

## Correlation between fresh and dry mass of some medicinal and aromatic herbs used in phytotherapy

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**Abstract** In recent years, it is trying to reintroduce into the culture different medicinal plants, given the growing interest of the phytotherapeutic community for the benefit of the human body in stopping and ameliorating diseases. Romania has an old and rich tradition in this field, currently over 300 medicinal and aromatic plants are known, and over 50 of them have developed cultivation technologies. *Lavandula officinalis* L. is cultivated for its aromatic and phytotherapeutic properties, *Calendula officinalis* L. is cultivated to stimulate the wound healing process, *Echinacea purpurea* Moench. for its proprieties in stimulating immunity and *Salvia officinalis* L. is cultivated for pronounced antisudor effect. The method of setting up the crop was carried out differently, for each species, depending on the mode of immersion (seedlings, seedlings, seed), optimal planting time, optimal distances between plants per row and between rows, with direct influences on the fresh and dried plant material. The present paper aims to highlight several elements of technology to improve the production and direct connection between the obtained material and after drying it.

### Key words

medicinal plants,  
phytotherapy, correlation,  
fresh and dry matter, yield

Old, since man exist and brought back by recent research, medicinal plants constitute a precious treasure gifted by the nature and used at the beginning by instinct, then, on the basis of experience, for the purpose of preventing or curing diseases (4)

Current guidelines in medicine are increasingly focusing on the use of phytotherapy (the treatment with medicinal products obtained from plants), limiting the use of synthetic drugs. The concern about medicinal and aromatic plants in our country has gained scientific support recognized since the beginning of this century. The first experimental resort in the world specialized in the study of medicinal plants was founded in Cluj Napoca in 1904, thus laying the foundations of experimental research in the field of medicinal and aromatic plants in our flora. With very varied climate and soil conditions our country has a diverse and rich flora. In order to improve the production and its quality, a series of studies were pursued at the Agronomic University of Cluj Napoca (13)

Medicinal plants are effective sources of flavonoids, tannins, glycosides, anthracinones, natural antimicrobial and antioxidant products (3). They are also an important source of physiological activities for

the body, being therapeutic remedies for various diseases. (6). There are a number of internal remedies (7, 10) based on these for external treatment (8, 1) and the management of dental, gum and oral hygiene where salvia (Foto) is used (14).

An other herb of great importance in the perfume and pharmaceutical industry and / or landscaping is the lavender (*Lavandula* Foto 1 ). Many bioactive constituents, such as polyphenols, anthocyanins, carotenoids, chemicals that act as antioxidants in the human body, have been reported for lavender, but there is little information about their antioxidant properties in the literature (11).

Marigolds (Foto 2) are cultivated due to the action of stimulating the wound healing process, the ligated flowers are used externally in the form of an ointment in the treatment of wounds (15).

Pharmacological studies have shown that cyclosporin, alcamid and glycoproteins / polysaccharides exhibit immunomodulatory activity. Therefore, they could be considered as active and most suitable principles for standardization. Clinical effects have been demonstrated for juice extracted from aerial parts of *Echinacea purpurea* (Foto 3.) in adjuvant therapy of respiratory tract and urinary tract infections (2).



Foto 1. *Lavandula angustifolia* Mill.

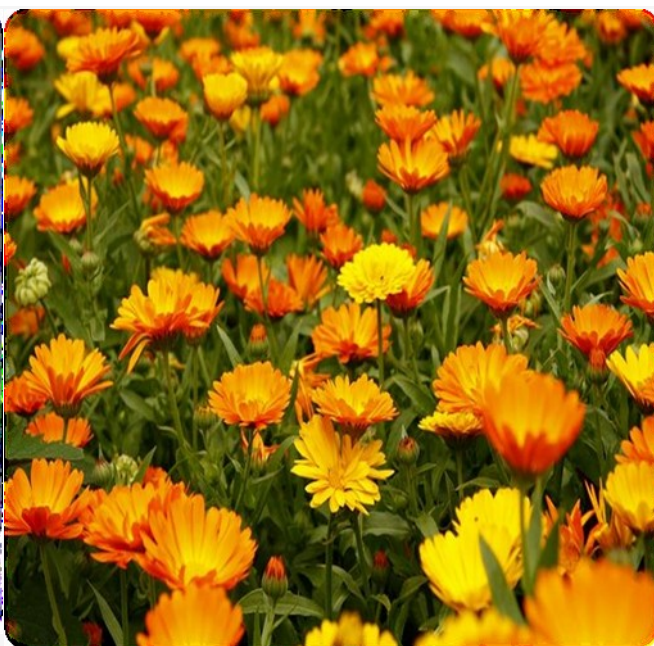


Foto 2. *Calendula officinalis* L.



Foto 3. *Echinacea purpurea* Moench.



Foto 4. *Salvia officinalis* L.

## Materials and Methods

To the National Institute of Research and Development I for Potato and Sugar Beet Brasov are carried out research regarding the study of medicinal and aromatic plant species and their positioning in a sustainable agriculture, both from the point of view of their cultivation and from the point of view of use; the introduction in the field of valuable plant species from the phytotherapeutic point of view, the maintenance of biodiversity, the development of new crop technologies and the improvement of existing ones.

## Results and Discussions

As can be seen in Table 1, the method of establishment the crop was carried out differently, for each species, depending on the mode of multiplication (cutting, seedling, seed), optimal planting time, optimal distances between plants on row and between rows, with direct influences on the fresh and dried plant material (Table 1).

Table 1

## Synthesis of the experimental lot

Species name	Breeding method	Establishment period	Distance plants /row (cm)	Harvested plant
<i>Lavandula angustifolia</i> (Mill)	cuttings	April	50x50x100	flower
<i>Calendula officinalis</i> (L.)	seed	April	40pl/mp <sup>2</sup> x50	flower
<i>Echinacea purpurea</i> (Moench)	seedling	October	20x20x80	herba
<i>Salvia officinalis</i> (L.)	seedling	September	15x15x60	herba

The harvest was carried out in the second year (Table 2). After drying, the ratio ranged between 5.6-6.5: 1 for lavender, 6.1-6.7: 1 for Calendula , 3.9-4.3: 1

for Echinacea and 3.8-4.2: 1 for Salvia. The reports have proved to be similar to those from literature (12).

Table 2

## Yield obtained in the experimental variants

Species	Variant	Yield green herba kg/ha	Yield dry herba kg/ha	Ratio on drying
<i>Lavandula angustifolia</i> (Mill.)	V <sub>1</sub>	2290	410	5.6:1
	V <sub>2</sub>	2760	450	6.1:1
	V <sub>3</sub>	2500	425	5.9:1
	V <sub>4</sub>	2830	435	6.5:1
	V <sub>5</sub>	2650	430	6.2:1
	Mean	2606	430	6.1:1
<i>Calendula officinalis</i> (L.)	V <sub>1</sub>	4780	715	6.7:1
	V <sub>2</sub>	4250	685	6.1:1
	V <sub>3</sub>	4620	710	6.5:1
	V <sub>4</sub>	4460	695	6.4:1
	V <sub>5</sub>	4380	685	6.4:1
	Mean	4498	698	6.4:1
<i>Echinacea purpurea</i> (Moench)	V <sub>1</sub>	12480	3120	4.0:1
	V <sub>2</sub>	13400	3115	4.3:1
	V <sub>3</sub>	12960	3325	3.9:1
	V <sub>4</sub>	13230	3150	4.2:1
	V <sub>5</sub>	12870	3140	4.1:1
	Mean	12988	3170	4.1:1
<i>Salvia officinalis</i> (L.)	V <sub>1</sub>	15380	3750	4.1:1
	V <sub>2</sub>	14750	3690	4.0:1
	V <sub>3</sub>	15420	3855	4.0:1
	V <sub>4</sub>	16100	3835	4.2:1
	V <sub>5</sub>	13980	3680	3.8:1
	Mean	15126	3762	4.0:1

The correlation coefficient between fresh and dry matter yield for *Lavandula angustifolia* was  $r = 0.87665$  (Figure 1). Comparing this value with the correlation coefficient with the probability of 5%,  $r =$

$0.87 > 0.50$  it can be said that between the production of fresh and dried matter the coefficient of correlation is distinctly positive.

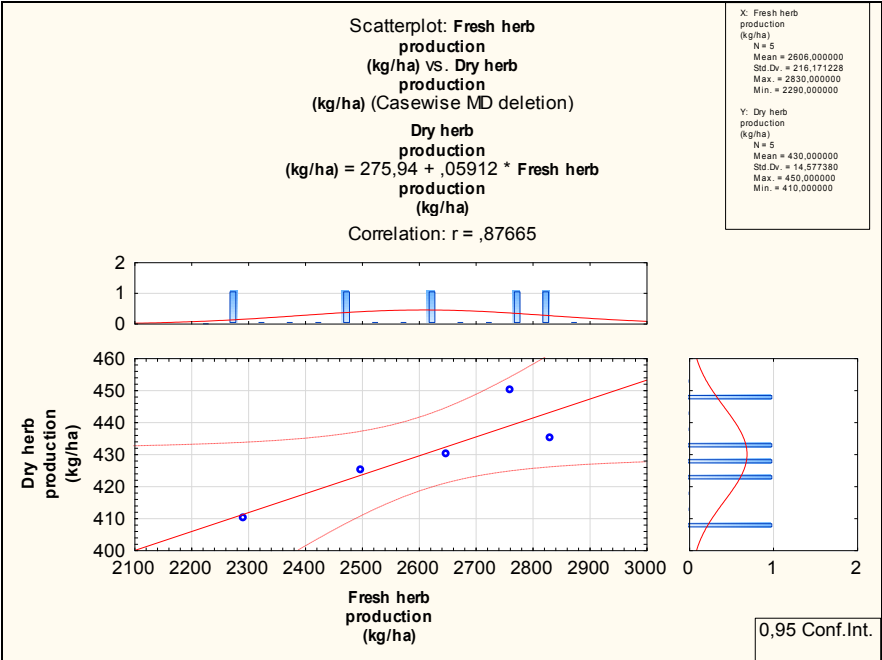


Fig. 1. Correlations between fresh and dry matter yield to *Lavandula angustifolia* L.

In the case of the second species, *Calendula officinalis*, the correlation coefficient increases ( $r = 0.96293$ ), being very significant (Figure 2). Higher

values of the correlation coefficient show direct link much closer between the two parameters.

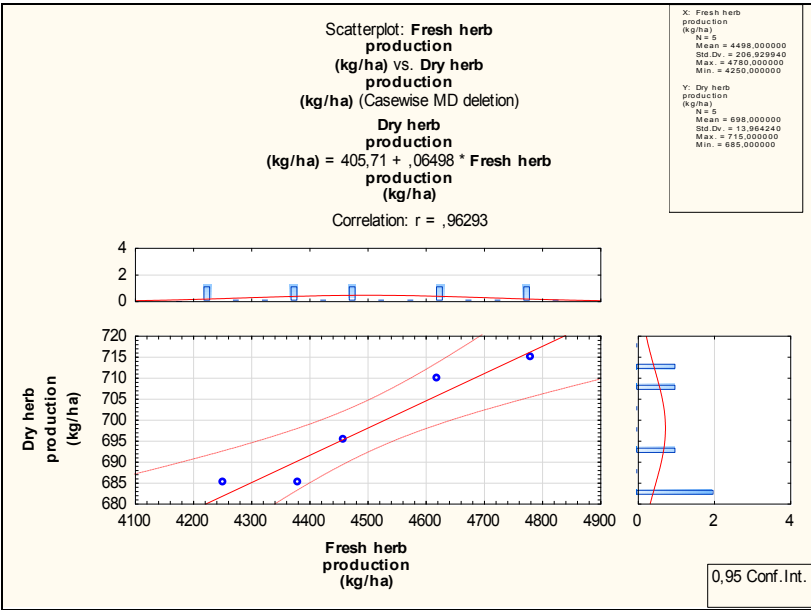


Fig. 2. Correlations between fresh and dry matter yield to *Calendula officinalis* L.

Regarding *Echinacea purpurea* (Moench) the yield was high but the correlation coefficient has a very

low value ( $r = 0.0233$ ) no statistically assured (Figure 3).



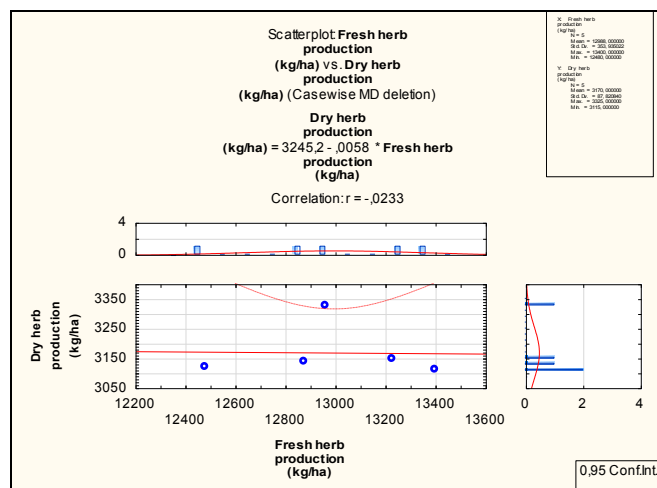


Fig. 3. Correlations between fresh and dry matter yield to *Echinacea purpurea* (Moench.)

Regarding *Salvia officinalis* species were obtained distinct linear relationships ( $r = 0.83939$ ) (Figure 4).

Comparing this value with the correlation coefficient of probability of 5% and respectively 1%,  $r$

$= 0.83 > 0.50$ , on the basis of these comparisons it can be say that between the yield of fresh and dried matter the correlation coefficient is positive distinctly significant.

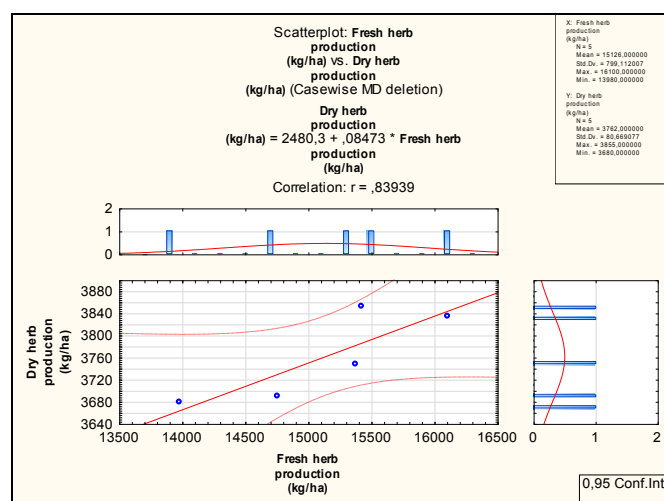


Fig. 4. Correlations between fresh and dry matter yield to *Salvia officinalis* L.

## Conclusions

Based on the results obtained and the correlation processing, the regression highlighted the relation between the two factors to three of studied species, *Lavandula angustifolia* Mill., *Calendula officinalis* L., *Salvia officinalis* L., while *Echinacea purpurea* Moench. did not record a statistical assured regression coefficient.

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