

TRENDS IN PRODUCTION OF RAW MEDICINAL AND AROMATIC PLANTS IN SERBIA

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Abstract

The largest amounts of medicinal raw plant materials that are sold in the market of Serbia and the international market, originate from nature, and are gotten from picking of wild medicinal and aromatic plants. This trend will continue for a longer period of time due to many factors: the large number of medicinal species originating from taxonomic groups for which there is little or no experience in cultivation, research has led to the conclusion that the domestication and cultivation of a large number of medicinal plant species expensive because a relatively small number of species is large enough or has secure market, collecting does not require additional infrastructure and investment in many countries wild species are an important source of income for local communities. However, the trend is in the market of medicinal and aromatic plants in the world and in Serbia for a greater share of cultivated plants. Most of the companies operating in this market (Over-the-counter (OTC), pharmaceutical, etc.) prefer raw plant materials products from plantation production, especially in manufacturing, which is certified as biodynamic or organic.

Key words: *Medicinal and aromatic plants (MAP), trends, raw, production, organic*

Introduction

Serbia is located on the Balkan Peninsula, extending from the Pannonian Plain in the north, to south Albanian high mountains Dinara and Sar-Pindos system in the south, covering an area of 88766 km². The geographical position of Serbia is unique, characterized by geomorphological, geological and pedological diversity, as well as the influence of different climate that caused the wealth of genetic, species and ecosystem diversity. Serbia is an important center of biodiversity, with about 700 species of medicinal characteristics. Of that number 420 is in use (Panjković et al. 2000), and it is estimated that 279 medicinal and aromatic plants (MAP) were placed in a trading turnover. Intensive cultivation of medicinal plants in Serbia began in the mid twentieth century. Compared to the past, today in our country about 30 species of medicinal plants is cultivated. Increased demand for medicinal raw materials of plant origin has led to the introduction of a large number of medicinal species in plantation production.

Picking of Medicinal and Aromatic Plants

Collection from nature still plays a key role in the sale of plant raw material for several reasons: many plant species is difficult or impossible to cultivate (mistletoe, moss, etc.). Many are used in small quantities, the quality of some plant species from the wild is superior, the cost of the cultivation is high, some species have a long life cycle and long periods to the stage of harvest (horse chestnut, elder, linden, hawthorn, etc..).

European countries, particularly the Mediterranean, have great genetic potential to medicinal wild plants as well as the cultivated. In Europe, there are somewhat less than 2000 taxons of

medicinal and aromatic plants, of which about two-thirds (1200) originated from Europe (Donnelly et al., 2003). The collection of wild medicinal plants is dominant way of supply, and the price of these raw materials is slightly less than the raw materials that are produced by cultivating. The collection is dominant in Albania, Spain, Hungary and Turkey. In Hungary, 30-50% of plants were collected from the wild in Germany between 50-70%, 75-80% in Bulgaria, while almost 100% of plants that is on the market in Albania, is obtained by collecting.

Picking wild medicinal plants and wild fruit is an integral part of the activities of many rural households (especially in the mountainous area of southeastern Serbia), and it is the most accessible form of activity within the LAB sector. There are many reasons: low investment, jobs can be done seasonally comparatively jobs on the farm, any generation can do it despite of their age. This work is usually popular among older people, especially women. The most commonly medicinal plants are sold dried. However, some companies organize pickers to pick the plants in the field (Ramsons, blueberry), which are then dried in a dryer. The reason is certainty that the necessary amount of plants will be collected in the short term, and that that obtained materials will have good quality.

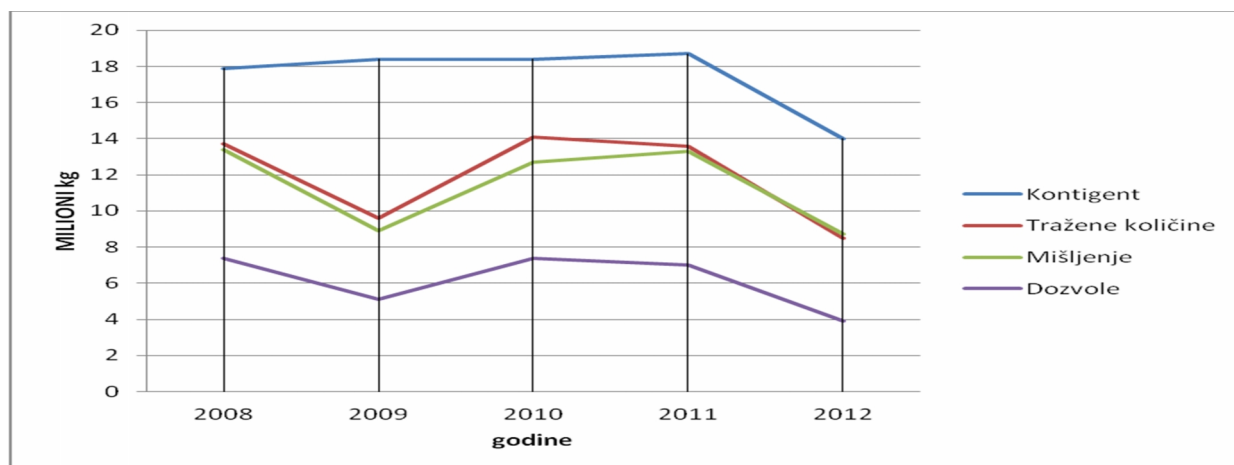
During the research of LAB sector in Serbia (SEED, 2003) it is estimated that there are about 4000 organized pickers of medicinal and aromatic plants, or picker's households. Given that in the work the members of the household are involved, it is estimated that there are about 12,000 pickers. In addition, there are occasional pickers, whose economic activity has lower weight, and dealing with it only when prices are high and there is a high demand for certain plant species (Turudija, 2010).

This sector now provides employment (permanent or seasonal), as well as income for about 50,000 persons, including pickers, as well as the owners and employees of companies engaged in processing, distribution, and retail products. In the late 90s the number of people who were employed in the sector was around 150,000th total value of the industry in the domestic market is estimated at \$ 150 million, with exports valued at \$ 50 million (USAID, 2008).

Based on interviews with processors and other stakeholders in the sector, in large quantities it is picked about 30 types of plants and 10 types are produced in the plantation production. The main limitation of the expansion of this sector is a small number of vital rural households. The depopulation of rural areas in Serbia is active for decades. In the few mountain village households live mainly old. Young people are poorly or not at all familiar with wild medicinal plants, and often are not interested in this activity. Also, the lack of purchasing places in Serbia. Companies purchase products mainly in the place where the headquarters of the company are. Other areas, where the plants are picked are covered with temporary buyers who work in the field. This type of organization is followed by a series of problems: an inadequate storage, insufficient knowledge of plants by the person making the purchase, and by people who picked plants, inadequate quality of the harvested plants, collecting a small number of plant species, and so on.

Under the protection of the state until recently was located 8.09% flora of Serbia, and now that number is 12.52%. It is difficult to estimate the total amount of MAP which is picked in Serbia, because there is no need for permission for all plant species. Quotas were relatively low from 2000 to 2004 year, from 2005 to 2007 or 2009 are increased. In 2012th quotas are slightly lower, and the reason is because for many plant species no permit is required for circulation, which is provided by the Institute for Nature Conservation of Serbia (USAID, 2008). Quotas used to be around 6-8000 t of fresh plant material, depending on the year. From that you can get around 1500-2000 t dried plants. In the last 5 years, quotas were increased and range from 14-19000 t of fresh plants or about 3-6000 t dry. It is impossible to know whether all quotas have been used, but on the basis of permits granted it is safe to conclude that market turnover is about 2000 t (average drying 4:1).

Chart 1 presents quotas for the picking of medicinal and aromatic plants in Serbia (in kg of freshly picked plants) for the period 2008-2012. From this graph it can be seen that the contingents are much higher than the required amount, reviews and by permits granted.



Source: Institute for Nature Conservation of Serbia, 2013.

Figure 1 Quotes for the collection of medicinal and aromatic plants in Serbia in the period from 2008 to 2012.

Cultivation of medicinal and aromatic plants

Overall, in all countries, the trend in the market of medicinal and aromatic plants is toward the greater participation of cultivated plants. Most of the companies operating in this market (OTC, pharmaceutical, etc.), prefer cultivated plant material, especially from plants whose production is certified as biodynamic or organic (FAO, 2002).

According Máthé and Math (2008) the benefits of cultivation are: reliable botanical identity, guaranteed continuous supply of raw materials, it is possible to control the production process and monitor production standards in accordance with the regulations and requirements of the market, provides a relatively simple procedure of certification of crops offers opportunities for growing wild plant species allows contracting between manufacturers, wholesalers and pharmaceutical or other companies in the quantities and at prices that are acceptable to all.

Cultivation of medicinal, aromatic and spice plants has a long tradition in the agro ecological conditions of Europe and originated in the Mediterranean area, where many species were produced in the past. From the point of view of biodiversity in Europe is now grown between 130-150 and picked between 150-170 plants of species. The most commonly cultivated species in Europe are: Kim (*Carum carvi* L.), coriander (*Coriandrum sativum* L.), fennel (*Foeniculum vulgare* Mill.), adders herb (*Silybum marianum* L), anise (*Pimpinella anisum* L.), wormwood (*Artemisia absinthium* L.), chamomile (*Matricaria recutita* L.), St. John's wort (*Hypericum perforatum* L.), peppermint (*Mentha piperita* L.), melissa (*Melissa officinalis* L.) and lavender (*Lavandula angustifolia* Mill.) (Laird and Pierce, 2002).

Table 1 shows the statistically analyzed data on area under medicinal plants in European countries that are the largest producers. It can be seen that Bulgaria, France, Finland and Poland are the biggest producers of MAP in Europe. Tendencies of changes in the area under MAP machine are very different across countries. The highest rate of growth (from major manufacturers) record Spain, Hungary, Croatia, Finland, and the highest rates of decline record Bulgaria, Romania and the Czech Republic.

Table 1: Key indicators of land under medicinal and aromatic plants in Europe in the period from 2004 to 2012.

Countries	The average value (000ha)	Variation interval		Coefficient of variations (%)	Rate of changes (%)
		Minimum (000ha)	Maximum (000ha)		
Belgium	0,16	0,10	0,20	33,88	-8,30
Bulgaria	49,64	30,60	83,50	34,55	-9,73
Czech Republic	7,34	4,00	11,70	32,82	-5,90
Germany	6,42	5,70	7,40	9,50	0,73
Estonia	0,38	0,10	0,90	84,52	18,90
Greece	2,72	1,00	5,00	56,78	-2,25
Spain	8,46	5,60	13,60	34,51	10,34
France	34,16	29,50	36,50	7,68	-0,42
Croatia	3,00	2,20	4,00	17,08	4,80
Lithuania	6,43	2,00	25,60	115,59	-1,31
Hungary	3,39	1,60	4,60	31,45	5,94
Austria	3,81	3,30	4,20	6,87	0,34
Poland	15,88	14,00	21,60	18,33	-0,42
Romania	10,41	4,60	23,70	56,29	-6,32
Slovakia	1,23	0,90	1,50	17,67	0,87
Finland	16,26	10,60	22,50	24,64	3,54

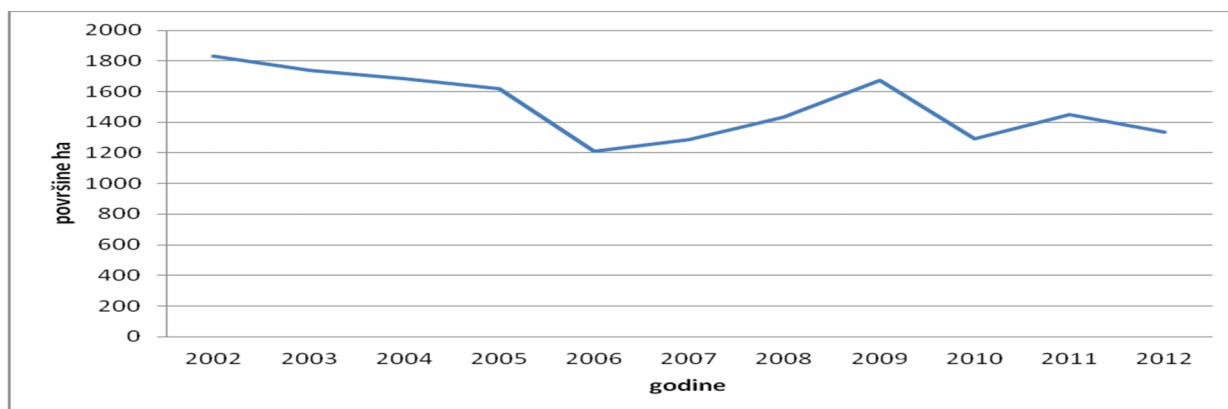
World production and processing of medicinal plants remains focused in Europe, particularly in Germany and France. Other important areas of production include the countries of former Yugoslavia, Bulgaria, Germany and Hungary.

Intensive cultivation of medicinal plants in Serbia began in the midtwentieth century. Compared to the past, today in our country about 30 species of medicinal plants are cultivated, depending on market demand. Increased demand of medicinal raw materials of plant origin has led to the introduction of a large number of medicinal species in plantation production. Cultivation of LAB, as well as the production of a species of wild medicinal plants is achieved uniform quality of raw materials produced while collecting wild species from different localities raw materials are of uneven quality. Improving the technology of plantation cultivation, seed production and cultivation of the most endangered or rare species is a prerequisite for the preservation of medicinal plants in their natural habitats. Plantation growing in addition to increased raw materials significantly reduces the pressure on natural resources, which are often due to unprofessional or unplanned exploitation threatened.

In some parts of our country cultivation has a long tradition (Vojvodina), while in other areas more often is present purchase of wild MAP (eastern and south-eastern Serbia). Production of cultivated medicinal plants has been most active in the area of Banat and Bačka. In this region, medicinal plants were grown even before World War II. Regionalization in this area is conditioned by the multiple factors: soil, climate, altitude, MAP prevalence in nature, tradition, proximity to markets, household machinery, labor etc.

In order to secure the supply and provision of additional quantities of medicinal and aromatic plants possibilities are explored plantation growing of many wild species. Based on which some methods are implemented in the projects of the Ministry of Science and Technology in Institute for Medicinal Plant Research "Dr Josif Pančić" the technologies is achieved of cultivation of many wild MAP species, and the practice has proven that there is economic justification for growing (Sage, Plantago, Oregano, White mallow etc.).

There are circumstances that limit large-scale production of MAP, such as: lack of knowledge agro biological seed characteristics and conditions of reproduction and cultivation, undeveloped technological processes for many species, a relatively long period of introduction into production, (non) existence of appropriate biotic and abiotic conditions in a particular location, insufficient market interest etc.



Source: Serbian Chamber of Commerce, 2013.

Figure 2: Areas under medicinal and aromatic plants in Serbia in the period 2002-2012. in ha.

Areas under MAP in Serbia are shown in chart 2 Part of the cultivated plants companies produce on their own parcels, in cooperation or buy on the open market. According to estimates the areas under MAP are below 5,000 ha, and never exceeded 10,000 ha. The maximum area for cultivation would be about 15,000 ha, in order to avoid a surplus of raw materials.

The maximum area during the period amounted 1832 ha, 1211 ha minimum. The mean value of area in the reporting period amounted to 1503.36 ha with a coefficient of variation of 14.18 and the rate of change of -3.1%.

Table 2 shows the estimated area under certain types of LAB in Serbia in 2013. Areas under medicinal plants, and growing regions, are approximately the same for last ten years. The largest areas are under mint, next is chamomile, fennel, lemon balm etc. Some plant species, for which there is a constant demand, are grown in the garden.

Table 2 Estimated area under medicinal and aromatic plants Serbia in 2013 in ha

Plant species	Area (ha)	Plant species	Area (ha)
Peppermint	300	basil Bosiljak	5
Chamomile	250	sage Žalfija	10
Melissa	50	marigold Neven	20
Parsley	200	immortelle Smilje	40
Fennel	60	lavender Lavanda	40
Marshmallow	50	Other Ostalo	50
Thyme	10		
Coriander, kim flax	20		
Total			1095

Source: Self-Assessment, 2013

Conclusion

At the international and domestic market MAP raw materials, demand for cultivated medicinal plants is rising, especially in manufacturing, which is certified as biodynamic or organic. The plant material from plantation production have reliable botanical identity, it is possible to continuously supply the market, the introduction of production standards in accordance with the regulations and requirements of the market possibility of growing wild plant species, thus protecting natural resources, contracting between producers and distributors of raw plant materials for quantities and at prices that are acceptable to all. Problems that occur in gathering are: control of collecting medicinal plants limits the amount that can be picked; reduces the number of pickers, inadequate storage, lack of knowledge of plants by the person making the purchase, and the people who pick crops, inadequate quality of the picked plants, collecting a small number of plant species, and so on. Contrary, there are all prerequisites for the cultivation of medicinal plants in this region (relief, climate, well-known technology of cultivation, traditions); labor force in this manner can be employed; There are institutional capacities of professional services that can organize and monitor the complete production and processing and export sector MAP.

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