Simić, D., Janković, S., Popović, V., Petrović M., Stanković, S., Nikolić, D., Gordanić, S. (2024). Improvement of sustainable production of medicinal herbs - mint, lemon balm and marshmallow. Agriculture and Forestry, 70 (2): 49-59. https://doi.org/10.17707/AgricultForest.70.2.4

DOI: 10.17707/AgricultForest.70.2.4

Divna SIMIĆ [1], Snežana JANKOVIĆ [1], Vera POPOVIĆ[2]*, Mladen PETROVIĆ [1], Slađan STANKOVIĆ [1], Dušan NIKOLIĆ [1], Stefan GORDANIĆ [3]

IMPROVEMENT IN SUSTAINABLE PRODUCTION OF MEDICINAL HERBS - MINT, LEMON BALM AND MARSHMALLOW

SUMMARY

The paper presents the results of the gross margin of three lines of production of medicinal herbs: mint, lemon balm and marshmallow. The importance of improving the production of these herbs has been presented in the form of gross margins. All three herb species achieved the highest gross margins in 2023, which was the criterion for choosing them for the research. The structure and participation of individual variable costs for all three production lines has been presented in relation to total variable costs. A sensitivity analysis was performed, in order to study the impact of price and yield changes (10% and 20% increase and decrease in all three production lines, and the impact of changes in the two largest costs for each production line, 10% and 20% increase and decrease in costs). Based on all the analyses, it can be concluded that the production of mint, lemon balm and marshmallow is very profitable, where around EUR 4,000–EUR 7,500 per ha of profits can be achieved.

Key words: Medicinal herbs, gross margins, production.

INTRODUCTION

The Balkan Peninsula is one of the most important centers of biodiversity in Europe, but the use of plant species in the traditional medicine of some Balkan regions has remained insufficiently researched. Medicinal herbs in previous periods had a much more versatile use (Živković *et al., 2020*).

In terms of biological diversity, Serbia is one of the 158 best centres in the world, and medicinal herbs are an integral part of Serbia's rich plant potential. Due to its favourable climate and soil, Serbia is suitable for cultivation and more

[1]Divna Simić, Snežana Janković, Mladen Petrović, Slađan Stanković, Dušan Nilolić, Institute for Science Application in Agriculture, 68b Blvd Despota Stefana, Belgrade, SERBIA;

[2]Vera Popović, ([*]Corresponding author: vera.popovic@ifvcns.ns.ac.rs), Institute of Field and Vegetable Crops, National Institute for the Rep. of Serbia, Maxim Gorky 30, Novi Sad, SERBIA; and University of Bijeljina, Faculty of Agriculture, Pavlovica put bb, Bijeljina, BOSNIA & HERZEGOVINA;

[3]Stefan Gordanıć, Institute for the Study of Medicinal Plants Dr. Josif Pančić, Department of Agricultural Research and Development, Svetozara Radića 7, Belgrade, SERBIA;

Notes: The authors declare that they have no conflicts of interest. Authorship Form signed online.

Recieved:02/02/2024 *Accepted: 24/04/2024*

intensive production of medicinal herbs on larger areas. The production of medicinal herbs is a great opportunity for development of small farms in rural areas of Serbia. There are around 700 types of medicinal and aromatic herbs in the Republic of Serbia, 420 of which have been officially registered, and about 270 in circulation. Regardless of great opportunities that the Serbian plant sector has in the country's economy, as well as many resources in the form of export, processing, packaging, and cultivation of medicinal herbs, it has not still sufficiently represented (Kostadinović *et al.*, 2013).

In the Republic of Serbia, the following medicinal, aromatic and spice herbs are mostly grown: chamomile and mint, on 500 ha, parsley on 100-500 ha, calendula on 100 ha, lemon balm on 50-100 ha, and basil on 10-50 ha. There are also marjoram, thyme, marshmallow, fennel, sage, oleander, celery, oregano, coriander, white scallion, valerian, which is grown in Banat on 50-100 ha, yellow gentian, selenium, and comfrey, commencing to grown due to prospects of its export to Switzerland

In recent years, there has been a high demand for medicinal herbs, in order to trade them as industrial raw materials to be further processed into medicines, cosmetic and hygienic products, spices and various extracts (Popović *et al.*, 2021; 2022a). The advantages of growing these herbs lie in having value-added products on farms, in diversification of production, obtaining quality raw materials, and in more rational use and revitalization of agricultural soil resources, since these herbs are also grown on soil of poorer quality and in hilly and mountainous areas that are completely acceptable for this production from the ecological aspect. Furthermore, growing medicinal herbs preserves rare and endangered plant species, especially those whose collection is prohibited or limited. Due to its available natural resources, Serbia is suitable for intensive cultivation of medicinal herbs, but farmers are advised to contract the sale beforehand. Moreover, the production and processing of medicinal herbs produces significant amounts of waste material that can be used as natural fertilizer in organic agriculture, significantly contributing to the implementation of the principles of circular bioeconomy and good agricultural practice. The production of medicinal herbs is in accordance with the principles of organic agriculture and sustainable rural development (Ugrenović *et al., 2015*).

The traditional use of medicinal herbs while respecting the principles of modern science has proven the presence of significant compounds in medicinal herbs with high biological activity. The goal of improving this production, apart from increasing farmers' profit, is the development of food products that have a positive effect on human health, prevent and reduce the risk of disease. The use of medicinal herbs and their extracts in the food industry has created a wide technological potential for the development of new technological processes and products for different purposes. The market for medicinal herbs has been growing at a rapid pace across the world. Farmers in Serbia should organize the production of those medicinal herbs that traditionally thrive well in our agro-ecological conditions and achieve good quality. Moreover, it would be good if the process

of production of medicinal herbs (Popović *et al*., 2018; 2021; 2022a; 2022b; Petrović *et al*., 2021; 2022; Burić *et al.*, 2023; Stevanović *et al*., 2023; Vasileva *et al.*, 2023; Filipović *et al*., 2021; 2023), inclined as much as possible to the direction of organic agriculture (Radojković *et al., 2017*). The aim of this study is to show the results of the gross margin of three lines of production of medicinal herbs: mint, lemon balm and marshmallow, as well as the importance of improving the production of herbs in question.

MATERIAL AND METHOD

In order to assess the economic effect of certain lines of production of medicinal herbs, the paper presents the gross margins for three lines of production: mint, lemon balm and marshmallow. The methods comprised an economic analysis of the production of medicinal herbs, primarily calculations based on variable costs (gross margin), according to which the researchers determined the basic economic parameters of production (value of production, variable costs and gross margin) per unit area. When determining the optimal volume and structure of production, calculations are often based on variable costs, and the obtained indicators can be used as a good financial instrument for making business decisions (Gogić, *2014;* Petrović *et al., 2021*).

The data on which the gross margins for mint, lemon balm and marshmallow production were calculated were obtained from data on the production of the medicinal herbs collected and analysed by the Institute for the Study of Medicinal Plants "Dr Josif Pančić" (ISMP), in Belgrade, Serbia. The reason for choosing these three species of medicinal herbs is that they achieved the highest gross margin in 2023. Furthermore, the method of sensitive analysis was used to determine which of the parameters is sensitive to change, and to determine the impact of those changes on the gross margins.

RESULTS AND DISCUSSION

Table 1 shows the results for the gross margins of the investigated medicinal herbs in the production year of 2023.

As shown in Table 1, it can be concluded that the highest value of production and the highest gross margin is recorded in the production of marshmallow. The value of marshmallow production in 2023 was EUR 24,000, while the gross margin per unit area amounted to EUR 7,545. The value of mint and lemon balm production was at a similar level amounting to EUR 7,200 and EUR 7,500, respectively, while the gross margins of the productions in question were also at a similar level (EUR 3,742 and EUR 3,938 per hectare). Although the production value and gross margin of marshmallow was highest compared to the other two productions, the share of gross margin in the value of marshmallow production was 31.44%, while the share of gross margin in the value of mint and lemon balm production was around 52%. The reason for this ratio lies in significantly higher variable costs in marshmallow production than in the other two productions.

Table 1. Gross margins of production of the medicinal herbs in 2023 (per ha)

Herbs	Production value (EUR)	Variable costs (EUR)	Gross margin (EUR)	Share of gross margin in production value (%)
Mint	7,200.00	3,458.00	3,742.00	51.97
Lemon balm	7,500.00	3,562.00	3,938.00	52.51
Marshmallow	24,000.00	16,455.00	7,545.00	31.44

Source: Authors' calculation based on the data from ISMP

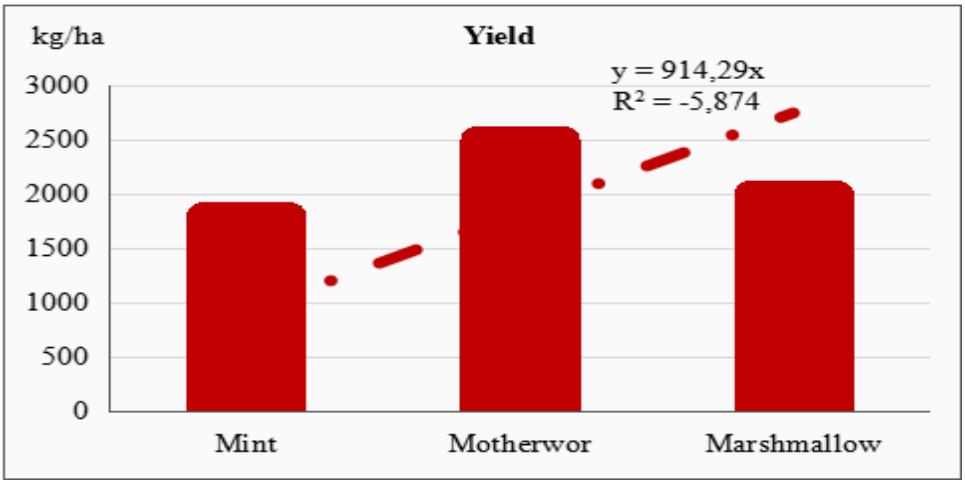

Figure 1. Yield of Mint, Motherwort and Marshmallow

Table 2 shows the structure and participation of individual variable costs in the production of the medicinal herbs in 2023.

Table 2 shows data on the amount and structure of variable costs in the production of mint, lemon balm and marshmallow. It can be concluded that in production of all three herbs, the cost of labour comprised the largest share of costs. In the production of mint, the labour costs made 37.59% of the total variable costs, in the production of lemon balm 40.71%, and in the production of marshmallow as much as 82.04%.

The second largest cost was the cost of planting material in the production of mint and lemon balm, amounting to 23.13% and 19.09% of the total variable costs of the production of these herbs. With marshmallow, the situation was slightly different, and after labour costs, the second largest variable cost was the cost of fuel (6.78%). Therefore, it can be concluded that all three productions of medicinal herbs are highly intensive, which is confirmed by the fact that the cost of labour was the highest in the total variable costs.

Table 2. Structure and participation of individual variable costs in the production of selected medicinal herbs in 2023 (per ha)

Herbs	Mint	Lemon balm	Marshmallow
Mineral fertilizers	376.00	350.00	460.00
	10.87%	9.83%	2.80%
Means of protection	76.00	76.00	140.00
	2.20%	2.13%	0.85%
Planting material/seeds	800.00	680.00	180.00
	23.13%	19.09%	1.09%
Diesel fuel	666.00	666.00	1,115.00
	19.26%	18.70%	6.78%
Drying costs	240.00	340.00	1,060.00
	6.94%	9.55%	6.44%
Labour costs	1,300.00	1,450.00	13,500.00
	37.59%	40.71%	82.04%
Total variable costs	3,458.00	3,562.00	16,455.00

Source: Authors' calculation based on the data from ISMP

A sensitivity analysis was done for all three types of production, namely for the impact of price and yield on the gross margin, and the impact of the two highest variable costs in the production of the three medicinal herbs in question. Table 3 shows the sensitivity analysis of price and yield changes on the gross margin in mint production.

Table 3 shows the sensitivity analysis of the gross margin in mint production to price and yield changes. The analysis took into account changes in price and yield (10% and 20% increase and decrease), and calculating the gross margin in relation to the aforementioned changes. Based on the sensitivity analysis, it can be concluded that with 20% increase in price and yield, the gross margin of mint production would amount to EUR 6,910, which would be an increase of 84.66% compared to the estimated gross margin of EUR 3,742. Furthermore, if the price and yield were to decrease by 20% each, the gross margin of mint production would amount to only EUR 1,150, which would be a decrease of 69.27%.

Therefore, it can be concluded that mint production, despite a 20% reduction in price and yield, would still give a good economic result in the form of a positive gross margin.

Table 4 shows the sensitivity analysis of the impact of change in the two largest variable costs on the gross margin in mint production.

Table 3. Analysis of the sensitivity of price and yield changes on the gross margin

in mint production (per ha)

Yield (kg/ha)		Price (EUR/kg)				
		-20%	-10%	Real	10%	20%
		3.20	**3.60**	**4.00**	**4.40**	**4.80**
-20%	**1,440.00**	1,150.00	1,726.00	2,302.00	2,878.00	3,454.00
-10%	**1,620.00**	1,726.00	2,374.00	3,022.00	3,670.00	4,318.00
Real	**1,800.00**	2,302.00	3,022.00	**3,742.00**	4,462.00	5,182.00
10%	**1,980.00**	2,878.00	3,670.00	4,462.00	5,254.00	6,046.00
20%	**2,160.00**	3,454.00	4,318.00	5,182.00	6,046.00	6,910.00

Source: Authors' calculation based on the data from ISMP

Table 4 presents an analysis of the sensitivity of the gross margin in mint production to changes in the two most common variable costs (in this case the cost of labour and the cost of planting material). The analysis took into account changes in the amount of the costs (10% and 20% increase and decrease), and calculated the gross margin in relation to the aforementioned changes. Based on the sensitivity analysis of the impact of 20% increase in labour costs and planting material, it can be concluded that there is a decrease of 11.22% in the gross margin, while the 20% decrease of the costs would lead to almost the same percentage of increase in the gross margin.

Table 4. Analysis of the sensitivity of the change in the two largest variable costs on the gross margin in mint production (per ha)

Planting material (EUR/ha)		Labour costs (EUR/ha)				
		-20%	-10%	Real	10%	20%
		1,040.00	**1,170.00**	**1,300.00**	**1,430.00**	**1,560.00**
-20%	**640.00**	4,162.00	4,032.00	3,902.00	3,772.00	3,642.00
-10%	**720.00**	4,082.00	3,952.00	3,822.00	3,692.00	3,562.00
Real	**800.00**	4,002.00	3,872.00	**3,742.00**	3,612.00	3,482.00
10%	**880.00**	3,922.00	3,792.00	3,662.00	3,532.00	3,402.00
20%	**960.00**	3,842.00	3,712.00	3,582.00	3,452.00	3,322.00

Source: Authors' calculation based on the data from ISMP

Table 5 presents an analysis of the sensitivity of price and yield changes to the amount of gross margin in the production of lemon balm.

Table 5 shows the sensitivity analysis of the gross margin in the production of lemon balm to changes in price and yield. It can be concluded that if there was 20% increase in price and yield, the gross margin of lemon balm production would amount to EUR 7,238, which would be an increase of 83.80% compared to the estimated gross margin of EUR 3,938 per ha. Moreover, if the price and yield were to decrease by 20% each, the gross margin of lemon balm production

would amount to only EUR 1,238 per ha, which would be a decrease of 68.56%. Based on this analysis, it can be concluded that the production of lemon balm, as well as the production of mint, despite the 20% reduction in price and yield, would still give a good economic result in the form of a positive gross margin.

Table 5. Analysis of the sensitivity of price and yield changes to the amount of gross margin in the production of lemon balm (per ha)

		Price (EUR/kg)				
		-20%	-10%	Real	10%	20%
Yield (kg/ha)		**2.40**	**2.70**	**3.00**	**3.30**	**3.60**
-20%	**2,000.00**	1,238.00	1,838.00	2,438.00	3,038.00	3,638.00
-10%	**2,250.00**	1,838.00	2,513.00	3,188.00	3,863.00	4,538.00
Real	**2,500.00**	2,438.00	3,188.00	**3,938.00**	4,688.00	5,438.00
10%	**2,750.00**	3,038.00	3,863.00	4,688.00	5,513.00	6,338.00
20%	**3,000.00**	3,638.00	4,538.00	5,438.00	6,338.00	7,238.00

Source: Authors' calculation based on the data from ISMP

Table 6 shows the analysis of the sensitivity of the impact of change in the two largest variable costs to the gross margin in the production of lemon balm.

Table 6. Analysis of the sensitivity of the change in the two largest variable costs to the gross margin in the production of lemon balm (per ha)

		Labour costs (EUR/ha)				
		-20%	-10%	Real	10%	20%
Planting material (EUR/ha)		**1,160.00**	**1,305.00**	**1,450.00**	**1,595.00**	**1,740.00**
-20%	**544.00**	4,364.00	4,219.00	4,074.00	3,929.00	3,784.00
-10%	**612.00**	4,296.00	4,151.00	4,006.00	3,861.00	3,716.00
Real	**680.00**	4,228.00	4,083.00	**3,938.00**	3,793.00	3,648.00
10%	**748.00**	4,160.00	4,015.00	3,870.00	3,725.00	3,580.00
20%	**816.00**	4,092.00	3,947.00	3,802.00	3,657.00	3,512.00

Source: Authors' calculation based on the data from ISMP

Table 6 presents an analysis of the sensitivity of the gross margin in the production of lemon balm to changes in the two most represented variable costs (in this case, as in the case of mint production, these were the cost of labour and cost of planting material). Based on the results of the sensitivity analysis, it can be concluded that 20% increase in the costs of labour and planting material would result in 10.82% decrease in gross margin, while 20% reduction of the costs

would lead to almost the same percentage of increase in the gross margin.
Table 7 presents an analysis of the sensitivity of change in price and yield to the gross margin in the production of marshmallow.

Table 7. Analysis of the sensitivity of price and yield changes to the gross margin in marshmallow production (per ha)

		Price (EUR/kg)				
		-20%	-10%	Real	10%	20%
Yield (kg/ha)		**9.60**	**10.80**	**12.00**	**13.20**	**14.40**
-20%	**1,600.00**	-1,095.00	825.00	2,745.00	4,665.00	6,585.00
-10%	**1,800.00**	825.00	2,985.00	5,145.00	7,305.00	9,465.00
Real	**2,000.00**	2,745.00	5,145.00	**7,545.00**	9,945.00	12,345.00
10%	**2,200.00**	4,665.00	7,305.00	9,945.00	12,585.00	15,225.00
20%	**2,400.00**	6,585.00	9,465.00	12,345.00	15,225.00	18,105.00

Source: Authors' calculation based on the data from ISMP

Table 7 shows the sensitivity analysis of the gross margin in marshmallow production to price and yield changes. Based on the results of the sensitivity analysis, it can be concluded that 20% increase in price and yield of marshmallow would result in the gross margin production of EUR 18,105 per ha, which would be an increase of 239.96% compared to the estimated gross margin of EUR 7,545 per ha. Nevertheless, 20% decrease in price and yield would result in a negative gross margin (EUR -1,095 per ha), which would be a decrease of 146.12%. Based on this analysis, it can be concluded that marshmallow production is very sensitive to changes in price and yield, which is also confirmed by the data on projected gross margin. The increase in price and yield of 20% would result in a large increase in the gross margin, almost 2.5 times higher, while the reduction of 20% of the parameters in question would make the gross margin negative.

Table 8 shows the analysis of the sensitivity of the change in the two largest variable costs to the gross margin in marshmallow production.

Table 8 presents the analysis of the sensitivity of the gross margin in marshmallow production to changes in the two most common variable costs (in this case, labour and fuel costs).

Based on the results of the sensitivity analysis, it can be concluded that the increase in labour and fuel costs of 20% would result in a decrease of 38.74% in a gross margin, while the reduction of 20% in the mentioned costs would lead to almost the same percentage of increase in the gross margin.

Based on this analysis, it can be determined that changes in the two most represented variable costs have a greater impact on changes in the gross margin in the marshmallow production compared to changes in the costs in the production of mint and lemon balm.

Table 8. Sensitivity analysis of the change in the two largest variable costs on the gross margin in marshmallow production (per ha)

Diesel fuel (EUR/ha)		Labour costs (EUR/ha)				
		-20%	-10%	Real	10%	20%
		10,800.00	**12,150.00**	**13,500.00**	**14,850.00**	**16,200.00**
-20%	**892.00**	10,468.00	9,118.00	7,768.00	6,418.00	5,068.00
-10%	**1,003.50**	10,356.50	9,006.50	7,656.50	6,306.50	4,956.50
Real	**1,115.00**	10,245.00	8,895.00	**7,545.00**	6,195.00	4,845.00
10%	**1,226.50**	10,133.50	8,783.50	7,433.50	6,083.50	4,733.50
20%	**1,338.00**	10,022.00	8,672.00	7,322.00	5,972.00	4,622.00

Source: Authors' calculation based on the data from ISMP

The results of many authors are in line with our results. The variety of soil and climate factors and production at different altitudes (even extremely high) are the objective basis of successful plantation production of medicinal plants in the Republic of Serbia. in Serbia, only between 1300 and 1800 ha of medicinal plants are planted annually. The European market shows an interest in high-quality medicinal plants originating from our area, which would provide significant financial results to business entities in the future. Incentive measures of the Ministry of Agriculture, Forestry and Water Management aimed at the cultivation of medicinal plants would significantly contribute to the development of hilly and mountainous regions, as well as the entire rural community of the Republic of Serbia (Ceranić *et al.*, 2005; Popović, 2008; Dajić, Dražić, 2003). The sustainable development of natural resources of medicinal and herbal plants directly depends on the implementation and improvement of legislation and standards that need to be harmonized with EU legislation and standards. Regardless of the great potential of the plant sector within the economic system of the country, many potentials, especially in export, higher stages of processing and cultivation of medicinal plants (especially on the principles of organic production) have not been used (Maletić *et al*., 2010).

CONCLUSION

Serbia has excellent climatic and geographical conditions for growing medicinal and aromatic herbs. Growing medicinal and aromatic herbs on farms would create value-added products and be a source of additional farm income. In order to improve the production of medicinal and aromatic herbs, it is necessary to take a number of technological measures.

Based on all the aforementioned analyses, it can be concluded that the production of mint, lemon balm and marshmallow is very profitable, where around EUR 4,000 per ha and EUR 7,500 per ha of profit can be generated. A possible obstacle to the production on larger areas could be high labour requirements, which is confirmed by the fact that the cost of labour in all three lines of production was largest of all variable costs. When it comes to the

sensitivity to price and yield changes, mint and lemon balm production achieved a positive financial result despite 20% decrease in both yield and price. Moreover, a positive financial result is achieved due to the increase of the two largest variable costs by 20% each, with other parameters unchanged.

Although marshmallow production can generate the highest financial result per hectare, with an increase of 20% in both price and yield the financial result of this production would be negative. Nevertheless, an increase in the two largest costs with other parameters unchanged would achieve a positive financial result. It can be concluded with a certainty that the introduction of profitable medicinal herbs into the sowing structure would generate an additional income on farms, and would increase the net profit of farms, as well as their economic sustainability.

ACKNOWLEDGEMENTS

The paper was created as a result of research within the contract on the realization and financing of scientific research work in 2024 between the Institute for the Application of Science in Agriculture, Belgrade and the Ministry of Science, Technological Development and Innovation of the Republic of Serbia, number: 451-03-66/2024-03/200045 and IFVCNS, 451-03-66/2024-03/200032.

REFERENCES

Burić, M., Popović, V., Ljubičić, N., Filipović, V., Stevanović, P., Ugrenović, V., Rajičić, V. (2023): Productivity of black oats: *Avena strigosa* Schreb. on chernozem and its significance as food and medicine. Selekcija i semenarstvo, 29(1): 21-32. DOI: 10.5937/SelSem2301021B

Ceranić, S., Maletić Radojka, Paunović Tamara (2005): Search for factors of the new policy of regional development of agriculture in Serbia, Economics of Agriculture, Belgrade, god. LII. 3, 365-370.

Gogić P. (2014): Teorija troškova sa kalkulacijama u proizvodnji i preradi poljoprivrednih proizvoda, Poljoprivredni fakultet, Beograd.

Dajić, Z, Dražić, S. (2003): Genetic resources of medicinal and aromatic plants in Yugoslavia. Conference on genetic resources for food and agriculture of Serbia and Montenegro. Association of Engineers and Technicians of Serbia and Federal Offce for plant and animal genetic resources, Belgrade, Bulletin 1, 21-25 (in Serbian).

Filipović, V., Ugrenović, V., Popović M. V., Popović, S., Mrđan, S., Dragumilo, A., Ugrinović, M. (2021): Use and agroecology efficiency of medicinal plants in plant production. An Introduction to Medicinal Herbs. Chapter in Book Emerald M. Ed., p.1-365. https://doi.org/10.52305/TKAL3430

Filipović, V., Ugrenović, V., Popović, V., Dimitrijević, S., Popović, S., Aćimović, M., Dragumilo, A., Pezo, L. (2023): Productivity and flower quality of different pot marigold (*Calendula officinalis* L.) varieties on the compost produced from medicinal plant waste, *Industrial Crops and Products*, 192: 116093. https://doi.org/10.1016/j.indcrop.2022.116093

Kostadinović, L., Ružičić, L., Dozet, G., & Cvijanović, G. (2013): Sustainable agricultural production of medicinal herbs. Agriculture & Forestry/Poljoprivreda i šumarstvo, 59(3): 193-205.

Maletić, R., Popović, B., & Janković-Šoja, S. (2010). Cultivation of medicinal herbs as successful model for development of hilly-mountainous regions of Serbia.

Economics of Agriculture, 57(Spec.num. 2), 100–107.

Petrović, B., Vukomanović, P., Popović, M.V., Jovović, Z., Nikolić, M., Šarčević-Todosijević, Lj., Jović, S. (2021). Herbal Remedies in the Treatment of Anxiety Disorders. Chapter 7. Ed. Emerald Mila. Book Title: An Introduction to Medicinal Herbs. NOVA Science publishers, USA, 205-236. https://doi.org/10.52305/TKAL3430

Petrović, B., Vukomanović, P., Popović, V., Šarčević-Todosijević, Lj., Burić, M., Nikolić, M., Đorđević, S. (2022). Significance and efficacy of triterpene saponin herbal drugs with expectorant action in cough therapy. Agriculture and Forestry, Podgorica, 68 (3): 221-239. https://doi.org/10.17707/AgricultForest.68.3.17

Petrović, M., Savić, B., Cvijanović, V. (2021): Financial aspects of pepper (*Capsicum annuum* L.) production on family farms in Serbia, Economic of Agriculture, Institute of Agricultural Economics, Belgrade, 68 (4): 1015-1028, https://doi.org/10.5937/ekoPolj2104015P, UDC 338.314:635.649(497.11).

Popović, B (2008): Contribution of small and medium sized enterprises in development of agribusiness of the Republic of Serbia, Ph.D. thesis, Faculty of Agriculture, Zemun.

Popović, V., Petrović, B., Ignjatov, M., Popović, B. D., Vukomanović, P., Milošević, D., Filipović, V. (2021): Economic Justification Application of Medicinal Plants in Cosmetic and Pharmacy for the Drugs Discovery. An Introduction to Medicinal Herbs. chapter in Book Emerald M. Ed., p.1-365. https://doi.org/10.52305/TKAL3430

Popović, D., Rajičić, V., Popović, V., Burić, M., Filipović, V., Gantner, V., Lakić Z., Bozović, D. (2022a). Economically significant production of *Secale cereale* L. as functional food. Agriculture & Forestry, 68 (3): 133-145. https://doi.org/10.17707/AgricultForest.68.3.11.

Popović, V., Burić, M., Mihailović, A.; Aćimić-Remiković, M., Vukeljić, N., Batrićević, M., Šarčević Todosijević, Lj., Petrović B., 2022b. Medicinal properties of buckwheat products and honey in compliance with food safety regulatory requirements. Journal of Agricultural, Food and Environmental Sciences - *JAFES*, North Macedonia. 76(3): 16-24.

Radojković, M., Mašković, P., Đurović, S., Filipović, V., Filipović, J., Vujanović, M., & Nićetin, M. (2017): Tehnološki potencijal lekovitog bilja Balkana. XXII savetovanje o biotehnologiji, 479.

Stevanović, A., Bošković, J., Zečević, V., Pešić, V., Ćosić, M., Šarčević-Todosijević Lj., Burić, M., Popović, V. (2023). Variability and heritability of technological characteristics of Amaranthus leaves and seeds. Notulae Botanicae Horti Agrobotanici Cluj-Napoca, 51(2): 13128. https://doi.org/10.15835/nbha51213128

Ugrenović, V., Filipović, V., Jevremović, S., & Ugrinović, M. (2015): Rezultati proizvodnje morača (*Foeniculum vulgare* p. Mill.) U izolacionom pojasu organske proizvodnje. Lekovite sirovine, Institut za proučavanje lekovitog bilja" Dr Josif Pančić, 35(1), 181-191

Vasileva, V., Georgiev, G., Popović, V. (2023): Genotypic specificity of soybean [*Glycine max* (L.) Merr.] plastid pigments content under sowing date and interrow spacing. Genetika. 55(2): 455-471. https://doi.org/10.2298/GENSR2302455V

Živković, J., Ilić, M., Šavikin, K., Ilić, A., Stojković, D. (2020): Traditional use of medicinal plants in South-Eastern Serbia (Pčinja District): Ethnopharmacological investigation on the current status and comparison with half a century old data. Frontiers in pharmacology, 11, 5651411.