

## EXPERIMENTAL RESEARCH REGARDING THE HARVEST OF SOME MEDICINAL PLANTS FROM FAM. LAMIACEAE

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### ABSTRACT

*Medicinal plants from Fam. Lamiaceae are characterized by the presence of compounds that have a high antioxidant activity. The quality of plant material depends on a complex of factors, which also includes harvesting. Applying especially to cultivated species, mechanized harvesting conditions the obtaining of profitable productions of medicinal plants.*

*The paper presents the experimental results obtained in the tests of the Multifunctional equipment for harvesting medicinal and aromatic plants (experimental model) in the crops of Lavender (*Lavandula angustifolia* Mill.) Respectively Hyssop (*Hyssopus officinalis* L.), both from the fam. Lamiaceae, made on small areas.*

### INTRODUCTION

Medicinal and aromatic plants have been widely studied in different countries, mainly due to the antioxidant capacity of their bioactive compounds and their beneficial effects on human health.

Antioxidants are substances that prevent the oxidation of other compounds or neutralize free radicals, protecting the human body in the long-term (Yashin A, et al. 2017).

Today, due to its proven effectiveness, medicinal and aromatic plants are included in treatment schemes, they are used in the manufacture of medicines and in other fields (cosmetics, food, etc.), which has led to a continuous increase in their consumption (Perez Gutierrez and Baez, 2009, Rastogi et al., 2016, Korkunc M. et al. 2018).

For these species, the quality of the plant material obtained is more important than productivity (Niemiec W. and Trzepieciński T. 2018). The quality of medicinal and aromatic plants depends on the geographical origin, species / variety, the stage of development at the time of collection, the method of harvesting, as well as the post-harvest handling (Pandey A.K. and Savita 2017).

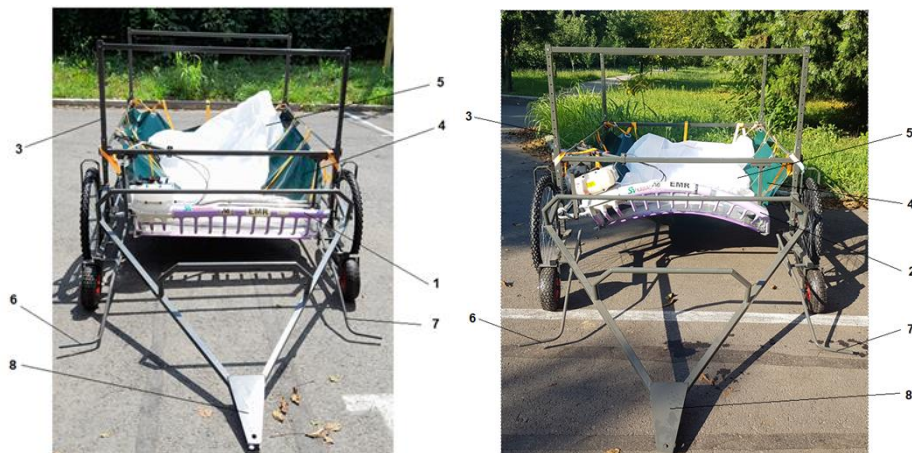
Hyssop (*Hyssopus officinalis* L., fam. *Lamiaceae*) is a perennial herbaceous plant, which has a pleasant smell, being cultivated and used in many countries, for medical or culinary purposes. Although native to the Mediterranean and Caspian Sea regions, the plant grows naturally in Southern Europe, the Middle East, Central Asia, North Africa and North America. (Stan C. et al. 2019).

Lavender (*Lavandula angustifolia* Mill., Fam. *Lamiaceae*) has a long history of traditional use and in addition it has been found that essential oil has a wide range of biological effects (Pruteanu A. et al. 2015, Yap W.S et al. 2019). Lavender is widespread especially in southern Europe, especially in the Mediterranean and Balkan countries but also in neighboring North Africa (Korkunc M. et al. 2018).

This paper presents experimental research on the mechanized harvesting of Hyssop and Lavender, using the *Multifunctional equipment for harvesting medicinal and aromatic plants*, intended for use on small areas.

## MATERIAL AND METHOD

The experimental model of *Multifunctional equipment for harvesting medicinal and aromatic plants* (fig.1), designed and made within INMA Bucharest, was used for the tests.



**Fig. 1. Multifunctional equipment for harvesting medicinal and aromatic plants – EMR**

The equipment consists of: 1 - mower with a straight knife; 2 - mower with curved knife; 3 - assembled chassis; 4 - assembled bag holder; 5 - collection bag; 6 - right plant lifter ; 7 – left plant lifter; 8 – assembled prop. It is a power and capacity equipment, easy to maneuver, removable and transportable, which can also work in aggregate with a tractor. It is intended for harvesting by cutting, at a certain height above the ground, the species of medicinal and aromatic plants, from which the stem with leaves and possibly flowers is harvested. The tests were performed at SCDA Secuieni, Neamț County, in July, in ecological crops of Lavender (*Lavandula angustifolia* Mill.) and Hyssop (*Hyssopus officinalis* L.), respectively, both species belonging, fam. *Lamiaceae*. Crop biometric data are presented in Table 1.

Table 1

**Biometric data crops of medicinal plants SCDA Secuieni**

Characteristic	Species	
	Lavender	Hyssop
Variety	Codreanca	Local population "de Ciorani"
Distance between rows [cm]	100	70
Distance between plants/row [cm]	50	50
Plant height [cm]	70	60
Flower stem height [cm]	30	40
Shrub diameter [cm]	60	-

For the Lavender harvest the equipment was equipped with the curved knife cutting machine, and for the Hyssop harvest, the experimental model was equipped with the straight knife cutting machine (fig.2).



**Fig. 2. Aspects during the tests**

## RESULTS AND DISCUSSIONS

The time of harvest of the medicinal plants under study was in bloom, when about 75-80% of the flowers were open. The harvesting height and working regime (working speed, “acceleration” of the engine) for each species were established following preliminary tests. Qualitative work indices as well as energy indices (table 2) were determined according to the experimental methodology developed within INMA.

*Table 2*

### Experimental results

Nr. crt.	Name of qualitative work indices and energy indices	U. M.	Lavender	Hyssop
			Medium value	Medium value
1	Number of rows harvested	-	1	2
2	Cutting height (working)	mm	330 (in the middle)	150
3	Working width	m	0.7	1.2
4	Degree of harvest (cut plants)	%	96.3	95.2
5	Degree of collection	%	94.8	94.1
6	Losses (uncollected cut plants + uncut plants)	%	5.2	5.9
7	Working speed	Km h <sup>-1</sup>	1.67	1.52
8	Fuel consumption (mower)	l h <sup>-1</sup>	1.49	1.56

In the case of Hyssop due to the culture technology, the results are obtained after two successive passes.

## CONCLUSIONS

The experimental results obtained demonstrate the efficiency of the *Multifunctional technical equipment for harvesting medicinal and aromatic plants EMR*, which can also work in aggregate with a tractor during work, being designed to collect *herba* of these species, grown on small and medium areas. The equipment is an important premise for the realization of technical systems useful to small farmers, as well as for obtaining quality productions.

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