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CULTIVATION OF MELISSA OFFICINALIS L. PLANT SEEDLINGS UNDER DIFFERENT CONDITIONS

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Abstract: *In the experiment, we developed the technology of growing a medicinal lemon plant. In the experiment, when the seeds of the lemon plant were planted in different conditions and norms, the variants using humus recorded higher indicators compared to the seeds planted in natural soil conditions. Since plant seeds are grown in soils with good permeability of air, heat, moisture and low soil density (biohumus soil), the transition of seeds to development phases has accelerated.*

Keywords: *Lamiaceae, Melissa officinalis L, seed, technology of cultivation.*

Introduction

Today, the demand for natural medicines extracted from the composition of plants is increasing. This leads to a high demand for identification and cultivation of medicinal plants.

In the conducted research, the species belonging to the lamiaceae family distributed in the Namangan region of the Republic of Uzbekistan were identified. Scientific research works on their distribution environment and medicinal properties were analyzed. Accordingly, Ziziphora tenuior L[11,9], Mentha asatica Boriss, Origanum tytthanthum gontsch, Perovskia scrophulariifolia Bunge, Salvia sclarea L, Ziziphora pedicellata Pazij are grown in the area. & Vved, Phlomoides isochila, Phlomoides kirghisorum species are distributed [10, 9, 4, 5].

Summarizing the conducted studies, Melissa officinalis species is not widespread in the natural conditions of Namangan region. and its menthol content was found to be higher than other representatives of the family [6, 1, 2, 3].

Adaptation of Melissa officinalis species to Namangan soils[10], cultivation technology was developed.

Planting of plants is carried out in 2 different ways;

1. By planting the seeds directly in the areas where the plants are grown.
2. Seedlings are prepared in protected areas and brought to cultivated fields by planting.

It is known from research that the smallness of the seeds causes a lot of death during germination. [7]. Preparing seedlings in protected areas and planting them in cultivated areas reduces the consumption of seeds and seedlings, their mortality, damage from diseases and pests[8].

We have found Method 2 to be effective in growing Melissa officinalis.

In the experiment, we developed the norm of planting seeds on an area of 30x50 cm (table 1).

Table 1:

Experience system

(The weight of 1000 seeds is 2.6 g)

Options	Planting conditions, 30x50 cm in place	Amount of sown seeds, gramm at the expense of
1	Planted in natural soil conditions	0,4
2		0,5
3		0,6
4		0,7
5	Soil treated with biohumus (2,5 t/ha)	0,4
6		0,5
7		0,6
8		0,7

In the experiment, the seeds of the Melissa officinalis plant were planted under different conditions and standards, applied humus variants recorded higher values compared to seeds planted in natural soil conditions.

In natural soils, seeds germinate on April 31, the lowest rate is 0.7% in option 3 compared to option 4 (12.3%), It was 1.3% higher in Option 1 and 3.9% higher in Option 2. Germination in humus soils started a little earlier than in natural soils, that is, on April 28. If 0.7 g (269 seeds) per 0.15 m^2 of humus was used, 15.9% germinated in option 8, where the most seeds were planted, 0.5 g (192 pieces) planted in option 6 showed a high germination rate (21.4%), it was observed that it was 5.5% higher than the most planted option 8. Option 5 was 2.9% higher than option 8, and option 7 was 2.3% higher.

The rate of seed germination depends on planting standards and soil conditions, According to the results of experimental observations, the germination rate of seeds sown in natural conditions (germination lasted 9 days) was high in option 2 and made 83.3 percent, the lowest figure belongs to option 4, equal to 68 percent (table 2).

Table 2:

Germination of Melissa officinalis seeds planted under different conditions (1000 seeds weigh 2.6 g)

№	Theoretical seedling thickness according to planting criteria (30x50 cm)	the degree of germination of seeds, in %							Actual seedling thickness, pcs (30x50 cm)
		28.07. 2022	29.07. 2022	30.07. 2022	31.07. 2022	01.08. 2022	02.08. 2022	03.08. 2022	
1	154	-	-	-	13,6	27,3	53,2	79,2	148
2	192	-	-	-	16,2	29,7	55,2	83,3	179
3	231	-	-	-	13,0	26, 0	51,1	79,6	226
4	269	-	-	-	12,3	26,8	46,8	68,0	249
5	154	18,8	38,3	63,3	81,8	-	-	-	149
6	192	21,4	43,8	68,8	87,5	-	-	-	182
7	231	18,2	35,5	58,9	78,4	-	-	-	219
8	269	15,9	29,4	51,7	72,9	-	-	-	248

In the experiment, the rate of germination in the options (germination lasted 6 days) using humus was higher than that of the seeds planted in natural soil conditions, and the highest rate in all options corresponded to option 6, i.e. 87.5%, the lowest index of humic soil belonged to option 8 (table 3).

In general, humus soil had a higher percentage of seed germination and less time spent per germination hour.

In addition, the seeds were collected in a petri dish and the fertility coefficient of the seed was determined. The experiment was carried out on 250 seeds (0.65 g). After 72 hours after placing on the plate, 230 of the seeds germinated and the germination rate was equal to 92%.

Table 3:

Effects of Melissa officinalis planted under different sheltered conditions on the transition of developmental stages

V	Planting period	Germination	Release of 1st pair Chinbarg	Release the 2nd pair of chinbarg	Picking period	Transplant to open field
1	22.07.2022	31.07.2022	07.08.2022	18.082022	31.08.2022	10.09.2022
2	22.07.2022	31.07.2022	07.08.2022	18.082022	31.08.2022	10.09.2022
3	22.07.2022	31.07.2022	07.08.2022	18.082022	31.08.2022	10.09.2022
4	22.07.2022	31.07.2022	07.08.2022	18.082022	31.08.2022	10.09.2022
5	22.07.2022	28.07.2022	02.08.2022	08.08.2022	20.08.2022	30.08.2022
6	22.07.2022	28.07.2022	02.08.2022	08.08.2022	20.08.2022	30.08.2022
7	22.07.2022	28.07.2022	02.08.2022	08.08.2022	20.08.2022	30.08.2022
8	22.07.2022	28.07.2022	02.08.2022	08.08.2022	20.08.2022	30.08.2022

The highest indicator of the beginning of the formation of the first pair of leaves of the germinated Melissa officinalis in natural soils was on August 7 in the 2nd option, 34.9 percent (67 pieces), The completion of the formation of the first pair of chin leaves was 70.31 percent (135 pieces) on August 12. The beginning of the formation of the 2nd pair of chin leaves on August 18, 32.29 percent (62 pieces), the end of formation of the second pair of chin leaves was 72.91 percent (140 pieces) on August 21.

The lowest indicator of the beginning of the formation of the first pair of leaves of the germinated Melissa officinalis in biohumus soils belongs to the 4th option, 25.27 percent (68 pieces) compared to the day of August 7, 71.74 percent (193 units) were completed by August 15. The beginning of the formation of the 2nd pair of leaves was 21.93 percent (59 pieces) compared to August 18, and the end on August 25 was 70.63 percent (190 pieces).

For seedlings grown in natural soils, separate planting was carried out on August 31, for seedlings grown in biohumus soils, on August 20. Seedlings grown in natural soils were transplanted to the open field on September 10, and seedlings grown in biohumus soils were transplanted on August 30.

Option 6, in which seeds are sown on protected lands with 2.5 t/ha of humus and 0.5 g (192 seeds) of 30x50 cm (0.15 m^2) area, is considered the most optimal, it was observed that the seeds germinated early compared to other options, the formation of 1 and 2 pairs of leaves was significantly different from the seedlings of other options, and the seedlings were formed early in the process of separation. When transplanting

to an open field, the seedlings of the 6th option differ from those of the other options in that they are formed earlier, the seedlings are relatively strong (leaves and stems), and the root system is strongly developed.

The reason for the low seed germination rate in the 4th and 8th options is the large amount of seeds. Because a large number of seeds cannot absorb enough heat energy and water. The low output of the 1st and 2nd pairs of leaves is due to the development of the root system. In the experiment, the root system of plants in these variants is not well developed compared to other options. As a result of constant moistening of the soil, its density increased, the lack of soil air prevented the maximum development of root hairs. This, in turn, led to slow development phases after the exhaustion of seed nutrients and significantly delayed Melissa officinalis seedlings grown in humic soils.

Summary

Since plant seeds were grown in normal quantities in soil with good air, heat, and moisture permeability and low soil density (biohumus soil), the transition of seeds to development phases was accelerated.

In addition to these conducted experiments, the process of plant development was observed by planting plant seeds in open natural soils outside of the protected field environment. Germination started 15 days after sowing the seeds and the emergence of the 1st pair of leaves was completed after 32 days. This is due to external environmental factors, including relatively difficult to retain moisture, conditions of soil compaction, constant inconsistency of hot and cold temperatures (temperature increases during the day and temperature drops sharply at night), animals and other natural factors have negative effects on the development of the plant.

It can be seen that the use of 0.5 g of seed per 0.15 m^2 of protected and humus soil is effective for growing Melissa officinalis seedlings.

Aviable Literature:

1. Adinee J., Piri K., Karami O. Essential oil component in flower of lemon balm (Melissa officinalis L.) //American Journal of Biochemistry and Biotechnology. – 2008. – Т. 4. – №. 3. – С. 277-278. https://www.researchgate.net/profile/Omid-Karami-3/publication/26624870_Essential_Oil_Component_in_Flower_of_Lemon_Balm_Melissa_officinalis_L/links/545ab9f50cf2c46f664387bf/Essential-Oil-Component-in-Flower-of-Lemon-Balm-Melissa-officinalis-L.pdf
2. Bounihi A. et al. In vivo potential anti-inflammatory activity of Melissa officinalis L. essential oil //Advances in Pharmacological and Pharmaceutical Sciences. – 2013. – Т. 2013. https://www.hindawi.com/journals/aps/2013/101759/ .
3. Ebadollahi A., Ashrafi Parchin R., Farjaminezhad M. Phytochemistry, toxicity and feeding inhibitory activity of Melissa officinalis L. essential oil against a cosmopolitan insect pest; Tribolium castaneum Herbst //Toxin Reviews. – 2016. – Т. 35. – №. 3-4. – С. 77-82. https://www.tandfonline.com/doi/abs/10.1080/15569543.2016.1199572 .
4. Hilolakhan R., Rustam G., Alidjan I. DETERMINATION OF AMINO ACID AND VITAMIN CONTENT OF PHLOMOIDESNUDA AND PHLOMOIDESSPECIOSA (LAMIACEAE) SPECIES //Universum: химия и биология. – 2023. – №. 4 (106). – С. 69-73.
5. https://www.researchgate.net/profile/Natalya-Beshko/publication/322677195_Flora_of_the_Western_Tien_Shan_The_Chimgan_Mountains/links/5a687196a6fdcc03e0777d4c/Flora-of-the-Western-Tien-Shan-The-Chimgan-Mountains.pdf .
6. Mimica-Dukic N. et al. Antimicrobial and antioxidant activities of Melissa officinalis L.(Lamiaceae) essential oil //Journal of agricultural and food chemistry. – 2004. – Т. 52. – №. 9. – С. 2485-2489. https://pubs.acs.org/doi/abs/10.1021/jf030698a .
7. Moles A. T., Westoby M. Seedling survival and seed size: a synthesis of the literature //Journal of Ecology. – 2004. – Т. 92. – №. 3. – С. 372-383. https://besjournals.onlinelibrary.wiley.com/doi/full/10.1111/j.0022-0477.2004.00884.x .
8. Palma A. C., Laurance S. G. W. A review of the use of direct seeding and seedling plantings in restoration: what do we know and where should we go? //Applied Vegetation Science. – 2015. – Т. 18. – №. 4. – С. 561-568. https://onlinelibrary.wiley.com/doi/abs/10.1111/avsc.12173 .

9. Quvondiqova Z. S., Sh T. K., Suyundikov U. A. O'zbekistonning G'arbiy Chotqol (Chimgan) botanik-geografik rayoni florasidagi kiyiko't (Ziziphora L.) turlarining geografik tahlili //Ta'lim fidoyilari. – 2022. – T. 24. – №. 17. – C. 2-200. https://cyberleninka.ru/article/n/o-zbekistonning-g-arbiy-chotqol-chimgan-botanik-geografik-rayoni-florasidagi-kiyiko-t-ziziphora-l-turlarining-geografik-tahlili

10. Tokhirjon U., Ilyosjon Z. Medicinal Plants of the Lamiaceae Family in Namangan Region //International Journal of Scientific Trends. – 2023. – T. 2. – №. 4. – C. 24-31. https://scientifictrends.org/index.php/ijst/article/view/87.

11. Zokirjon o'g'li, Usmonov Toxirjon. "CHO 'L YALPIZ (ZIZIPHORA TENUIOR L.) O 'SIMLIGINING DORIVORLIK XUSUSIYATLARI." *Conferencea* (2023): 115-118. https://conferencea.org/index.php/conferences/article/view/1934 .