

## Research regarding biochemical characterization of volatile oils in some valeriana genotypes

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**Abstract** The purpose of this work was to determine the possibility of volatile oil extraction from rhizomes at 4 genotypes of *Valeriana officinalis*: Rossica x Magurele 100, Sambucifolia, Volgensis x Magurele 100, Moscova 835 x Magurele 100. This direction was obtained through the extraction of the volatile oil by using the steam distillation method. Beforehand the dry substance percentage was determined from the rhizomes. The obtained results have shown the presence of some differences between the genotypes as far as the dry substance percentage obtained (24-36%-6.1. BBCH) and the efficiency of volatile oil extraction (1,16 – 0.87%).

### Key words

volatile oils, valeriana, biochemical and physiological research

The valeriana type includes species used in medicinal purposes since ancient times (H. P. Dorfler și G. Roslet, 1984, M. D. Bobiț, 1997, S. Muntean și L. S. Muntean, 1999 etc.). Valerian derives from the Latin “valere” which means to be strong, to be fit, thus showing its therapeutic attributes.

The Valerian type is important because of its complex chemical compounds which act as a antispasmodic in state of nerves, anxiety, insomnia, tachycardia etc. It is a cerebral stimulant, local analgesic in wounds, ulcers, and contusions; it is recommended as an antiseptic, reducing polymeria (H. Dressing et al., 1992; C. Bounthanth et al., 1983, L. Koeber, 1948, R.G. Reichert, 1998)

Although known from ancient times by the old Greeks and Romans, valeriana continues to be the subject of numerous studies which follow the establishment of chemical and pharmacological bases that form its activity.

The growth represents a physiological attribute of the living matter which consists in the irreversible and stabile growth of the total weight and of the cells volume, tissues and organs, in the ensemble of the entire organism. The process is based on the

increase of dry quantity of substance by active processes of biosynthesis.

### Material and Method

The determination of dry substance quantity accumulated by the plants is obtained through successive determinations at different time intervals, separately for each category of organs. We detached the organs which are weighed separately in a fresh state, we finely chop the material, it homogenizes, and then we choose 4 samples from each category of organs (root, leaves, and stem). The samples are then introduced in thermo balance by which we determine the quantity of dry substance by continuous increase of work temperature and elimination of the humidity content, until the weight of the sample remains constant.

For the separation of the volatile oils, simultaneous distillation was used with water vapors and extraction with a non-polar solvent. The process was first described by Likens and Nickerson, the device used creates the simultaneous condensation of the water vapors and of the extraction solvent immiscible with water.



Fig. 1 The Kern MLs thermobalance used for the determination of dry matter

## Results and Discussions

Based on performing some other studies (R.B.H. Wills and D.Shohet, 2003), has been

established that the percentage of dry matter in plant valerian roots is increasing as plants advance in the life cycle.

Table 1

**The dry matter accumulation dynamics (d.m %) from root in valeraiana studied genotypes**

Nr.crt	GENOTYPE	The moment of determination	
		The beginning of efflorescence(5.1. BBCH)	The beginning of the inflorescence(6.1.BBCH)
		x±sx	x±sx
1	Rossica x Măgurele 100	23,99±0,21	24,34±0,02
2	Sambucifolia	35,58±1,15	36,50±0,35
3	Volgensis x Măgurele 100	25,79±1,64	26,84±0,23
4	Moscova 835 x Măgurele 100	24,14±0,02	25,80±1,06

Regarding the content of dry substance accumulated in the case of *Valeriana officials* stem we can observe a differential tendency between the genotypes influenced by pedoclimatic conditions in the experimental field and by different origins of the genotypes. The values recorded have shown some genotypes with better results in the agricultural region

of Banat like: Sambucifolia (35.58%). Regarding the content of dry substance determined at the beginning of inflorescence the best results have also been obtained by Sambucifolia genotype (36,50%) and the lowest results were obtained by Rossica x Magurele genotype (24,34%).

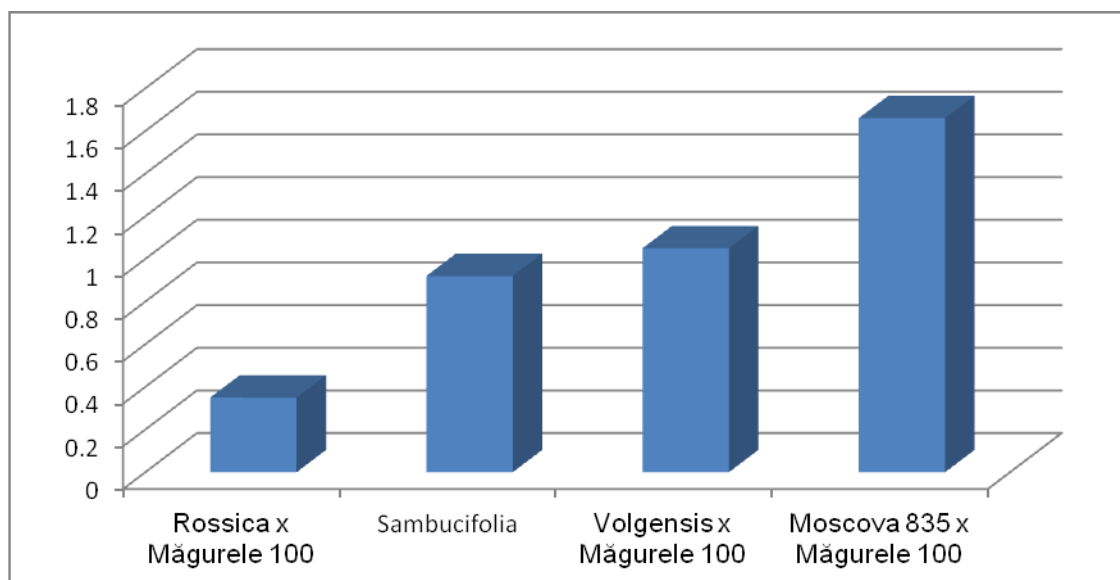


Fig. 2 Difference in the dry matter accumulation dynamics (d.m %)

The differences between the dynamics registered in the two moments of determination showed that the highest rate of dry matter accumulation was emphasized by the genotype Moscova 835 x

Magurele 100 (1,66%) whilst the lowest rate was presented by the genotype RossicaXMagurele 100 (0,35%).

Table 2

#### Extraction capacity of volatile oils from different vegetative organs

Nr. Crt.	Vegetal material		Quantity of valeriana plant (g)	Extrct of volatile compounds obtained (g)	Efficiency (%)
1	RossicaxMăgurele 100	root	98,76	0,864	0,87
2	Moscova 835x Măgurele 100	root	98,21	0,985	1,00
3	Sambucifolia	root	71,98	0,639	0,89
4	VolgensisxMăgurele 100	root	82,93	0,962	1,16

There were made 4 volatile extract separations from valeriana genotypes with different efficiencies of separation regarding the vegetal material (amount of plant taken in discussion), the quantities of prime materials and products obtained being indicated in table 2.

For volatile oil probes extracted from root, the results regarding the efficiency of extraction are

situated between 0.87% (Rossica x Magurele 100) and 1.16% (Volgensis x Magurele 100).

#### Conclusions

Concerning the content of dry substance from root, determined at the beginning of the efflorescence

there are evident differences between the valeriana genotypes studied. This fact is very important because the root (rhizome) is the vegetal organ in which the active principals are accumulated. Thus the percentage values of the dry substance quantity were situated between  $22,27 \pm 2,16\%$  and  $35,58 \pm 1,15\%$  at the beginning of efflorescence.

For the probes of volatile oils extracted from root the results of extraction efficiency are situated between  $0,87\%$  (RossicaxMăgurele 100) and  $1,16\%$  (VolgensixMăgurele 100).

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