

VERMICOMPOST INFLUENCE ON PRODUCTION OF *OCIMUM BASILICUM L.* SEEDLINGS

INFLUENȚA VERMICOMPOSTULUI ASUPRA PRODUCERII RĂSADURILOR DE *OCIMUM BASILICUM L.*

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Abstract. In the current paper are presented the results obtained regarding the influence of vermicompost on production of basil seedlings, *Ocimum basilicum L.* Research took place at UASVM Iași, Romania, in 2018. Experiences were organized in four variants represented by participation rate of vermicompost in substrate together with garden soil, respectively 0% (V₁), 10% (V₂), 20% (V₃) and 30 % (V₄). Seedlings with the best quality were obtained at a rate of 30% vermicompost in substrate (V₄).

Key words: germination, *Ocimum basilicum*, vermicompost

Rezumat. În această lucrare sunt prezentate rezultatele privind influența vermicompostului asupra producerii răsadurilor de busuioc, *Ocimum basilicum L.* Cercetările s-au desfășurat la USAMV Iași, România, în anul 2018. Experiențele au fost organizate în patru variante reprezentate de proporția în care a participat vermicompostul în substrat alături de pământul de grădină, respectiv 0% (V₁), 10% (V₂), 20% (V₃) și 30% (V₄). Răsadurile de cea mai bună calitate s-au obținut la un aport de 30% vermicompost în substrat (V₄).

Cuvinte cheie: germinație, *Ocimum basilicum*, vermicompost

INTRODUCTION

Ocimum basilicum L. is important as ornamental plant (cut flower in fresh state or dried, for decor of green spaces), as well as aromatic plant (in food, cosmetic, pharmaceutical industry).

Seedlings production is an important link in plants' cropping. At basil, in laboratory conditions, seeds germination could reach 95-98%, if optimal temperature is 25°C (Birendra, 2012; Ramin, 2006). Germination of basil seeds could be difficult in saline conditions and in unfavourable temperature conditions. Basil could be classified as moderate tolerant at saline stress during seeds' germination and apparition of seedlings (Ramin, 2006).

Basil reacts positively at nutritive substrate type, especially at organic substrates (Jelačić *et al.*, 2005). In last years, we look for variants as environmental friendly as possible, in all technological links for plants cropping, avoiding as much as it is possible utilisation of nutritive substances obtained by chemical synthesis. So, were tested and utilised many organic variants and among them being utilisation of bio-humus or vermicompost.

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Vermicompost improves seeds' germination rate and seedlings' quality, due to its physical, biological and nutritional properties, and could be a source of bioactive molecules and microbial populations. These bioactive compounds and micro-organisms intensify the absorption of nutrients, initial development of roots and seedlings' development capacity (McGinnis *et al.*, 2004; Kalra *et al.*, 2010; Mathivanan *et al.*, 2012).

Positive effect of vermicompost on seeds' germination and seedlings' quality was observed at different plant species: legumes (Suthar *et al.*, 2005; Singh *et al.*, 2011); *Arachis hypogaea* L. (Kalra *et al.*, 2010; Mathivanan *et al.*, 2012); ornamental grasses (Chelariu and Ghiorghe, 2017).

In the current paper are presents results regarding vermicompost influence on basil seeds germination and seedlings quality before planting.

MATERIAL AND METHOD

Experiences for the current research were organized into the didactical glasshouses belonging to Floriculture discipline, UASVM Iași, Romania, in 2018. For the design of those experiences was used as study material species *Ocimum basilicum* L.

Were established four experimental variants, represented by the participation rate into substrate of vermicompost together with garden soil, respectively 0% (V_1), 10% (V_2), 20% (V_3) and 30% (V_4) (tab. 1). On each variant were sowed 50 seeds. For seedlings transplanting was utilised the same substrate as at sowing.

Table 1

Experimental design for *Ocimum basilicum* L. species

Species	Variant	Substrate type
<i>Ocimum basilicum</i>	V_1	garden soil (control)
	V_2	garden soil + 10% vermicompost
	V_3	garden soil + 20% vermicompost
	V_4	garden soil + 30% vermicompost

Research took place during March-May 2018, and we observed germination dynamics of seeds, germination rate, and characterization of seedlings before establishment of crops. The obtained results were statistically.

RESULTS AND DISCUSSIONS

Production of planting material at floral plants is one of the important technological links with implication into a successful cropping. Various factors could influence seedlings production, one of them being the utilized substrate for sowing and transplanting, as the case may be.

At the end of research was observed that germination of *Ocimum basilicum* seeds took place during 15 days at variants which in substrate had a rate of vermicompost, and at control variant V_1 majority of seeds germinated into an interval of 20–25 days (fig. 1).

Germination rate of seeds was between 81% at control variant (V_1) and 92% at V_2 (10% vermicompost), 94% at V_3 (20% vermicompost) and 96% at V_4 (30% vermicompost) (tab. 2).

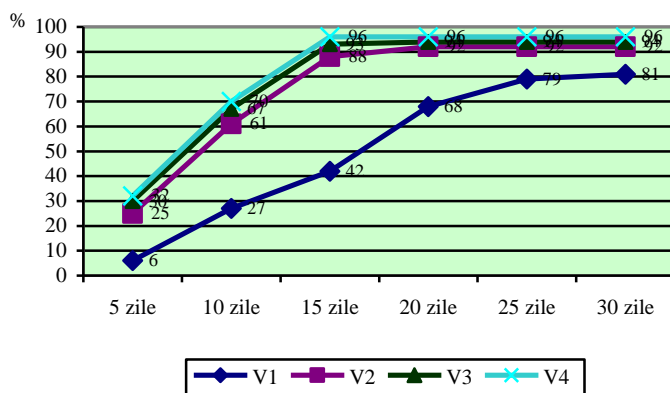


Fig. 1 Germination dynamics at *Ocimum basilicum*

After statistical interpretation was observed that differences face to control were very positive significant at those three variants which have included vermicompost into substrate (tab. 2).

Table 2

Results regarding influence of substrate on *Ocimum basilicum* seeds germination rate

Variant	Germinated seeds (%)	% face to control	Difference	Significance
V ₁ - control	81	100.00	0,0	control
V ₂ - 10% vermicompost	92	113.58	11.0	***
V ₃ - 20% vermicompost	94	116.05	13.0	***
V ₄ - 30% vermicompost	96	118.52	15.0	***
LD _{5%} = 3.7 LD _{1%} = 5 LD _{0.1%} = 9.0				

Basil seedlings were observed from the point of view of morphological features such as plants' mean height, leaves' mean number and mean number of roots on plant at the end of germination period.

Presence of vermicompost in substrate influenced features of basil seedlings. So, seedlings mean height was 10.3 cm at control variant (V₁) and between 14.9 cm and 16.3 cm at variants with vermicompost. Mean number of leaves was 10.3–12.5 pcs/plant at variants with vermicompost face to 8.2 pcs/plant at control variant (tab. 3).

Table 3

Characterization of *Ocimum basilicum* seedlings

Variant	After 30 days from sowing			
	Mean height (cm.)	Mean number of leaves (pcs.)	Mean number of ramifications (pcs.)	Mean number of main roots (pcs.)
V ₁ - control	10.3	8.2	1.1	8.3
V ₂ - 10% vermicompost	14.9***	10.3***	2.1***	12.5***
V ₃ - 20% vermicompost	15.4***	10.9***	2.3***	17.3***
V ₄ - 30% vermicompost	16.3***	12.5***	2.4***	20.8***
	LD _{5%} = 0.3 cm LD _{1%} = 0.5 cm LD _{0.1%} = 0.8 cm	LD _{5%} = 0.3 pcs. LD _{1%} = 0.5 pcs. LD _{0.1%} = 0.8 pcs.	LD _{5%} = 0.1 pcs. LD _{1%} = 0.2 pcs. LD _{0.1%} = 0.3 pcs.	LD _{5%} = 0.4 pcs. LD _{1%} = 0.7 pcs. LD _{0.1%} = 1.1 pcs.

Mean number of main roots varied between 12.5 roots/plant and 20.8 roots/plant at variants with vermicompost, face to 8.3 roots/plant at control, and mean number of stems' ramifications was between 2.1 ramifications/plant and 2.4 pcs./plant, face to 1.1 ramifications/plant at V₁ (tab. 3).

After statistical interpretation regarding seedlings' features before planting in field was observed that at seedlings' mean height, also as mean number of leaves per plant, mean number of main roots and ramifications number, differences face to control V₁, at all variants with vermicompost were very positive significant (tab. 3).

CONCLUSIONS

Vermicompost influence germination onset, germination duration, as well as germination process at *Ocimum basilicum*.

Vermicompost helps mainly at plants' roots development.

Statically speaking, characteristics of seedlings before planting in field, regarding mean seedlings height, mean number of leaves per plant, mean number of main roots and ramification number, recorded face to control very significant positive differences, at all variants with vermicompost.

Seedlings with the best quality were obtained when in substrate was a rate of 30% vermicompost (V₄).

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