

## THE ECONOMIC POSSIBILITIES AND PERSPECTIVES OF AROMATIC AND MEDICINAL HERBS (SATUREJA KITAIBELII)

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### Abstract

*The economy in Serbia has not been working at its full capacity for a long time, which had left a great mark in economic stability of the country. The good side is that the environment pollution is less than in case of its full capacity. Therefore there shouldn't try to achieve the developed technologies at all costs, but it should orient to the utmost to agriculture and food production. Economically high developed countries pay a lot of attention to the healthy way of life and nutrition, and therefore the market, on which would sell the food products from Serbia, are with characteristic brand and undoubtable quality. Owing to the expressed trend for the healthy way of living, more and more people in high developed countries turn to aromatic and medicinal herbs which they use as spices, for therapeutic or medicinal purposes. Such trend shows also various industry branches, and they increasingly base their production on natural products. Hereof the aromatic and medicinal herbs start being more and more important economic resource of those countries which have them.*

**Key words:** *economy, aromatic and medicinal herbs, essential oils, health and protection.*

**JEL:** Q57

### Introduction

The agriculture is the oldest economic branch people have been engaged from times immemorial. Most of humanity is still engaged in agriculture, and that is why it should be observed through double aspects: on the one hand, the agriculture is important as

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the primary food and other animal and herbal products manufacturer, and on the other hand, the agriculture is a base for starting the economic development, and how much it would be fast depends not only on a natural base the agriculture has, but also on the social, economic and political and other circumstances (Simonović, 2014). The modern agriculture implies the process of building a new economic activity based on efficiency, competitiveness, intensity and marketability (Vehapi, Šabotić, 2015).

The economic position of agriculture, according to the economic science, determines in accordance to four indicators, by which the significance of agriculture in the economy is determined. Based on these indicators, the role of agriculture in economic development is measured:

- Share of agricultural population in the total population,
- Share of agricultural population in the total active population,
- Share of agriculture in creation of the national income, and
- Share of agriculture in creation of foreign-trade balance (Stipetić, 1968).

Agrarian policy is the essential part of the economic policy, which applies in agriculture and it cannot be created either out of the economic policy principles, or can the intentions and the agrarian policy concept be different from the economic policy concept. If we observe the agrarian policy transformation, the main goals of reforming in Serbia would refer to the radical reconstruction and modernisation of agro sector. On the way of redefining a base for conducting the agricultural policy, the agricultural sector was enforced several goals, and among them the following can be singled out as the most important:

- Building sustainable and efficient agro economy which can compete on the world market,
- providing healthy-safe and high quality food,
- support to life standard for people who depend on agriculture, and they are not able to follow the economic reforms by their development, support to sustainable rural development,
- The environment preservation from impact of the effects of agricultural production intensification (Simonović, 2014).

What connects the indicators of agriculture significance in the economy and the agrarian policy goals are the aromatic and medicinal herbs (AMH) and their products. In support of this claim is the data that the world market of AMH is evaluated to 400-500,000 tons of dried herb material, which value annually ranges between 1.1 and 1.3 milliard USD. On the AMH market is also present a permanent growth of 5-15% annually. The European Union (UN) represents the biggest individual commercial market in the world for AMH. The biggest world AMH markets are: China, India, France, Germany,

Italy, Japan, Spain, Great Britain and the United States of America (USA). The most important world exporters of this economic resource are China and India (Shengji, 2001). With increasing popularization and demand for AMH, there is expected that in 2050 turnover of this economic resource will be around five billion USD per a year (FLRHT, 1996).

As for Serbia, the export raises of AMH from Serbia to other countries, the same as the trend in the world - the export was increased from 7 million USD in 2005 to around 13.5 million USD in 2008, when spice plants and aromatic herbs were participating with 63% (ground spicy pepper), medicinal herbs with 34%, and teas with 3%. The countries, Serbia exports the most in, are: Austria, Bosnia and Herzegovina, Croatia, Hungary and Macedonia. However, after the year 2008, the export, i.e. income has stagnated or has a slight decline, which is no good and it should be changed (Jelenković, 2014).

### **Possibilities and perspectives for growing AMH in Serbia**

As it is well-known, thanks to its favourable climate, land and relatively unpolluted environment, Serbia represents a very suitable space for intensive growing of AMH. Serbia, by its biodiversity, has been classified into one of 158 the best world centres, i.e. one out of six in Europe. It is aligned with due to a fact that over 700 species of AMH were determined in the rich flora, of which 420 were officially registered, and 279 were in turnover as an industrial raw material, used by its further processing for the production of drugs, cosmetic and hygiene products, spices, different extracts and other products.

Biodiversity requires today a full attention, as regarding flora, as well as regarding fauna. If we want to exploit the natural wealth we have as the economic resource, among other things also the AMH, than we have to treat them as the renewable resource. It implies systematically and long-term arrangement, management, planning and investment into this field, which is primarily the state's obligation. Interested individuals or groups can involve in all segments of the natural wealth treatment, but a leading part plays the government, owing to the resources recovery. All other ways of the AMH exploitation, or any other natural resource, sooner or later, will lead to disturbances in biological diversity, which violates the natural balance (Jelenković, 2014).

The production by itself, i.e. growing the AMH requires, especially at the beginning, also the specific financial support. As for the necessary financial resources, except the favourable agricultural credits which have to be provided by the government (by including the banks which support the agricultural production), there are also the EU funds today (now we are the member-candidate for the EU membership) for which can be applied. These funds are, first of all, the IPA (IPA I-V - Instrumental for Pre-Accession Assistance) programs, especially the IPA V program, which refers to rural development. These programs, with the total fund of 11,468 milliard euro for 7 years, aim to help the countries-candidates in adjustment and implementing the EU regulations, and in that way to prepare the countries for using the structural EU funds (Jelenković, Jelenković,

2012). What speaks in favour of the fact that using these funds today is inevitable, in a segment of organic manufacturers is increased demand for the financial resources than the supply, i.e. that business banks and other financial institutions do not want or cannot to satisfy the financial needs in a value chain (Ljumović et al., 2015).

More intensive cultivation of the AMH in Serbia has started in the middle of the past century, although growing these plant species in Vojvodina has its tradition before the II World War. For other parts of Serbia, e.g. east and south-east, is more characteristic gathering and purchase of indigenous AMHs. Compared to the previous period, in our country produces more intensive larger quantities of raw materials for around 30-50 of these plant species.

As regards to the plantation (large-scale) production, i.e. growing the AMHs, it is significant that it is possible to preserve, along with seeds production, the most vulnerable or rare species, significant for different industry branches which use them. In that way, there makes pre-conditions for the preservation of the AMH in natural habitats. It is very important because of the fact that increased interest for the indigenous AMH has led to the irrational use of the natural resources, so some of the AMH has been protected by law with different measures, as: prohibition of gathering, picking and destruction, complete prohibition of their use and sale, control of use and sale and the necessary permission for gathering.

The second advantage in growing these plant species, in regard to indigenous plants, is that by their growing provide the unchangeable conditions for plant, i.e. the conditions that is possible to influence to, so in that way there provides, as the permanent qualitative and quantitative chemical composition of the essential oils, as well as the increased amounts of the essential oils (Adamović, Danojević, 2006) as the most significant AMH products. It is very important because the permanent chemical composition enables a continuous sale of a plant raw material.

### **Threatening-possibilities of the environment pollution**

The ecological issue of using land resources had predominantly the local character by mid-century. Nowadays, by using the land resources, it has mostly the global and regional implications. Combustion of fossil fuels and deforestation in a much greater extent than they renew increase the amount of a carbon-dioxide in atmosphere, which together with other gases have an effect to the global climatic changes. The combustion of fossil fuels is the largest source of air pollution that affects trees, crops, lakes, humans and causes certain soil damages (Milenović, 2000). Owing to the environment pollution resources, it is especially spoken on the “emission” phenomenon. Under this phenomenon is meant the discharge of pollutants or energy from individual and diffuse sources into the environment and its doers (Todić, 2008).

Air pollution is one of the most important consequences of the environment degradation and it represents at the same time the problem in high developed and under-developed countries, although depending on a country’s economic development differ a lot

the main sources of air pollution, as well as the dominant pollutants. In the whole world, high concentrations of potentially harmful gases and particles which emit in the air bring not only to health damage, but also to the aggravation of the environment quality in general, which harms all resources necessary for the long-term sustainable development of Earth (LEAP, 2001).

As the biggest polluter, taking into consideration the research localities (high altitudes), is traffic, especially in air traffic (for the plant species *Satureja kitaibelii*, the subject of the implemented research). Aerospace is very encumbered and saturated with various substances of particles, smoke, soot, dust and gases made by the combustion of solid and liquid fuels, which is one of the indicators of air quality. The Republic of Serbia is one of the more polluted states in the region, by chemical and biological means containing metals. The mentioned dangerous materials is concentrated in this space via the CHEMTRAIL system, while the threat of radiation represents the HAARP system, through which manages and controls the climatic changes in the narrower and wider area (Pejanović, 2016). Via the HAARP system can be directed the energetic impulses of 3.6 MW through the frequency range between 2.8 and 10 MHz into ionosphere ([www.willthomasonline.net](http://www.willthomasonline.net)).

There develops the awareness of the impact of the environment pollution to agricultural products, confirmed by numerous data lately; there intensifies increasingly the issues of active substances content, micro-biological correctness, and the amounts of the chemical remnants in the produced raw material which use further for human and animal nutrition or for food preparation. There are the regulations on maximum permitted quantities of remnants of plant protection means in our country (OG RS), micro-biological correctness of foods in traffic (OG RS), sanitary-Hygiene and general sanitary conditions (Law on Sanitary Inspection). The environment protection in public and in business world still encounters scepticism, but also obstructions, because it entails the additional costs, higher prices and the changes of entrenched habits. However, the economy of future is unbreakably linked to the ecology, and the environment by itself represents a new economic branch which provides also the possibility of making money, which can be achieved by plantation cultivation of the AMH, too (Jelenković, Jelenković, 2012).

### Materials and methods

Habitats in which was gathered the plant material of the tested plant species were: Devojacki Grob, on Suva Mountain (1,300 m of altitude), Visocka Rzana, on Stara Mountain (750 m of altitude), and Sicevacka klisura in the vicinity of Nis (Sicevac Gorge – 280 m of altitude). Flora in these habitats doesn't stop to surprise us and it provides the possibilities to discover new, so this part of Nis and Bela Palanka Valley also calls the "Serbian biological laboratory under open sky". Ecological factors of the environment, or mountain land, surface water, i.e. the river Nisava and its gorge, as well as the sub-Mediterranean climate provides a wide ecological atomicity, which provides conditions for life to many plant and animal species, so there often meet the endemic species such as

the tested species *Satureja kitaibelii* Wierzb. et Heuff (Jelenković, 2014).

In the vicinity of Nis, there are canyons and gorges, which are characterized by very rich and diverse flora, and which is caused by the special geo-morphological and climatic factors. According to the available data (report on the strategic evaluation of environmental impact) on the Sicevac Gorge area, there were concluded 1,138 species within 441 genus and 96 families of higher plants. The flora of Sicevac Gorge with its 1,138 species makes 34.8% of the total number of all species recorded in Serbia. Originality of the Sicevac Gorge flora reflects, first of all, in the existence of endemic representatives, especially those characterized by extremely small areals. There dominates in flora the species of Mediterranean-sub-Mediterranean diffusion. Highly presence of these species explains by the existence of large areas of thermophilic rocky grounds and shrubberies. The Sicevac Gorge represents also the northernmost finding place of sage (*Salvia officinalis*). The Sicevac Gorge, with 20-40 endemic plants per 10 km<sup>2</sup>, represents a significant region of endemism in Serbia.

In this area the production of AMH is not developed, except some in Leskovac, Nis and Gadzin Han. Gathering and processing (first of all drying) of the specific species of medicinal herbs and spice plants is more developed in the neighbouring municipality Svrljig, where there are certain processing capacities which have their subcontractors they negotiate the production with. Although most are in the “grey” zone, i.e. in places where the AMHs are represented, there are gatherers, who deliver picked herbs or process them and sell. Generally, as it is assessed, around 4000 organized gatherers or gathering household in Serbia are engaged in gathering of AMH. Seeing that the household members are also engaged in business, there evaluates that a number of gatherers is in fact around 12,000. Besides, there are those who gather herbs for their own use or market sale, so a number of gatherers in last two groups are hard to assess (Živanović, 2010).

Of all AMHs, which are present in this area, two of them single out that can be turned into the local brand: sage (*Salvia officinalis* L.) and Rtanj tea (*Satureja montana* L.). Sage is the most popular medicinal herb since ancient times. Rtanj tea (winter savory) doesn't lag behind by its popularity, which can be raised in the rank of Nis brand in a short time. The plant species researched in this study represents the variety of Rtanj tea and there is necessary to have permission for its gathering (Rulebook on Proclamation and Protection of Strictly Protected and Protected Wild Species of Plants, Animals and Fungi). As both species (*Satureja montana* L. and *Satureja kitaibelii*) are sufficiently researched in bio-chemical and taxonomical sense, in laboratories of the Department for Chemistry at the Faculty of Natural Sciences – University in Nis, are created conditions to move on with their planned plantation cultivation.

Anyhow, *Satureja kitaibelii* (Illustration no. 1) is a perennial plant, and the most used synonyms for this plant species are *Satureja montana* L. var. *kitaibelii* (Wierzb.) and *Satureja montana* L. subsp. *kitaibelii* (Wierzb.) (Bal, 1972). It grows as semi-bush, height of about 30-70 cm, with well-developed root system. There are numerous sprouts,

lignified, especially at the bottom. Leaves are elongated lanceolate, stiff and leathery. Flowers are dense, placed in 3-7 floral bifurcations, on a short or long vertical stem. Calyx is cylindrical; corona is pink-purple, twice longer than calyx. It blossoms from July to September. It grows on open limestone rocky grounds in mountain belt on 500 to over 1000 m of altitude. It appears as a member of open communities in the east of our country. It can also be found in south Romania and west Bulgaria (Palić, Gašić, 1993).

**Illustration 1.** *Satureja kitaibelii* Wierzb. et Heuff.



Source: Jelenković, 2014.

The ecological or living factors have an effect on the plant growth, which means on its chemical composition, and the amount of oil. They are multitudinous, miscellaneous and changeable both in space and time. It is practically impossible to find two places on Earth in which the life conditions would be identical and at the same time invariable in function of time.

As for climatic conditions, they differ from one habitat to another, but those differences are not significant. The warmest is in Sicevac Gorge, where the average summer temperature is 21.37 °C; the temperature is for half a degree lower in Visocka Rzana, and for one degree and a half in Devojacki Grob; in other words, it decreases with altitude increase. Water, as the next basic ecological factor of the environment, represents by the average annual rainfall, which amount is approximately the same in

all three habitats, and it amounts from 551 to 586 mm of atmospheric residue annually and it is evenly disposed during a year. Sunny weather is from 45 to 55% annually. A type of land, as the third basic ecological factor of the environment is very similar, i.e. the plant material has been gathered from a limestone area-limestone rocky ground and the rocky slopes. Essentially, we might say for all these three habitats that the ecological parameters and seasonal variations changes with the changes in altitude; at lower altitudes, the climatic conditions are slightly milder, i.e. more favourable for plant growth, and thereby the amount and composition of the essential oils.

The essential oils were insulated from fresh and dry plant material (above-ground part of the plant, non-ligneous part of tree, leaves and flowers) by steam distillation. The representative samples of plants in this research are in herbarium of the Faculty of Natural Sciences – University in Nis, the laboratory for organic analysis and synthesis, no. NR 0709. For dry herbal drugs, the herb material was dried 10 days at a draft. Insulation was done by steam distillation in the appliance of the type Clevenger, in duration of 2.5 hours, from comminuted plant material. The oils were extracted then by diethyl-ether, and then diethyl-ether extracts of the essential oils were dried by anhydrous sodium-sulfate ( $\text{Na}_2\text{SO}_4$ ). After separating the desiccant by filtration, diethyl-ether was removed by the rotary vacuum evaporator at room temperature, by which was obtained pure essential oils.

The essential oils were highly prevalent in flora – there were insulated around 2,500 plant species classified in 60 families (Gašić, 1992). They are also called the fragrances. They represent the complex mixtures of volatile compounds, which are the products of a secondary plant metabolism. The most important characteristics of plants secondary metabolites are that they don't have the energetic significance, they are chemically heterogeneous, as well as that they show high biological and pharmacological activity. To the group of active secondary metabolites of plants belong: alkaloids, heterosides, saponosides, tannins and essential oils. The essential oils, so called fragrances, represent a very complicated mixture of tithe to several hundred compounds, although there are also the essential oils of practically just one compound (Gašić, 1985). It is well-known that the essential oil composition is genetically conditioned and it represents a specific characteristic of a certain species. Differences in quantitative composition and the ratio of components are the consequence of the ecological factors impact, as well as the ontogenetic stage of plant development (Heffendehl, Murray, 1976), as well as some other factors.

## Results and discussion

The output of essential oils of tested population of *Satureja kitaibelii* Wierzb et Heuff from fresh and dry herb material from all mentioned habitats, altitude of the habitats, developmental stage, as well as the dates of gathering was shown in the Table 1.

Aromatic plants contain in average 0.05-20% of essential oil, so according to their quantity the plants classify in the ones rich in essential oils, and the ones poor in essential



oils. *Satureja kitaibelii* Wierzb. et Heuff contains different amounts of the essential oil depending on habitats and the stage of plant development, as well as of whether oil was insulated from dry or fresh vegetable raw material.

The largest amount of oil in the two habitats (Visocka Rzana and Devojački Grob) obtained from the fresh vegetable raw material in the pre-blossoming stage, while in the habitat Sicevac Gorge, the oil content is highest in dry vegetable oil raw material in blossoming stage.

**Table 1.** Content of essential oils of the tested populations *Satureja kitaibelii* by a habitat and a growth stage

Habitat	Altitude (m)	Growth stage	Date of gathering	% (w/w)
<b>Devojački grob</b>	1.300	<b>Pre-blossoming</b>	07.07.	<b>0,220</b>
Devojački grob	1.300	In bloom	30.08.	0,060
Devojački grob	1.300	Forming fruit	06.11.	0,015
Devojački grob	1.300	Dry above-ground part of the flower	30.08.	0,150
<b>Visočka Ržana</b>	750	<b>Pre-blossoming</b>	09.07.	<b>0,180</b>
Visočka Ržana	750	In bloom	02.09.	0,060
Visočka Ržana	750	Forming fruit	22.10.	0,062
Visočka Ržana	750	Dry above-ground part of the flower	02.09.	0,088
<b>Sícevačka klisura (Sicevac Gorge)</b>	280	<b>Pre-blossoming</b>	09.07.	<b>0,150</b>
Sícevačka klisura	280	In bloom	02.09.	0,060
Sícevačka klisura	280	Forming fruit	22.10.	0,065
Sícevačka klisura	280	Dry above-ground part of the flower	02.09.	<b>0,216</b>

Source Jelenković, 2014.

*Note:* In the Table 1 the maximum amount of essential oil for every habitat and the appropriate stage of plant growth are shown in bold

As for the ecological factors, there is evident the difference among these habitats only regarding altitude. In accordance to it, it can be concluded that the highest yield of the essential oils in lower areas (280 m of altitude) is expected from dry vegetable raw material in the blossoming stage, while in higher areas (over 750 m of altitude) there is a higher yield of the essential oils from fresh vegetable raw material in the pre-blossoming stage. This data is surely very important for the plantation cultivation of these plants.

If we observe the amount of the essential oils only in fresh above-ground part of the plant drug through the stages of plant growth in all three habitats, it is characteristic that the oil amount is the highest in the pre-blossoming stage, while in the blossoming stage and in the stage of forming fruit is less in regard to the pre-blossoming stage.

For the habitats Sicevac Gorge and Visocka Rzana, the areas under 1000 m of altitude,

it is characteristic that the amounts of the essential oils are about the same in the blossoming stage and the stage of forming fruit, and they are three times (V.Rzana), i.e. 2.3 times (S.Gorge) less in regard to the pre-blossoming stage. On the site D.Grob, the habitat above 1000 m of altitude, the amount of the essential oils is four times less in the stage of forming fruit in regard to the blossoming stage. If we compare these amounts with the amounts of oils in the pre-blossoming stage, it is evident that there is decreased amounts of oil of 3.5 in the blossoming stage to even 14.5 times in the stage of forming fruit, which shows clearly the tendency of a greater decline of the essential oil amounts with the increase in altitude in regard to the plant growth stage, as it is especially obvious above 1000 m of altitude.

If we observe the habitats individually, the amounts of the essential oils in fresh plant drug in regard to the plant growth stage has decreased the most on the habitat Devojacki Grob, approximately 14.5 times, in the habitat Visocka Rzana 3 times, and the least on the habitat Sicevac Gorge, approximately for 2.3 times. These perceptions are in accordance with Thieme's (Thieme, Tam, 1972) and Biggs' (Biggs, Leopold, 1955) perceptions, i.e. with the fact that the synthesis of monoterpenes is much faster in young than in old tissues, which implicates that the young tissues have the higher amount of oil/g of tissue, and this is what the obtained results unambiguously confirm. They also lead to the conclusion that the amount of oil in the plant growth stage have a much faster decline at higher altitudes (difference in altitude between the habitats Devojacki Grob and Sicevac Gorge is 1020 m), i.e. that the ecological factors have an effect on the essential oil amount in fresh plant material.

The results of obtained essential oil amounts in dry plant material in the blossoming stage show that the amount of essential oil is higher in dry plant material than in fresh plant material in the same stage of plant growth. On the site Devojacki Grob, the amount of oil is approximately 2.5 times higher, on the site Visocka Rzana around 0.5 times, while on the site Sicevac Gorge the amount of oil is around 3.6 times higher. On average, the mean value of the essential oils amount in dry plant material in the blossoming stage for all three habitats is 0.15%, which lines up the population *Satureja kitaibelii* Wierzb. et Heuff. in poor oil types of the genus *Satureja*, especially if one takes into account that *S. viminea* contains even 9.4% of the essential oil, according to some researches (Suarez, Echandi et al., 2008).

If we compare the highest amounts of oil obtained from the plant material on all three habitats, regardless to whether they were obtained from fresh or dry plant material, we can see that it is the same in the highest (Devojacki Grob) and the lowest altitude (Sicevac Gorge) and it amounted 0.22%. However, in the habitat of higher altitude, the oil amount was obtained from the fresh plant material, while in the habitat with the lowest altitude that oil amount was obtained from the dry plant material. As in this research was identified also the complete chemical composition of the essential oil in all three sites, and fresh (95.52-99.81% depending on the habitat, as well as the plant growth stage) and dry (94.55-97.20% depending on the habitat) plant material, there could say that the chemical composition of oil of fresh and dry plant material is very

similar, so there were not chemical reasons that the essential oil insulates from dry plant material, what has been common practice.

The obtained oil amount of the genus *Satureja kitaibelii* Wierzb. et Heuff. is in accordance with the results of Palić and associates (Palić, Kapor et al., 1982), as well as Chalchat and the associates (Chalchat, Gorunović et al., 1999). Unlike them, Zivanovic and the associates (Živanović, Jančić et al., 1987) stated that the population *Satureja kitaibelii* Wierzb. et Heuff. in the habitat Lepenski Vir contains even 0.65% of the essential oil in the dry plant material in the blossoming stage, which is around three times higher amount in regard to this research. However, the habitat Lepenski Vir is very characteristic by its climate, which is caused by very fast change of altitude (50-800 m), and which is the consequence of a characteristic mountain relief and the vicinity of the river Danube, while the content of the soil is limestone, and very similar to the content on the tested habitats. In other words, the ecological factors, i.e. altitude and climatic conditions in the habitat Lepenski Vir differ significantly in regard to the same factors from the habitats observed in this study. This proves that the different ecological factors can, and evidently cause the difference which appears in the amount of essential oils in the habitat Lepenski Vir in regard to all other studied habitats of this plant species.

The research of Adamovic and Danojevic in 2006 follows cultivated, plantation species *Satureja* L. in the period of 10 years. The highest percentage of essential oil, as well as dry plant per a hectare, was obtained in the stage of full plant development, i.e. in the pre-blossoming stage, which is in accordance with this research. Likewise, it showed that under the controlled (in sense of irrigation) ecological conditions can economically cultivate this aromatic plant in longer time interval, with the lowest yield of the essential oil in the first year, and which is subsequently considerably increased.

### Conclusion

The amount of the essential oil in plant material differs and it depends on ecological, and on the stage plant growth, i.e. it depends on the age of a plant tissue, as well as on the type of plant material. The largest quantities of the essential oil obtained from a fresh plant material in the pre-blossoming stage on sites of greater altitude, i.e. Devojacki Grob (1300 m – 0.220%) and V.Rzana (750 m – 0.180%), while in the habitats of the lowest altitude, S.klisura (280 m – 0.216%) the largest amount of oil obtains from a dry plant material in the blossoming stage. There comes to decreasing amount of oil in the plant material in the stage of the plant tissue development, i.e. in regard to the age of plant tissue, and it is greater at higher altitudes, while it decreases even 14.5 times in regard to the amount of oil/g of a young tissue. The results that were obtained are completely coincident with the other authors' results also in regard to the amount of obtained oil, the stage of plant growth, as well as in regard to the type of plant material the oil was insulated from, when there compare the obtained results from the habitats of similar ecological characteristics. The results got in the habitats (sites) of different ecological characteristics were given different amounts of the essential oils

of the same plant species in the same stages of plant growth and from the same types of plant material, which undoubtedly point out to the impact of ecological factors to the amount of plant essential oil. These scientific evidences have invaluable significance for planned plantation cultivation of AMH, while with the adjustment of conditions in which plants cultivate we make an influence to the amount and composition of the essential oil, as the one of the main derivative from AMH. The AMH manufacturers ensure and make safe the steady customers for their products, by the permanent composition and amount of the essential oil. As the market of AMH grows each year, there the manufacturers' income increases, by the guaranteed quality of AMH.

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## PRIVREDNE MOGUĆNOSTI I PERSPEKTIVE AROMATIČNIH I LEKOVITIH BILJAKA (SATUREJA KITAIBELII)

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### Rezime

*Privreda u Srbiji ne radi punim kapacitetom dugi niz godina, što je ostavilo veliki trag u ekonomskoj stabilnosti zemlje. Dobra strana toga je da je zagađenje životne sredine mnogo manje nego što bi bilo da je radila punim kapacitetom. Zato ne treba pokušavati da se pošto poto dostignu razvijene tehnologije, već se treba maksimalno okrenuti poljoprivredi i proizvodnji hrane. Privredno razvijene zemlje, mnogo polažu na zdrav način ishrane i života, pa su zato tržište na kome će se plasirati prehrambeni proizvodi iz Srbije, sa karakterističnom robnom markom i nesumljivim kvalitetom. Zbog izraženog trenda za zdravim načinom života, u razvijenom svetu se sve više ljudi okreće aromatičnim i lekovitim biljkama koje koriste kao začine, u terapijske ili medicinske svrhe. Takav trend pokazuju i različite grane industrije, pa svoju proizvodnju sve više baziraju na prirodnim proizvodima. Zbog toga aromatične i lekovite biljke postaju sve važniji privredni resurs onih država koje njima raspolažu.*

**Ključne reči:** *privreda, aromatične i lekovite biljke, etarska ulja, zdravlje i zaštita.*

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