllaceae)		Mountain Chickweed		
33	<i>Cerastium dinaricum</i> Beck et Szysz. (Caryophyllaceae)		Dinaric Chickweed		
34	<i>Cerastium grandiflorum</i> Waldst. et Kit. (Caryophyllaceae)		Bering Chickweed		
35	<i>Chenopodium bonus henricus</i> L. (Chenopodiaceae)	Radix et herba (Chenopodii) Boni Henrici	Good King Henry	V-IX	
36	<i>Dactylorhiza cordigera</i> (Fries) Soo (Orchidaceae)		Heart-Flowered Marsh Orchid	VI-VIII	
37	<i>Dactylorhiza maculata</i> (L.) Soó (Orchidaceae)	<i>Salep tuber</i>	Heath Spotted Orchid	IV-V	Jug,II
38	<i>Daphne alpina</i> L. (Thymelaeaceae)		Alpine Mezereon	V-VII	
39	<i>Doronicum columnae</i> Ten. (Asteraceae)		Eastern Leopard's Bane		
40	<i>Dryas octopetala</i> L. (Rosaceae)		Eight-petal Mountain Avens	VI-VIII	
41	<i>Daphne mezereum</i> L. (Thymelaeaceae)	<i>Mezerei cortex, Mezerei fructus</i>	Mezereon	II-IV	EB 6.; Helv V.; NF VIII.; BPC 34.

	Specie	Latin name of drug	Common name	Collect time - month	Official pharmacopeia
42	<i>Epilobium angustifolium</i> L. (Oenotheraceae)	<i>Epilobi herba E. folium</i>	Fireweed	V-VIII	
43	<i>Epilobium montanum</i> L. (Oenotheraceae)		Willow-herb, Broad Leafed	VI-X	
44	<i>Equisetum palustre</i> L. (Equisetaceae)	<i>Equiseti herba</i>	Marsh Horsetail	III-V	Otrovan
45	<i>Euphorbia amygdaloides</i> L. (Euphorbiaceae)	<i>Oleum cataputiae minoris</i>	Spurge	IV-VI	
46	<i>Euphorbia myrsinites</i> L. (Euphorbiaceae)	<i>Oleum cataputiae minoris</i>	Myrtle Spurge		
47	<i>Euphrasia</i> sp (Scrophulariaceae)	Euphrasiae herba	Eyebright	V-X	EB 6, DAC 86, BHP 83.
48	<i>Fragaria vesca</i> L. (Rosaceae)	<i>Fragariae folium</i>	Strawberry	V-VI	Portug 46; EB 6
49	<i>Galium rotundifolium</i> L. (Rubiaceae)		Bedstraw, round-leaved	VI-VII (IX)	
50	<i>Galium verum</i> L. (Rubiaceae)	<i>Galii veri herba</i>	Lady's Bedstraw	V-IX	HAB.34
51	<i>Galium cruciata</i> (L.) Scop. (Rubiaceae)	<i>Galii cruciatae herba</i>	Smooth Bedstraw	IV-VI	
52	<i>Genista ovata</i> Waldst. & Kit. (Fabaceae)		Dyer's Broom		
53	<i>Genista sagittalis</i> L. (Fabaceae)	<i>Genista sagittalis herba, G.s.flos</i>	Broom, Winged	VI-VIII	
54	<i>Gentiana asclepiadea</i> L. (Gentianaceae)	<i>Gentianae asclepiadae radix</i>	Willow Gentian	VII-X	DAB 10 (Eur); ÖAB 90; Helv VII; BHP 83; Mar 29
55	<i>Gentiana cruciata</i> L. (Gentianaceae)	<i>Gentianae cruciatae herba</i>	Cross Gentian	VII-IX	
56	<i>Gentiana kochiana</i> Perr. Et Song./ <i>G. acaulis</i> L.p.p. (Gentianaceae)		Trumpet Gentian	VI-VIII	

	Specie	Latin name of drug	Common name	Collect time - month	Official pharmacopeia
57	<i>Gentiana lutea</i> L. (<i>Gentianaceae</i>)	<i>Gentiana radix</i>	Yellow Gentian	VI-VIII	DAB 7; Ned 6; ÖAB 9; Helv VI; Serb.II. Jug.I, II, III i IV
58	<i>Gentiana punctata</i> L. (<i>Gentianaceae</i>)	<i>Gentianae radix</i>	Spotted Gentian	VII-IX	DAB 7; Ned 6; ÖAB 9; Helv VI; CsL 4
59	<i>Gentiana utriculosa</i> L. (<i>Gentianaceae</i>)		Bladder Gentian	(V) VI-VIII	
60	<i>Gentiana tergestina</i> Beck (<i>Gentianaceae</i>)		Triglav Gentian		
61	<i>Gentiana verna</i> L. (<i>Gentianaceae</i>)		Spring Gentian	V-IX(X)	
62	<i>Geranium sanguineum</i> L. (<i>Geraniaceae</i>)		Cranesbill, Bloody	V-VII (IX)	
63	<i>Geum bulgaricum</i> Pančić (<i>Rosaceae</i>)		Bulgarian Avens	VI-VIII	
64	<i>Geum montanum</i> L./ <i>Sieversia montana</i> R.Br (<i>Rosaceae</i>)	<i>Gei montani rhizoma</i> , <i>Caryophyllatae radix</i>	Alpine Avens	VI-VIII	
65	<i>Geum rivale</i> L. (<i>Rosaceae</i>)	<i>Caryophyllatae herba,</i> <i>Caryophyllatae rhizoma</i>	Water Avens	V-X	HAB; BHP.1983.
66	<i>Globularia cordifolia</i> L. (<i>Globularaceae</i>)		Globularia, Matted		
67	<i>Gnaphalium pichleri</i> Murl. (<i>Asteraceae</i>)		<i>Gnaphalium pichleri</i>		
68	<i>Gymnadenia conopsea</i> (L.) R. Br. (<i>Orhidaceae</i>)	<i>Salep tuber</i>	Orchid, Fragrant	V-VIII	
69	<i>Helianthemum alpestre</i> (Jacq.) DC (<i>Cistaceae</i>)		Alpine Rock-Rose	VII-VIII	
70	<i>Helianthemum nitidum</i> Clementi (<i>Cistaceae</i>)		Rock-Rose		

	Specie	Latin name of drug	Common name	Collect time - month	Official pharmacopeia
71	<i>Hieracium pilosella</i> L. (Asteraceae)	<i>Hieracii herba</i>	Hawkweed, Mouse Ear	V-VIII	
72	<i>Hypericum richerii</i> Vill (Hypericaceae)	<i>Hyperici herba</i>	St. John's Wort		
73	<i>Homogyne alpina</i> Cass./ <i>Tussilago alpina</i> L. (Asteraceae)		Alpine Coltsfoot	VI-IX	
74	<i>Hypericum alpinum</i> W. K. (Hypericaceae)	<i>Hyperici herba</i>	Alpine St. John's Wort		
75	<i>Hypericum maculatum</i> Crantz (Hypericaceae)	<i>Hyperici herba</i>	Cat's Ear, Spotted		
76	<i>Hypericum perforatum</i> L. (Hypericaceae)	<i>Hyperici herba</i>	St. John's Wort, Perforate	VI-VIII	Ross 9; DAC 86; BHP 83; DAZ. 1986; Eur.3-suppl. 2001; Jug.I.
77	<i>Iberis sempervirens</i> L. (Brassicaceae)	Snježnica, snjeguljak	Evergreen Candytuft		
78	<i>Juniperus nana</i> Wild (Cupressaceae)	<i>Juniperi fructus, J. Lignum, i J. aetheroleum</i>	Wild Juniper	Kasno proljeće	Jug. IV; DAB 10; PF X; ÖAB 90; Helv VII; BHP 83; Mar 28.
79	<i>Knautia sp</i> (Dipsacaceae)		Scabious	V-VIII	
80	<i>Laserpitium sileri</i> L. (Apiaceae)		Sermountain		
81.	<i>Leontodon hispidus</i> L. (Asteraceae)		Rough Hawkbit	VI-IX	
82.	<i>Leucanthemum vulgare subsp. montanum</i> (All.) Briq. (Asteraceae)		Daisy, Ox-Eye	V-XI	
83.	<i>Linaria peloponnesiaca</i> Boiss et Heldr. (Scrophulariaceae)		<i>Linaria peloponnesiaca</i>	VII-VIII (IX)	

	Specie	Latin name of drug	Common name	Collect time - month	Official pharmacopeia
84.	<i>Linum capitatum</i> Kit. (<i>Linaceae</i>)		Headed Flax	VI-VIII	
85.	<i>Luzula</i> Ssp.DC. (<i>Juncaceae</i>)		Woodrush		
86.	<i>Lilium albanicum</i> Gris. (<i>Liliaceae</i>)		Albanian Lily	VI-VIII	
87	<i>Meum mutelina</i> Gaertn (<i>Apiaceae</i>)		Mutter		
88	<i>Muscarii</i> <i>botryoides</i> (L) Mill. (<i>Liliaceae</i>)		Grape Hyacinth		
89	<i>Nigritella nigra</i> (L.) Rchb. (<i>Orchidaceae</i>)		Black Vanilla Orchid	VI-VIII	
90	<i>Onobrychis</i> <i>scardica</i> Griseb. (<i>Fabaceae</i>)		Scardic Sainfoil	V-VII	
91	<i>Orchis morio</i> L. (<i>Orchidaceae</i>)	<i>Salep tuber</i>	Green Winged Orchid	IV-VII	DAB 6, ÖAB 9, Helv V, Mar 28; Jug.II; Ross.9.
92	<i>Origanum vulgare</i> L. (<i>Lamiaceae</i>)	<i>Origani herba</i> i <i>O.</i> <i>aetheroleum</i>	Marjoram		EB 6; Csl.2;Pol.III; Norv.V.;
93	<i>Orreohertzogia</i> <i>fallax</i> (Boiss.) Vent. (<i>Rhamnaceae</i>)		<i>Orreohertzogia</i> <i>fallax</i>		
94	<i>Oxytropis</i> <i>campestris</i> (L) DC <i>subsp. dinarica</i> Murb. (<i>Fabaceae</i>)		Dinaric Locoweed	VI-VIII	
95	<i>Pancicia serbica</i> Vis (<i>Apiaceae</i>)		Serbian Pancicia	VI-VII	
96	<i>Pedicularis</i> <i>brachyodonta</i> Schloss. Et Vukot. (<i>Scrophulariaceae</i>)		Lousewort	VI-VIII	
97	<i>Pedicularis</i> <i>comosa</i> L. (<i>Scrophulariaceae</i>)		Crested Lousewort		

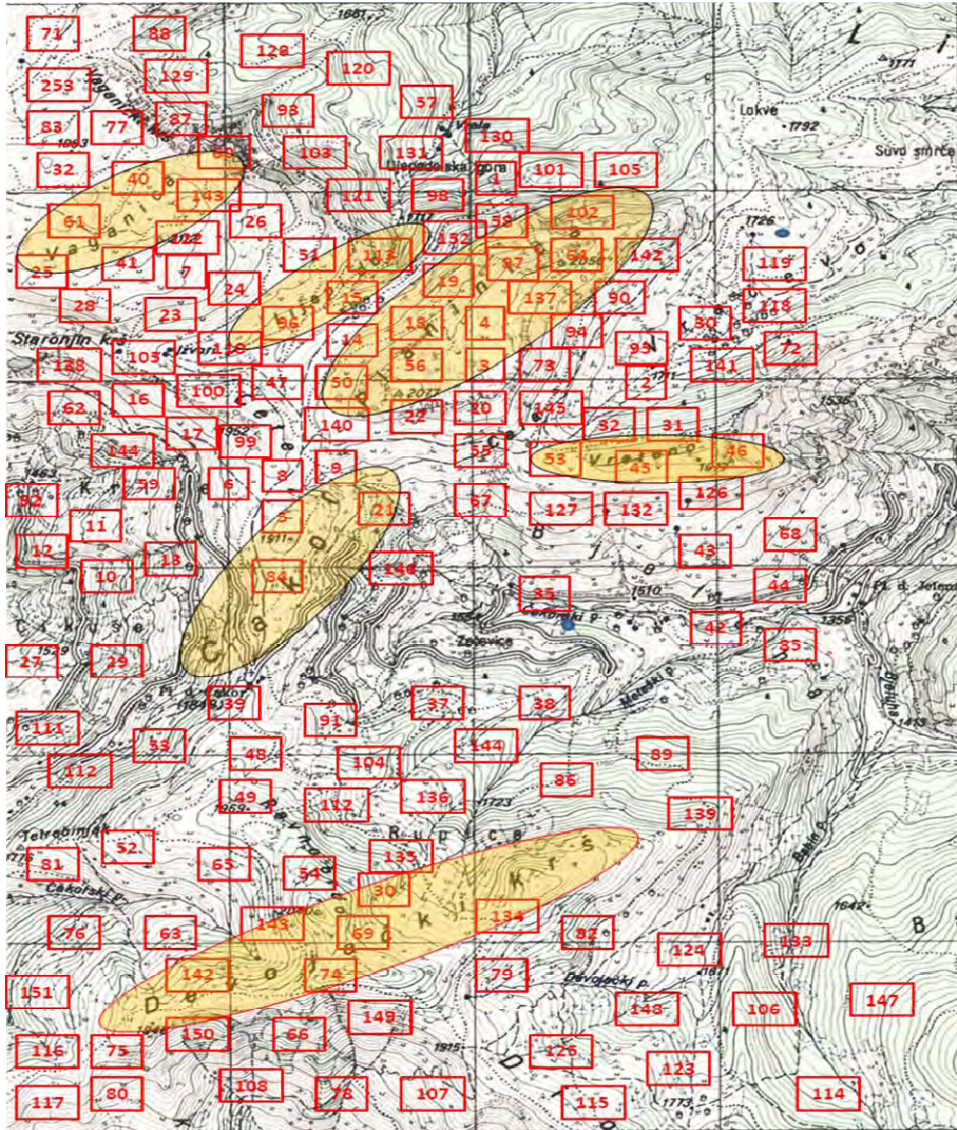
	Specie	Latin name of drug	Common name	Collect time - month	Official pharmacopeia
98	<i>Pedicularis verticillata</i> L. (<i>Scrophulariaceae</i>)		Whorled Lousewort		
99	<i>Phyteuma pseudoorbiculare</i> Pant. (<i>Campanulaceae</i>)		Round-Headed Rampion	VI-VIII	
100	<i>Picea abies</i> (L) Karsten (<i>Pinaceae</i>)	<i>Piceae turiones recentis</i>	Spruce	IV-VI	
101	<i>Pinus peuce</i> Grisebach (<i>Pinaceae</i>)		Balkan Pine	V	
102	<i>Pinus mhugo</i> Turra. (<i>Pinaceae</i>)	<i>Pini pumilionis aetheroleum</i>	Mountain Pine		DAB 10; BP 80; USP XXI; ÖAB 90; Helv VII; EB 6
103	<i>Plantago media</i> L. (<i>Plantaginaceae</i>)	<i>Plantaginis majoris herba P.majors folium Plantaginis semen</i>	Hoary Plantain	V-IX	BHP.1983. Martindale 30
104	<i>Plantago reniformis</i> G. Beck. (<i>Plantaginaceae</i>)		Plantain reniformis	VI-VII	
105	<i>Polygala amara</i> L. (<i>Polygalaceae</i>)	<i>Polygala herba, P. amara radix et herba</i>	Bitter Milkwort	V-VI	Ned.6.; Erg.B6.
106	<i>Polygonum bistorta</i> L. (<i>Polygonaceae</i>)	<i>Bistortae rhizoma</i>	Bistort	V-VIII	
107	<i>Polygonum viviparum</i> L. (<i>Polygonaceae</i>)		Alpine Bistort	VI-VIII	
108	<i>Populus tremula</i> L. (<i>Salicaceae</i>)	<i>Gemmae populi, populi corteh, P. folium, Carbo ligni</i>	European Aspen	II-III	
119	<i>Potentilla montenegrina</i> Pant. (<i>Rosaceae</i>)		Montenegrin Five- Fingered Plant	VII-VIII	
110	<i>Potentilla recta</i> L. (<i>Rosaceae</i>)		Sulphur Cinquefoil	V-VII	
111	<i>Primula elatior</i> L. (<i>Primulaceae</i>)	<i>Primulae flos cum calycibu, Primulae radix</i>	Oxlip		DAB 10; ÖAB 90 EB6 ; BHP83.

	Specie	Latin name of drug	Common name	Collect time - month	Official pharmacopeia
112	<i>Ranunculus croaticus</i> Schott var. <i>jahorine</i> Maly (<i>Ranunculaceae</i>)		1.Croatian Buttercup	VI-VII	
113	<i>Ranunculus scutatus</i> Waldst. & Kit (<i>Ranunculaceae</i>)		Frog Flower		
114	<i>Ribes alpinum</i> L. (<i>Grossulariaceae</i>)	Fruit and leaf	Mountain Currant		
115	<i>Rosa alpina</i> L./ <i>R. pendulina</i> L. (<i>Rosaceae</i>)	<i>Rosae pseudofructus cum fructibus</i>	Mountain Rose	V-VII	DAB 10; Eur.3-suppl.2001
116	<i>Rosa canina</i> L. (<i>Rosaceae</i>)	<i>Cynosobati fructus</i> , <i>Rosae caninae fructus</i>	Dog Rose	V-VII	DAB 10; Eur.3-suppl.2001. Jug.I.
117	<i>Rubus idaeus</i> L. (<i>Rosaceae</i>)	<i>Rubi idaei folium</i> , <i>R.i. fructus recens</i>	Red Raspberry	V	
118	<i>Rumex acetosa</i> L. (<i>Polygonaceae</i>)	Leaf	Common Sorrel	V-VIII	
119	<i>Rumex alpinus</i> L. (<i>Polygonaceae</i>)		Mountain Sorrel		
120	<i>Salix purpurea</i> L. (<i>Salicaceae</i>)	<i>Salicis cortex</i> <i>Salicis folium</i> <i>Salicis herba</i>	Purple Willow		DAB 10.
121	<i>Salix caprea</i> L. (<i>Salicaceae</i>)	<i>Salicis cortex</i>	Willow, Great Sallow		
122	<i>Salix retusa</i> L. (<i>Salicaceae</i>)	<i>Salicis cortex</i>	Blunt Leaved Willow	VII-VIII	
123	<i>Saxifraga rotundifolia</i> L. (<i>Saxifragaceae</i>)		Round-Leaved Saxifrage		
124	<i>Scabiosa graminifolia</i> (L.) Greuter & Burdet (<i>Dipsacaceae</i>)		Grass-Leaved Scabious		
125	<i>Scabiosa silenifolia</i> W. K. (<i>Dipsacaceae</i>)		Catchfly-Leaved Scabious	VII-VIII-IX	
126	<i>Sempervivum heufelii</i> Schott (<i>Crassulaceae</i>)	<i>Sempervivi folium recens</i> , <i>S. succus</i>	Purple Haze	V-VII	
127	<i>Sempervivum kosaninii</i> Praeger (<i>Crassulaceae</i>)		<i>Sempervivum kosaninii</i>	VII-VIII	

	Specie	Latin name of drug	Common name	Collect time - month	Official pharmacopeia
128	<i>Senecio rupestris</i> Walds. Et Kit. (Asteraceae)		Rock Ragwort	VI-VIII	
129	<i>Senecio fuschii</i> Gmelin (Asteraceae)		Wood Ragwort		
130	<i>Silene sendtneri</i> Boiss. (Caryophyllaceae)		Balcanic Catchfly	VI-VII	
131	<i>Silene vulgaris</i> <i>subsp. prostrata</i> Gaud (Caryophyllaceae)		Campion, Bladder		
132	<i>Tanacetum larvatum</i> (Gnis.) Kanitz. (Asteraceae)		<i>Tanacetum larvatum</i>		
133	<i>Taraxacum officinale</i> Weber (Asteraceae)	<i>Taraxaci folium</i> <i>T. radix</i> , <i>T. radix cum herba</i>	Dandelion	IV-IX	BHP 90; ÖAB 90; BHP 90; Mar 29; DAC 86
134	<i>Telekia speciosa</i> (Scherb.) Baumg. (Asteraceae)	<i>Telekiae radix</i>	Hearth-Leaved Oxeye	VII-IX	
135	<i>Teucrium montanum</i> L. (Lamiaceae)	<i>Teucrii herba</i>	Mountain Germander	VI-VIII (IX)	ÖAB 90
136	<i>Thymus serpyllum</i> L. (Lamiaceae)	<i>Serpylli herba</i> , <i>Serpyll aetheroleum</i>	Breckland Thyme	V-IX	DAB 10; BHP 83
137	<i>Trolius europaeus</i> L. (Ranunculaceae)		Globe Flower	VI-VII	
138	<i>Trifolium alpestre</i> L. (Fabaceae)		Purple-Globe Clover	V-VII	
139	<i>Trifolium noricum</i> Wulfen (Fabaceae)		Cream Clover	VI-VIII	
140	<i>Tussilago farfara</i> L. (Asteraceae)	<i>Farfarae folium</i> , <i>Farfarae flos</i>	Coltsfoot	III-V	Jug.I; Helv VII; EB 6; Mar 29; DAB 10; ÖAB 90; BHP 83; Mar 29

	Specie	Latin name of drug	Common name	Collect time - month	Official pharmacopeia
141	<i>Urtica dioica</i> L. (<i>Urticaceae</i>)	<i>Urticae folium</i> <i>Urticae herba</i> <i>Urticae radix</i>	Nettle	VI-XI	DAB 97; Ross 10; DAC 86; BHP 90.
142	<i>Vaccinium myrtillus</i> L. (<i>Ericaceae</i>)	<i>Myrtilli folium</i> , <i>Myrtilli fructus</i>	Bilberry	V-VI	EB 6 ÖAB 90; Helv VII; DAC 86; Jug.II.
143	<i>Vaccinium uliginosum</i> L. (<i>Ericaceae</i>)	<i>Fructus uliginosi</i>	Bog Blueberry	VI-VII	
144	<i>Valeriana montana</i> L. (<i>Valerianaceae</i>)	<i>Valerianae radix</i>	Dwarf Valerian	VI-VIII	
145	<i>Valeriana pancicii</i> Halacsy & Bald. (<i>Valerianaceae</i>)		<i>Valeriana pancicii</i>	VII-VIII	
146	<i>Veratrum album</i> L. (<i>Liliaceae</i>)	<i>Veratri (albi)</i> <i>rhizoma (radix)</i>	White False Helleborine	VI-VIII	DAB 6; AB- DDR; Helv VI; Ross 9; CsL 2; Hung VI; Jug II; BPC 34.
147	<i>Verbascum thapsus</i> L. (<i>Liliaceae</i>)	<i>Verbasci flos</i>	Mullain	VI-VIII	Jug.II.
148	<i>Veronica chamaedrys</i> L. (<i>Scrophulariaceae</i>)	<i>Veronicae herba</i>	Germander Speedwell	VI-VIII	
149	<i>Veronica officinalis</i> L. (<i>Scrophulariaceae</i>)	<i>Veronicae herba</i>	Common Speedwell	VI-VIII	Erg. B.6; Dan. VIII
150	<i>Viola tricolor</i> L. (<i>Violaceae</i>)	<i>Viola tricoloris</i> <i>herba</i>	Wild Pansy, Heartease	V-VIII	DAB 6; ÖAB 90; Helv V; DAC 86
151	<i>Viola nicolai</i> Pant. (<i>Violaceae</i>)		Nicola's Violet	VII	
152	<i>Wulfenia bleicii</i> Lakušić (<i>Scrophulariaceae</i>)		Wulfenia bleicii	VI-VIII	
153	<i>Gentianella bulgarica</i> (Velen.) Holub. (<i>Gentianaceae</i>)		Bulgarian Gentian		

	Specie	Latin name of drug	Common name	Collect time - month	Official pharmacopeia
154	<i>Gentianella crispata</i> (Vis.) Holub (<i>Gentianaceae</i>)	<i>Gentianellae herba</i>	<i>Gentianella crispata</i>	V-IX (X)	



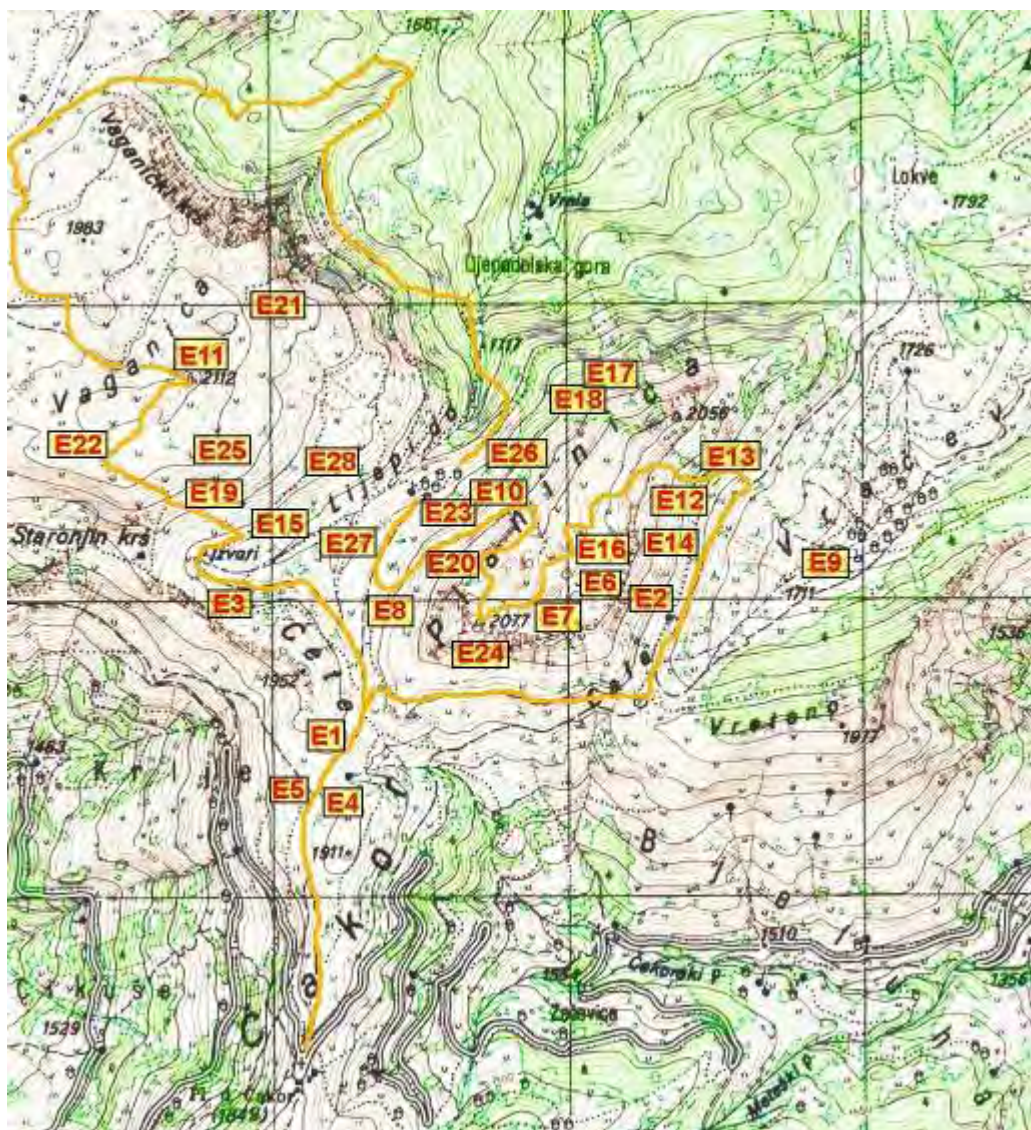
Picture.2. Pharmacognostic chart of the researched area of Cakor

Pharmacochemical classification of drugs of identified medicinal species, namely of different plant parts that contain medicinal substances and are used for medicinal treatments:

- **Alkaloid drugs:** A1- *Aconiti tuber*, A2- *Veratri rhizome*, A3- *Ranunculi herba*, A4- *Calthae palustris herba*, A5- *Trollii flos*, A6- *Senecii herba*, A6- *Senecii radix cum radicibus*
- **Heterozoide drugs:** H1- *Antenariae dioiceae herba*, H2- *Anthyllidis herba*, H3- *Anthyllidis radix*, H4- *Uvae ursi folium*, H5- *Aster alpini flos*, H6- *Aster bellidiasteridis herba*, H7- *Centaurium nervosae flos*, H8- *Doronici flos*, H9- *Octopetalae summitates*, H10- *Epilobii herba*, H11- *Epilobii folium*, H12- *Gentianae asclepiadeae radix*, H13- *Gentianae cruciatae herba*, H14- *Gentianae cruciatae radix*, H15- *Gentianae kochianae herba*, H16- *Gentianae kochianae radix*, H17- *Gentianae radix*, H18- *Gentianellae crispatae herba*, H19- *Gentianellae bugaricae herba*, H20- *Caryophyllatae radix*, H21- *Onobrychis scardicae herba*, H22- *Fallacis cortex*, H23- *Polygalae herba (Acmellae herba)*, H24- *Populi tremulae cortex*, H25- *Populi gemmae*, H26- *Salicis cortex*, H27- *Taraxaci herba*, H28- *Taraxaci radix*, H29- *Trifolii flos*, H30- *Myrthilli folium*, H31- *Myrthilli cormus*, H32- *Myrthilli fructus*, H33- *Veronicae herba*
- **Saponin drugs:** S1- *Betulae folium*, S2- *Boni Henrici herba*, S3- *Boni Henrici radix*, S4- *Equiseti herba*, S5- *Primulae flos*, S6- *Primulae radix cum radicibus*, S7- *Verbasci flos*, S8- *Violae odoratae radix*, S9- *Violae tricoloris herba*
- **Tannin drugs:** T1- *Agrimoniae herba*, T2- *Alchemillae herba*, T3- *Fragariae folium*, T4- *Galii herba*, T5- *Sanguinariae herba*, T6- *Sanguinariae radix*, T7- *Hyperici herba*, T8- *Polygoni rhizome*, T9- *Polygoni vivipari herba*, T10- *Polygoni vivipari radix*, T11- *Potentillae herba*, T12- *Tormentillae rhizome*, T13- *Rubi idaei folium*, T14- *Myrthilli fructus*, T15- *Rumices herba*
- **Drugs with essential oils:** E1- *Abies albae folium*, E2- *Abies albae cortex*, E3- *Abies albae strobuli*, E4- *Millefolii flos*, E5- *Millefolii herba*, E6- *Juniperi fructus*, E7- *Origani herba*, E8- *Piceae turiones recens*, E9- *Pini mugo folium*, E10- *Pini mugo strobuli*, E11- *Tanacetii larvati herba*, E12- *Telekiae radix cum radicibus*, E13- *Teucrii montani herba*, E14- *Serpylli herba*
- **Mucilage drugs:** S11- *Bardanae radix*, S12- *Lilii albanici flos*, S13- *Lilii albanici bulbus*, S14- *Salep tuber*, S15- *Plantaginis folium*, S16- *Plantaginis herba*, S17- *Farfarae folium*, S18- *Farfarae flos*
- **Vitamin drugs:** V1- *Primulae folium juvenilis*, V2- *Fragariae fructus*, V3- *Urticae folium*, V4- *Myrthilli fructus*, V5- *Pini folium*, V6- *Rosae fructus*, V7- *Ribes fructus*, V8- *Rubi idaei fructus*

Chart 3. Endemic plants found in the Cakor area (Endemic plants of Balkan)

	Specie	Family		Specie	Family
E1	<i>Acer heldreichii</i> Orph.	<i>Aceraceae</i>	E16	<i>Paniccia serbica</i> Vis. (Dinarida)	<i>Umbelliferae</i>
E2	<i>Achillea abrotanoides</i> Vis.	<i>Asteraceae</i>	E17	<i>Pedicularis brachyodonta</i> Schloss. Et Vukot.	<i>Scrophulariaceae</i>
E3	<i>Achillea lingulata</i> W. et K. (Randelović et al., 2008)	<i>Asteraceae</i>	E18	<i>Pinus peuce</i> Grisebach	<i>Pinaceae</i>
E4	<i>Aconitum vulparia</i> Reich. <i>ssp.</i> <i>pantoscekiatum</i> (Deg.& Bolu) Hay	<i>Ranunculaceae</i>	E19	<i>Plantago reniformis</i> G. Beck. (Dinarida)	<i>Plantaginaceae</i>
E5	<i>Aconitum penteri</i> Hay.	<i>Ranunculaceae</i>	E20	<i>Potentilla montenegrina</i> Pant.	<i>Rosaceae</i>
E7	<i>Anthyllis jacquini</i> Kern	<i>Fabaceae</i>	E21	<i>Ranunculus scutatus</i> Waldst. & Kit	<i>Ranunculaceae</i>
E8	<i>Cerastium dinaricum</i> Beck et Szysz.	<i>Caryophyllaceae</i>	E22	<i>Sempervivum kosaninii</i> Praeger (Prokletija)	<i>Crassulaceae</i>
E10	<i>Euphorbia myrsinites</i> L.	<i>Euphorbiaceae</i>	E23	<i>Tanacetum larvatum</i> (Pant.) Hayek	<i>Asteraceae</i>
E11	<i>Geum bulgaricum</i> Pančić	<i>Rosaceae</i>	E24	<i>Valeriana pancicii</i> Halacsy & Bald	<i>Valerianaceae</i>
E12	<i>Lilium albanicum</i> Gris (Dinarida)	<i>Liliaceae</i>	E25	<i>Viola nicolai</i> Pant.	<i>Violaceae</i>
E13	<i>Onobrychis scardica</i> Griseb.	<i>Fabaceae</i>	E26	<i>Wulfenia bleicii</i> Lakušić (Prokletija)	<i>Scrophulariaceae</i>
E14	<i>Oxytropis dinarica</i> Murb. (Dinarida)	<i>Fabaceae</i>	E27	<i>Gentianella bulgarica</i> (Velen.) Holub	<i>Gentianaceae</i>
E15	<i>Ranunculus croaticus</i> Schott.	<i>Ranunculaceae</i>	E28	<i>Gentianella crispata</i> (Vis.) Holub (balkans. –apeninski)	<i>Gentianaceae</i> (Lakušić, 1990)



Picture 3. Geographic map of found endemic species in the researched Čakov area

154 plant species with 98 different genera were registered at the researched area of Čakov and classified into 48 families. Under the registered plant species, 39 plants were identified as legitimate biological source of drugs that are official in respect to domestic and foreign pharmacopeias. Rational collecting is possible only for some of them, such as:

Chart 4. Plants found in the Cakor area which are interesting from the pharmacoeconomic aspect

	Specie	Family	Drug
K1	<i>Abies alba</i> Mill.	<i>Pinaceae</i>	Raw fir leafs; cone; bark
K2	<i>Achillea millefolium</i> L.	<i>Asteraceae</i>	Herbaceous above-ground part of yarrow
K3	<i>Aconitum penterii</i> Hay	<i>Ranunculaceae</i>	Tuber
K4	<i>Agrimonia eupatoria</i> L.	<i>Rosaceae</i>	Herbaceous above-ground part
K5	<i>Alchemilla hoppeana</i> (Rchb.) D.Torre	<i>Rosaceae</i>	Herbaceous above-ground part
K6	<i>Alchemilla hybrida</i> Mill.	<i>Rosaceae</i>	Herbaceous above-ground part
K7	<i>Alchemilla vulgaris</i> L.	<i>Rosaceae</i>	Herbaceous above-ground part of lady's mantle
K8	<i>Arctostaphylos uva ursi</i> (L.) Spreng.	<i>Ericaceae</i>	Leaf of bearberry
K9	<i>Betula alba</i> L.	<i>Betulaceae</i>	Bark and leaf of common birch
K10	<i>Chenopodium bonuc hrricus</i> L.	<i>Chenopodiaceae</i>	Root and herbaceous above-ground parts
K11	<i>Dactylorhiza cordigera</i> (Fries) Soo	<i>Orchidaceae</i>	Tuber
K12	<i>Dactylorhiza maculata</i> (L.) Soó	<i>Orchidaceae</i>	Tuber
K13	<i>Epilobium angustifolium</i> L.	<i>Oenotheraceae</i>	Herbaceous above-ground part or only leaf
K14	<i>Fragaria vesca</i> L.	<i>Rosaceae</i>	Leaf of wild strawberry
K15	<i>Gentiana asclepiadea</i> L.	<i>Gentianaceae</i>	Root

K16	<i>Gentiana cruciata</i> L.	<i>Gentianaceae</i>	Herbaceous above-ground part
K17	<i>Gentiana punctata</i> L.	<i>Gentianaceae</i>	Root
K18	<i>Gymnadenia conopsea</i> (L.) R. Br.	<i>Orhidaceae</i>	Tuber
K18	<i>Hypericum maculatum</i> Crantz	<i>Hypericaceae</i>	Herbaceous above-ground part
K19	<i>Hypericum perforatum</i> L.	<i>Hypericaceae</i>	Herbaceous above-ground part
K20	<i>Juniperus nana</i> Wild	<i>Cupressaceae</i>	Fruit, wood and essential oils
K21	<i>Orchis morio</i> L.	<i>Orchidaceae</i>	Tuber
K22	<i>Origanum vulgare</i> L.	<i>Lamiaceae</i>	Tips of flowering branches and essential oils
K23	<i>Orreohertzogia fallax</i> (Boiss.) Vent.	<i>Rhamnaceae</i>	Bark
K24	<i>Pinus mhugo</i> Turra.	<i>Pinaceae</i>	Tips of branches and essential oils
K25	<i>Polygonum bistorta</i> L.	<i>Polygonaceae</i>	Rhizome
K26	<i>Potentilla recta</i> L.	<i>Rosaceae</i>	Rhizome
K27	<i>Primula elatior</i> L.	<i>Primulaceae</i>	Root and flower
K28	<i>Ribes alpinum</i> L.	<i>Grossulariaceae</i>	Fruit and leaf
K29	<i>Rosa alpina</i> L.	<i>Rosaceae</i>	Fruit
K30	<i>Rosa canina</i> L.	<i>Rosaceae</i>	Fruit
K31	<i>Rumex alpinus</i> L.	<i>Polygonaceae</i>	Root
K32	<i>Salix purpurea</i> L.	<i>Salicaceae</i>	Bark
K33	<i>Taraxacum officinale</i> Weber	<i>Asteraceae</i>	Root, rarely entire plant with root

K34	<i>Thymus serpyllum</i> L.	<i>Lamiaceae</i>	Above-ground part of flowering plant and essential oils
K35	<i>Tussilago farfara</i> L.	<i>Asteraceae</i>	Leaf and flower
K36	<i>Urtica dioica</i> L.	<i>Urticaceae</i>	Leaf and root and above- ground part
K37	<i>Vaccinium</i> <i>myrtillus</i> L.	<i>Ericaceae</i>	Fruit, leaf and sprouts
K38	<i>Veratrum album</i> L.	<i>Liliaceae</i>	Rhizome with roots
K39	<i>Verbascum thapsus</i> L.	<i>Liliaceae</i>	Flower
K40	<i>Veronica</i> <i>chamaedrys</i> L.	<i>Scrophulariaceae</i>	Above-ground part
K41	<i>Veronica</i> <i>officinalis</i> L.	<i>Scrophulariaceae</i>	Above-ground part
K42	<i>Viola tricoloris</i> L.	<i>Violaceae</i>	Above-ground part



Arctostaphylos uva ursi (L.) Spreng. (Ericaceae)
Photo by Jeremić Miroslav

It is very abundant at all peaks of mountainous Cakor region, but the most abundant at the peak Planinice (2077 m).



Vaccinium myrtillus L. Ericaceae
Photo by Jeremić Miroslav

It is abundant everywhere, on meadows and pastures. It is a resource which is rarely used. It gives drug when fresh and its dry fruit is official European pharmacopeia. Its above-ground part, *Vaccinii kormus* or herba, is also used in phytotherapy.

Among numerous medicinal plants of Prokletije and Komovi, the number one position in respect to its abundance belongs to *Vaccinium myrtillus* (Milojević et al., 1974). Medicinal plants that are also very abundant on Prokletije, Komovi and Bjelasica are *Arctostaphylos uva ursi* (L) Spr.(4), and *Vaccinium myrtillus* L.(1-2-3-4 depending on location), which were recorded by Lakušić and Milojević (1972), and Lukić, P et al. (1985) recorded *Arctostaphylos uva ursi* (L) Spr. I *Vaccinium myrtillus* L on mountains nearby Berane.

CONCLUSIONS

154 plant species with 98 different genres were registered at the researched area of Cakor and classified into 48 families. The mostly abundant

plant species belong to families Asteraceae (21), Gentianaceae (10), Rosaceae (10), Fabaceae (9), Scrophulariaceae (7), Ranunculaceae (6), Lamiaceae (6) etc.

Under the registered plant species, 39 plants were identified as legitimate biological source of drugs that are official in respect to domestic and foreign pharmacopeias.

The structure of pharmaco-chemical groups is following: Alkaloid drugs (7 representatives); Heterozoidne drugs (33); Saponin drugs (9); Tannin drugs (15); Drugs with essential oils (14); Mucilage drugs (8) and Vitamin drugs with 8 representatives.

It is concluded that the researched area is a rather small area, ranging from 1800 to 2100 m above sea level, but it is characterized with great wealth and diversity of resources. If we also take into account that presence of 28 endemic species was registered, than the picture of rich Cakor biodiversity becomes clear.

One of main objectives of this research was to consider potentials of raw materials for pharmaceutical, cosmetic and other industries. In such context, it was determined that there are 43 commercially interesting medicinal plants. Rational collecting is possible only for some of them, such as: *Arctostaphylos uva ursi* (L) Spr. And *Vaccinium myrtillus* L

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PRILOG ISTRAŽIVANJU LJEKOVITOG I DRUGOG BILJA PLANINSKE REGIJE ČAKOR, CRNA GORA

SAŽETAK

Inventarizacija ljekovitog i drugog bilja na prostoru planinske regije Čakor, izvršena je korišćenjem stručne literature. Procena zastupljenosti izvršena je kombinovanjem Brauni- Blanqueti metoda i modela Instituta za lekovito bilje „Dr Josif Pančić“ iz Beograda.

Na istraživanom prostoru Čakora registrovano su 154 biljne vrste, zastupljene u 98 različitih rodova i svrstane u 48 familija. Najzastupljenije su biljne vrste familije Asteraceae (21), Gentianaceae (10), Rosaceae (10), Fabaceae (9), Scrophulariaceae (7), Ranunculaceae (6), Lamiaceae (6) i druge.

U okviru registrovanih biljnih vrsta, identifikovano je 39 biljaka koje su legitimni biološki izvor droga oficinalnih po domaćim i stranim farmakopejama.

Struktura farmakohemijskih grupa je slijedeća: Alkaloidne droge(7 predstavnika); Heterozidne droge (33); Saponinske droge(9); Taninske droge (15); Droge sa etarskim uljima (14); Sluzne droge(8) i Vitaminske droge takođe sa 8 predstavnika.

Za mali prostor, kakav je za ovu priliku izučavan, u dijapazonu od 1800 do 2100 m nadmorske visine, konstatuje se veliko bogatstvo i raznolikost resursa. Kada se ovome doda podatak da je konstatovano i prisustvo 28 endemičnih vrsta, obnda se slika o bogatom biodiverzitetu Čakora potpuno zaokružuje.

Jedan od glavnih ciljeva ovih istraživanja je sagledavanje potencijanih sirovina značajnih u farmaceutskoj, kozmetičkoj i drugim industrijama. U tom smislu konstatovano je 43 komercijalno interesantne lekovite sirovine. Racionalno sakupljanje mogućeje samo za neke od njih, a to su: *Arctostaphylos uva ursi* (L) Spr. i *Vaccinium myrtilus* L.

Gljučne riječi: ljekovite biljke, endemične biljke, droga, farmakopeja, farmakognozijska karta, farmakohemija