631.415.7

M. Akhalkatsi, M. Bokeria, I. Maisaia

CULTIVATED AND WILD SPECIES OF SAVORY (*SATUREJA* L.) IN GEORGIA AND THEIR USE

Savory (*Satureja* L.) is economically one of the most important genus of the Mint family (Lamiaceae Lindl.). The family Lamiaceae includes many aromatic herbs used in culinary and folk medicine, such as thyme, hyssop, oregano, mint, basil, rosemary, sage, ziziphora, savory, motherwort, etc. The widely used garden herb - summer savory (*Satureja hortensis* L.) is not native for Georgia but it was cultivated here in house gardens from ancient times. Savory is noted among garden herbs in manuscripts of XVII-XVIII cc. by Vakhushti Batonishvili in his "Agtsera Sameposa Sakartvelosa" – "Description of the Kingdom of Georgia" and in "Saakimo Tsigni" – "Medicinal Book" translated into Georgian by Khoja-Kofili (Javakhishvili, 1986).

Besides cultivated summer savory, there are several wild species of this genus distributed in Georgia. The authors (Kapeller, 1952; Kapanadze, 1987; Czerepanov, 1995; Govaerts, 2003) mention their different number causing some taxonomic disorder. According to the first edition of the "Flora of Georgia" (Kapeller, 1952), there are 3 native wild species of savory distributed in Georgia - (1) *S. bzybica* Woronow, (2) *S. laxiflora* K. Koch and (3) *S. spicigera* (K. Koch) Boiss. Later, one more species - *S. zuvandica* D.A. Kapan. was described (Kapanadze, 1985). This new species first was described by S. Zeinalova in 1969 in the province Zuvand in Azerbaijan as two independent species – *S. densiflora* Zeinal. and *S. borissovae* Zeinal. (Kapanadze, 1987), which later were unified under one name *S. zuvandica* (Kapanadze, 1985). This name was given after the province where the species was first found by S. Zainalova. In the second edition of the "Flora of Georgia", this species is considered as subspecies - *S. laxiflora* subsp. *zuvandica* (D.A. Kapan.) D.A. Kapan. (Kapanadze, 1987). Correspondingly, there is another subspecies - *S. laxiflora* K. Koch subsp. *laxiflora*. Although, S. Czerepanov (1995) considers *S. zuvandica* as independent species and *S. laxiflora* is mentioned as synonym of *S. hortensis*. According to recent data (Govaerts, 2003) both species are considered as synonyms of *S. hortensis*. All this is indicative that the taxonomic survey of the genus *Satureja* in Georgia is not complete and it needs further exploration to clarify relation among the species - *S. hortensis*, *S. laxiflora* and *S. zuvandica*.

Below we give short characteristics of cultivated and wild species of savory distributed in Georgia:

Bzybian savory – *S. bzybica* is perennial semi shrub with many straight foliar stems. Flowers are pink, flowering between July and October. It is growing in Abkhazia and Russia, along the Black See coast. It is considered as endemic of the western Caucasus (Kapa-

nadze, 1987). Grows on calcareous rocks, screes and groves at the forest edges in lower montane belt. Contains essential oil and has decorative value. We have no data on the use of this species.

Summer savory – *S. hortensis* (Baghis Kondari in Georg.) is 30-40 cm tall annual herb. Flowers are pale pink, flowering between July and August. It is native for South Europe, Balkan Peninsula, Crimea, Kazakhstan and Altai. Some authors (Lipski, 1899; Govaerts, 2003) note it's occurrence in the Caucasus and Turkey. In all probability, R. Govaerts means *S. laxiflora*, which he considers as synonym to summer savory. Although, Lipski (1899) mentions *S. hortensis* as native species for Transcaucasus. This last information is cited by I. Javakhishvili in his "Economic History of Georgia" (1986). To our opinion this problem should be investigated in more details together with the taxonomic survey of the genus *Satureja* in the Caucasus.

Forest savory – *S. laxiflora* (Tkis kondari in Georg.) is 10-30 cm tall annual herb with branched stem. Flowers are pink, flowering between June and October. Grows in dry places, on stony slopes, in lower and middle montane belts. Occurs in different regions of Georgia, in the whole Caucasus, in Eastern Anatolia and Iran. Contains essential oil, which is used in production of liquor and brandy. Medicinally used as stomachic remedy. Contains tannins and is used for treatment of animal skins. Is attractive for honey bees. Leaves are used as spice (Kapeller, 1952).

Creeping savory – *S. spicigera* (Oncho in Georg.) is woody perennial herb. Flowers are white or slightly pink, flowering between July and October. Grows on rocks and open sites at the forest edges. Occurs mainly in lower and middle montane belts of the western Georgia. Especially abundant populations are found in Racha, Lechkhumi and Imereti. There are some geographic names originated form the Georgian name of this plant – "Oncho" (Makashvili, 1951). E.g. "Onchevi" – a village in Oni distr.; "Oncheishi" – two different villages in Kutaisi distr. and "Onchiketi" – as well two villages in Chokhatauri distr. Although, it is of interest that name "Oncho", according to A. Makashvili (1951), is in use only in Guria and local name of this plant in other provinces of Georgia is "tkis kondari" – forest savory, which is correct name of *S. laxiflora* (Makashvili, 1951). We have found *S. spicigera* in Borjomi gorge and Meskheti, near v. Ota in Aspindza distr. Outside of Georgia it occurs in the whole Caucasus, Tallish, Eastern Anatolia and Iran. It is attractive for honey bees and contains essential oil.

Many of the spices and herbs used today were known to the people of ancient cultures throughout the world, and they were valued for their preservative and medicinal powers as well as their flavor and odor qualities. Two species of savory used as culinary herbs are cultivated in the European countries – annual summer savory - *S. hortensis*, and perennial winter savory - *S. montana*, which was used during winter time when annual summer was gone. Summer Savory was used by the Romans to flavour vinegar and the Ancient Egyptians used it as a love potion. It is known that German King, Carl the Great required

cultivating of the savory among other spices (Javakhishvili, 1986). Both *S. montana* and *S. hortensis* were introduced to the Central Europe and Britain by the Romans and were two of the plants the English colonists took with them to America to remind them of the gardens they left behind and so far these species are cultivated on both continents. Georgian name of the summer savory is "garden savory" and it is cultivated in house gardens. Morphologically similar to winter savory in Georgia is creeping savory - *S. spicigera*, which is cultivated in the province Guria (western Georgia), where it is called "oncho" and in Lower Adjara to be called "encho". Similar to winter savory it's leaves are used during whole winter (Makashvili, 1951). Usually, there are only 2-5 individuals of Oncho in house gardens in Guria, while their use is very restricted. It is propagated by division and self sowing (Makashvili, 1951). According to our data Oncho is still cultivated in Guria "...we plant oncho in house gardens and use the leaves for aromatizing a fresh cheese" (Personal communication (PC), M. Pochkhishvili, v. Khidistavi, Chokhatauri distr.).

The green leaves and herbaceous sections of stems of savory are used in Georgia fresh and dried as herbs and spices. In many European countries savory is used as flavouring agents in meat dishes, poultry, sausages, and vegetables. In Georgia, mainly is used summer savory in cooked dishes and salads. Especially often it is added to meat dishes and beans. Oncho – creeping savory is used more rarely. A. Makashvili in his work (1951) cites fragment from the first book of the trilogy of P. Chkhikvadze – "Steps", where the description of the Georgian dinner is given at the Prince Sharvashidze house. Among other dishes here is mentioned "fresh cheese with "pitna" (mint), oncho (creeping savory) and ombalo (Pennyroyal)". Oncho is used for flavoring of fresh cheese in Guria until today. Specific aroma and flavor of savory is determined by rich content of essential oils. One might be expected that the local population in Guria was informed from antiquity that in addition to spices and their derivatives being used for flavoring foods and beverages and for medication, they have also been highly valued for their use as antimicrobials determining food conservation.

Essential oil was used for food preservation from ancient times (Baydara et al., 2004). The leafy part of plants such as oregano, thyme and savory belonging to the Lamiaceae family have been added to meat, fish and food products in the near East for many years (Baydara et al., 2004). It is shown (Özcan, Erkmen, 2001) that the antimicrobial activities of the essences of savory, thyme and oregano are mostly attributable to the phenolic compound cavracrol and to the hydrocarbons γ-terpinene and p-cymene. These essential oils of natural origin are preventing the growth of foodborne pathogens or spoilage organisms and at the same time represent ecologically safe food preservatives. The antibacterial and antifungal activity of the essential oils of *S. hortensis* was shown against following microbs - *Escherichia coli*, *Staphylococcus aureus*, *Pseudomonas aeruginosa*, *Enterobacter aerogenes*, *Candida albicans*, *Penicillium clavigerum*, *Mucor hiemalis* & *Absidia glauca* (Dilek Azaz et al., 2005).

The main constituents of the essential oil in summer savory (0,5 % of dry weight) are the phenols carvacrol and thymol, as well as ρ-cymene, β-caryophyllene, linalool, γ-terpineol, camphene, myrcene, and other terpenoids (Boyraza, Özcan, 2006). The essential oil of oncho (3,82 % of dry weight) contains (Sefidkon, Jamzad, 2004) thymol (35.1%), ρ-cymene (22.1%), γ-terpinene (13.7%) and carvacrol (4.0%). Essential oils are used both in culinary and perfumery as in pure state as well as mixture with other essences.

During the last years there has been growing interest in testing natural compounds of different origins as defense for cultivated plants against phytopathogenic fungi. It was determined (Boyraza, Özcan, 2006) the strong antifungal activities of the essential oil of summer savory on mycelial growth of *Alternaria mali* Roberts and *Botrytis cinerea* Pers. All doses of the extract completely inhibited the mycelial growth of both fungi, and exhibited a fungicidal effect. According to this data, the derivatives from *S. hortensis* represent environmentally safer alternatives to protect the spoilage of food products from pathogenic and saprophytic fungi. This methods seems to be most effective to inhibit post-harvest fungal pathogens in apple and grape fruits

As a medicinal plant, summer savory has been traditionally used as a stimulant, stomachic, carminative, expectorant, antidiarrheic, and aphrodisiac (Chevallier, 1996). Savory has been used in the treatment of cancer (Simon et al., 1984). The whole herb or only the flowering shoots are use. The plant is harvested for medicinal purposes when in flower. It should not be prescribed for pregnant women. Antimicrobial and antidiarrheic activity is determined because of the phenols in the oil (Bown, 1995).

It is noteworthy that summer savory has a milder medicinal action than the closely related winter savory, *S. montana* (Chevallier, 1996). Perennial *S. spicigera* and wild *S. laxiflora* were traditionally used in Georgia as medicinal plants. Local population of high-mountain region of Samegrelo. in western Georgia, especially shepherds, used water solution of grained wild savory and garlic against cold and fever (PC, Givi Eliava, t. Martvili). Oncho, like summer savory, is said to be a sovereign remedy for colic, bronchitis and a cure for flatulence (Bown, 1995). There is a famous mixture called "Tibu" traditionally used against cold in Samegrelo. Maize flour is cooked in plenty of water and there are added dry or fresh grained leaves of savory, garlic, hot pepper and salt. The mixture is takes as hot and it causes intensive perspiration and the condition of the patient is improved very rapidly (PC, Eter Solomonia, Tbilisi). Oncho is harvested in Meskheti in the nature and a tea is prepared, which is used as blood pressure reliever (PC, Anaida Bagdasarian, t. Akhaltsikhe). Summer savory is effective against neuroses (PC, Liana Baginashvili, v. Tsnisi, Akhaltsikhe distr.). In should be noted that native Georgian population living currently in Turkey is using savory for traditional medicinal treatments till today as carminative and sugar relieving remedy at the diabetes mellitus (PC, Gunesh and Fatma Akaltun, v. Robati, Imerkhevi, Artvin Vilaiet, Turkey).

Thus, it should be concluded that both cultivated and wild species of the genus savory distributed in Georgia represent plants of high economic value. They are rich in essential oils and are used in culinary, perfumery and folk medicine. Special emphases should be done on antimicrobial activity of their extracts determining their use as effective and environmentally safe preservatives of food and plant products. It is noteworthy that cultivation of both species summer and creeping savory is very easy and do not requires high working and financial investments. It is desirable to disseminate information on economic values of these plant species in Georgia for their popularization that local farmers undertake their production and deliver this product to the world market. At the same time it should be excluded harvesting of wild species of savory in the nature, which will cause deminisheng of the populations and lead to the extinction of the species.

მ. ახალკაცი, მ. ბოკერია, ი. მაისაია

ქონდრის (*SATUREJA* L.) კულტურული და ველური სახეობები საქართველოში და მათი გამოყენება

რეზიუმე

საქართველოში კულტივირებულია ქონდრის ორი სახეობა – ბაღის ქონდარი (*Satureja hortensis*) და ონჭო – (*S. spicigera*). ეს უკანასკნელი ველურად არის გავრცელებული და კულტივირებულია გურიასა და ქვემო აჭარაში. ქონდრის კულტურული და ველური სახეობები შეიცავენ ეთეროვან ზეთს, რომელიც განაპირობებს მათ არომატს და ფართოდ გამოიყენება კულინარიაში, როგორც არომატიზატორი და კონსერვანტი. ეთერზეთის შემადგენელი ფენოლური ნაერთები განსაზღვრავენ მის ანტიმიკრობულ აქტივობას და აფერხებენ საკვები პროდუქტების პათოგენური და ფუჭების გამომწვევი მიკრობების მოქმედებას და ამავე დროს ეკოლოგიურად უსაფრთხო კონსერვანტებს წარმოადგენენ. ისინი ეფექტურია კულტურული მცენარეების დასაცავად ფიტოპათოგენური სოკოებისგან. სამკურნალო მიზნით ქონდარი გამოიყენება, როგორც სიცხის დამწევი, მასტიმულირებელი, მეტეორიზმის საწინააღმდეგო, ამოსახველებელი და აფროდისიაკი.

М. Ахалкаци, М. Бокерия, И. Маисая

КУЛЬТУРНЫЕ И ДИКИЕ ВИДЫ РОДА ЧАБЕР (*SATUREJA* L.) В ГРУЗИИ И ИХ ИСПОЛЬЗОВАНИЕ

Два вида *Satureja* культивируются в Грузии – чабер садовый (*Satureja hortensis*) и чабер колосоносный (*S. spicigera*). Последний распространен в диком виде и культивируется в Гурии и в Нижней Аджарии. Культурные и дикие виды *Satureja* содержат эфирные масла, которые определяют их аромат и широко используются в кулинарии, как ароматное и консервирующее средство. Фенольные соединения содержащиеся в эфирном масле определяют их антимикробную активность и задерживают действие патогенных микробов вызывающих порчу пищевых продуктов и одновременно представляют собой натуральные и экологически чистые консерванты. Они эффективны для защиты культурных растений от фитопатогенных грибов. В лечебных целях чабер используется против простуды, как стимулирующее средство, а также против метеоризма, отхаркивающее и антиканцерогенное средство.

ლიტერატურა – Литература – References

1. Baydara H., Sadiç O., Özkanc G., Karado T. 2004. Antibacterial activity and composition of essential oils from *Origanum, Thymbra* and *Satureja* species with commercial importance in Turkey. Food Control, 15, 3:169-172.
2. Bown. D. 1995. *Encyclopaedia of Herbs and their Uses*. Dorling Kindersley, London.
3. Boyraza N., Özcan, M. 2006. Inhibition of phytopathogenic fungi by essential oil, hydrosol, ground material and extract of summer savory (*Satureja hortensis* L.) growing wild in Turkey Int. J. Food Microbiology 107, 3, 1 : 238-242.
4. Chevallier. A. 1996. *The Encyclopedia of Medicinal Plants* Dorling Kindersley. London
5. Czerepanov, S. K. 1995. Vascular plants of Russia and adjacent states (the former USSR). Cambridge,University Press.
6. Dilek Azaz A., Kürkcüoglu M., Satil F., Hüsnü Can Baser K., Tümen G. 2005. *In vitro* antimicrobial activity and chemical composition of some *Satureja* essential oils. Flavour and Fragrance Journal 20, 6:587 – 591.
7. Govaerts, R. 2003. World Checklist of Selected Plant Families Database in ACCESS: 1-216203. The Board of Trustees of the Royal Botanic Gardens, Kew.
8. Javakhishvili I. 1986. Sakartvelos ekonomiuri istoria (Economic history of Georgia). 2nd ed. Works in 12 volumes, v. 5, Publish Georg. Acad. Scien. and Tbilisi State Univ., Tbilisi. p. 259-260. (Georg.).

9. Kapanadze, D. 1985. Kriticheskaia zametka o vide *Satureja densiflora* Zeinalova (Labiatae). (Criticat note on the species *Satureja densiflora* Zeinalova (Labiatae).) Soobsch. Akad. Nauk; Gruz. S. S. R., 119, 2:373-376. (Russ.).
10. Kapanadze, D. 1987. *Satureja* L.- Kondari (*Satureja* L.- Savory). In: "Sakartvelos flora" (Flora of Georgia). 2nd ed. Ed. R. Gagnidze. v. 11, Metsniereba, Tbilisi, p. 183-189. (Georg.).
11. Kapeller, O. 1952. *Satureja* L.- Kondari (*Satureja* L.- Savory). In: "Sakartvelos flora" (Flora of Georgia). 1st ed. Ed. N. Ketskhoveli. v. 7, Publish. Acad. Scien. Georg., Tbilisi, p. 394-401. (Georg.).
12. Lipski, V.I. 1899. Flora Kavkaza (Flora of the Caucasus). Sankt-Peterburg, Tipo-Lithography Gerold, p. 417. (Russ.). Липский, В.И. 1899.
13. Makashvili, A. 1951. Kolkhetis utsnobi kulturebi (Unknown cultivated plants of Kolkheti) Works Tbilisi State Univer. 44:31-88. (Georg.).
14. Özcan M., Erkmen, O. 2001. Antimicrobial activity of the essential oils of Turkish plant spices. Eur. Food Res. Technol. 212:658–660.
15. Sefidkon, F., Jamzad, Z. 2004. Essential oil composition of *Satureja spicigera* (C. Koch) Boiss. from Iran. Flavour and Fragrance Journal, 19, 6:571-573.
16. Simon, J.E., Chadwick, A.F., Craker, L.E. 1984. Herbs: An Indexed Bibliography. 1971-1980. The Scientific Literature on Selected Herbs, and Aromatic and Medicinal Plants of the Temperate Zone. Archon Books, 770 pp., Hamden, CT.