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# INNOVATIVE RESEARCH ON GERMINATION OF BASIL SEEDS (*OCIMUM* SPP.)

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***Abstract***

*Healing with herbs is as old as mankind. The connection between man and his search for remedies in nature dates back to the distant past, of which there is ample evidence. One of the plants often used for this purpose is the basil (Ocimum spp), a plant with multiple values: biblical, medicinal, ornamental, culinary and social. In this regard, research has been conducted on the optimal method of seed germination in this species. The tests were performed at the Vegetable Research and Development Station (SCDL) Buzau. The experiment involved the establishment of eight study variants, with three repetitions each. The results are statistically assured. Following the research on the germination faculty, it was found that in the variant where aghiasma (Holy water) was used for wetting the seeds, there was the highest number of germs of the species under observation. In conclusion, by establishing the optimal method of twinning basil seeds, producers will benefit from the economic efficiency of the crop, and the finished product will reach the final consumer at a low price and high quality.*

***Key words****: basil, germination, Holy water, production, quality.*

## INTRODUCTION

In Romanian: "Busuiocl"; in Hebrew: "Rihau"; in French: "Basil"; in English: "Basil", "Sweet basil", "Exotic basil"; in German: "Basilienkraut". Scientific name: *Ocimum basilicum* L. Family Lamiaceae. Popular name: sweet basil, borjolica, basil, mint, basil (Bojor O., Dumitru R., 2007). This plant has been cultivated for over 5000 years, so its origins are obscure. It is believed to originate from the Indian subcontinent, from there spreading to various regions of the globe (https://gradinaistorica.ro/busuioc/). Basil was cultivated in China as early as 800 BC (Enachescu G., 1984), to the east and by the Egyptians, Greeks and Romans, closer to us, and through the influence of these cultures it was extended, over time, to the less warm areas of the European continent (because it lends itself very well to growing in pots) (https://gradinaistorica.ro/busuioc/). This plant was brought to Europe by Charlemagne and was cultivated as a medicinal herb in the gardens near the monasteries. In the ancient pre-Christian cultures of the Near East, but especially in Palestine, basil was considered a holy plant, used for religious purposes, being preserved until the times of the Christianization of Europe (Borloveanu M., 2014). In our country we find it mostly in the rural area, cultivated in the gardens around the houses (Burnichi F., Vlad C., Strugariu C. G., Bebea P., 2014). In Romania, the exact period and area in which this plant was introduced for the first time is not known, but it is assumed that it would have entered our country around the century. XVI. Initially, basil was not found in organized cultures, but only sporadically, it being often used as a sacred plant in church worship. The water in which the basil is soaked acquires special properties. Phytoncides and volatile oil dissolved in water give it disinfectant, comforting, sanitizing properties (Vînătoru C., Mușat B., Bratu C., 2019). Basil is a valuable biblical, aromatic, ornamental, social and medicinal plant, widely used in both traditional and scientific medicine, in the perfume and food industry, in cosmetics, organic agriculture, as a companion plant, landscaping territory, and as a vegetable product it has a deep religious significance, serving as an object of worship. This paper aims to present in a synthetic manner the most

important implications of the species *Ocimum basilicum* in human concerns of all times, highlighting the potential of its use in various fields.

***Taxonomy***

The genus *Ocimum* is known as one of the most famous genera in the Lamiaceae family and currently comprises more than 150 species. Distribution is mainly in tropical regions. Recently, they have been cultivated worldwide as culinary herbs and for the extraction of essential oils. Taxonomic identification within the genus and between cultivars can be done by morphological characteristics such as leaf shape and color, flower and seed morphology. Numerous polymorphisms resulting from extensive cultivation and inter- and intra-specific cross-hybridization result in a wide range of subspecies, each with its own chemical composition and biological activity. In Romanian: "Busuioc"; in Hebrew: "Rihau"; in French: "Basil"; in English: "Basil", "Sweet basil", "Exotic basil"; in German: "Basilienkraut". Scientific name: *Ocimum basilicum* L. Family *Lamiaceae*. Popular name: sweet basil, borjolica, basil, mint, basil (Bojor O., Dumitru R., 2007). The term basil comes from the Greek language, βασιλευς (basileus) meaning "king", this plant is said to have grown on the site where the Emperors Constantine and Helena discovered the Holy Cross. The Oxford English Dictionary mentions some speculation that basil was used in "some royal salves or medicines". Basil is still considered the "king of spices" by many chefs and food book authors (https://ro.wikipedia.org/wiki/Busuioc).

The Lamiaceae family is one of the families with the largest number of species cataloged as aromatic plants, the classification of the genus *Ocimum* of which busuiocum is a part, undergoing changes over time due to various discoveries and increasingly precise taxonomic studies, the systematic classification within this genus thus becoming very complex (Upson and Andrews, 2004; Moja et al., 2016). *Ocimum basillicum* plants studied in the present paper have the following distinct morphological characteristics.

Kingdom: Plantae
Division: Magnoliophyta
Class: Magnoliopsida
Order: Lamiales
Family: Lamiaceae
Genus: *Ocimum*
Species: *basilicum*
(https://www.mdpi.com/2311-7524/8/2/144/htm)

***Biblical uses***

Basil (*Ocimum basilicum* L.) has always been considered a sacred plant. Precisely for that reason, only the basilisk had the right to pick it, associating this gesture with a ritual full of mystery. In India, where it originates, basil was raised to the rank of "sacred plant" (tulsi), being cultivated only in specially arranged places around sanctuaries. For the ancient Greeks, basil was the "king of plants" (https://www.gustos.ro/sfaturi-culinare/sa-mancam-sanatos/tot-ce-trebuie-sa-stii-despre-busuioc.html). Basil is not mentioned in the Bible. Similar to him would be, in the Old Testament, Hyssop, with which the sacrifices and the people were sprinkled as a sign of soul cleansing; it was believed to bring good luck to a person's home. Even today, mothers in rural communities perfume the shirts of young men with basil, and girls, on the eve of the Baptism of the Lord, put basil under their pillow to dream of their lover. The essential oil of basil (Basil Oil) enters as an ingredient in the preparation of the Holy and Great Mir (Bojor O., Dumitru R., 2007). Basil is also used in the process of sanctifying water. In general, the priest immerses a cross and a basil sprig in a vessel of water, this procedure, followed by a church order, specific to the sanctification of water, causes the water to be transformed, by the descent of the Holy Spirit, into aghiasma. Also with this plant, the priest sanctifies people's houses, icons, objects of worship, cars, and last but not least, the person is sprinkled, to cleanse the body and soul. From our grandmothers we inherited the habit of asking the priest for a few sprigs of basil to be placed on the icons, to decorate and venerate them. And the Holy Sacrament of baptism is performed by sprinkling the baby with the bunch of basil soaked in water, also at this Holy Sacrament the basil is used together with the child's diaper to be sprinkled for cleansing. From the "sacred grass" to the "magical one" it was not a long way. People have invented all kinds of customs related to the power given by

eating or simply touching basil. Beyond rituals and superstitions, basil is also used in Orthodox rituals (https://www.gustos.ro/sfaturi-culinare/sa-mancam-sanatos/tot-ce-trebuie-sa-stii-despre-busuioc.html).

***Social uses***

When it comes to the social uses of basil, we are talking about traditions and customs related to this herb. One of the most widespread customs, carried out with the help of basil, is the one that takes place on Epiphany night. That night, the young girls who wanted to dream of their bear had to tie a red silk thread and a piece of basil on their ring finger, then, as when they went to bed, after having previously fasted with a black or harsh fast, they put sprigs of basil under the pillow (https://www.crestinortodox.ro/datini-obiceiuri-superstitii/traditii-obiceiuri-boboteaza-68744.html). In the child's first bath, basil was compulsorily placed, so that the newborn would be loved and honest, as basil is, and smell nice. Another custom by which young, unmarried girls can find out their chosen one is to put basil at the well guides, and if the next day they find the basil with a prom, then they will get married that winter (Tudor P., 1914). Most often, however, basil appears in wedding customs. In the Apuseni Mountains, but also in other parts, the bride and groom's crowns were made of sasau (known in Moldova as barbănoc) and basil. When leaving the house, the dance, also called "Basil", was played, accompanied by shouts that indicate the magical function of the dance: "Three times after the meal, / May the evil leave the house, / May the good remain, / May the youth live" . When she left her parents' house, the bride held in her hand a bunch of basil wrapped in a beautifully sewn scarf, which she twirled three times above her head, so that the other girls of her age would also marry. In the north of Moldova, brides, when going to the wedding, girded themselves with basil and put it in their breasts, to enjoy the honor enjoyed by basil. In the south of the country, before the wedding, the bride went to the well with two boys, whose parents were both alive. From home to the fountain they stopped three times and played three dances. Then he took water from the well in the small pot and put basil in the water. On their way back, they also danced three times around the donut with water and basil. When the groom arrived with his groomsmen, they were sprinkled by the bride and groom with basil soaked in water and, finally, they poured the water on their feet. Basil was placed in the pillow on which the bride and groom would sleep. In Ialomiţa county, the bride, accompanied by a boy or two and fiddlers, brought a bowl of water, decorated with basil, and placed it next to the wedding tree. Water was played around the tree, and when the groom and the bride arrived, the bride sprinkled them three times with the basil soaked in water. And the great mother-in-law, when she welcomed her daughter-in-law, among other symbolic objects, also had a sprig of basil (Costin Costin C., 2021).

***Ornamental and landscape uses***

Basil can be used fresh in floral arrangements or dried, to make various design objects (Morales M.R., Simon, J.E., 1997). Basil is a decorative, annual plant native to India. Alone or in a combination of varieties, basil is used to decorate yards and gardens. If it is grown in the garden, it can grow up to 50-60 cm high, and if it is grown in the planter, it remains shorter, 20-30 cm high (https://www.agrodenmar.ro/busuioc-rosu).

The main four decorative varieties of basil that are part of the collection of the Buzau Vegetable Research-Development Station are: *Ocimum basilicum* L. var. *violaceum* hort. *Purple Seraphim basil*, *Ocimum basilicum* L. - Basil Scented with Buzău, *Ocimum basilicum* var. *citriodorum* - Macedon lemon-flavored basil, *Ocimum basilicum* var. *minimum* L.- The 'Smarald' dwarf basil variety.

***Medicinal uses***

Medicinal plants are increasingly widely cultivated to meet the high demand for natural remedies. These species are generally cultivated in the open field, which results in a large variability from year to year, both in biomass production and in the content of active principles (R. Maggini, C. Kiferle, L. Guidi, A. Pardossi, A. Raffaelli, 2012). Basil (*Ocimum basilicum* L.) is an annual plant native to India that has been cultivated for several millennia for its culinary and medicinal uses (P. Pushpangadan, V. George, 2012).

Basil has traditionally been used as a medicinal herb for various purposes, such as headaches,

coughs, diarrhea, constipation, intestinal worms, and kidney dysfunction. It is also considered a stomachic antispasmodic, carminative, antimalarial, febrifuge (Wome, 1982; Giron, 1991). Essential oils are a diverse group of natural products that are important sources of aromatic and flavoring chemicals in food, industrial and pharmaceutical products. Essential oils are complex mixtures of volatile compounds particularly abundant in aromatic plants, composed largely of terpenes and aromatic phenylpropanoid compounds. The essential oil composition of plants varies and is due to genetic and environmental factors. Due to their chemical composition, essential oils possess numerous biological activities (antioxidant, anti-inflammatory, antimicrobial, etc.) of great interest in the food and cosmetic industry, as well as in the field of human health. (Bernath, 1986). The essential oil content of plant tissue also varies with developmental stage (Burbott and Loomis, 1967) and may vary with extraction methods (Guenther, 1972). The chemical composition of flowers, leaves and stems of basil (*Ocimum basilicum* L.) was analyzed by gas chromatography (GC) coupled with mass spectrometry (GC-MS). The components identified constituted 99.03%, 95.04% and 97.66% in oils from flowers, leaves and stems, respectively. The main constituents of essential oils from flowers, leaves and stems were estragole (58.26%, 52.60% and 15.91%) and limonene (19.41%, 13.64% and 2.40%) and p - cumin (0.38%, 2.32% and 2.40%). Apiol (50.07%) was identified as the highest major constituent for the strain. This was followed by estragole (15.91%) and exo-phenyl acetate (6.14%). Minor qualitative and major quantitative variations for some essential oil compounds were determined in relation to different parts of *O. basilicum*. The chemical composition of different parts of basil oils has been reported to be highly variable. It is known that specific chemotypes of estragole are also known (Jean-Claude Chalchat, Mehmet Musa Özcan, 2008). Essential oils, as sources of natural products, represent an alternative to synthetic antioxidants and antimicrobial agents in the food and pharmaceutical industries, alternative medicine and natural therapy. Basil (*Ocimum basilicum* L.) belongs to the Lamiaceae Family, which, in addition to being used as a spice, is also known as a powerful antibacterial, antimutagenic and chemopreventive medicine. The antioxidant activity of the essential oil was investigated spectrophotometrically by the DPPH test and the antimicrobial activity using the agar diffusion method on the following microorganisms: *Escherichia coli*, *Listeria monocytogenes*, *Salmonella enterica*, *Staphylococcus aureus*, *Pseudomonas aeruginosa*, *Bacillus cereus*, *Providencia stuulii*, *Providencia stuartii*, *Streptococcus* group D, *Salmonella* spp. and *Candida albicans*. The results obtained proved the presence of 65 components, with the highest content of linalool (31.6%) and methyl chavicol (23.8%). The essential oil showed the best antioxidant properties after 90 minutes of incubation with an EC50 value of 2.38 mg/ml. The oil showed the best coagulase-positive antimicrobial activity on staphylococcus. The chemical composition, antioxidant and antimicrobial activity of the investigated basil essential oil indicate a significant phytomedical potential (Ljiljana P. Stanojevic, Zeljka R. Marjanovic-Balaban, Vesna D. Kalaba, Jelena S. Stanojevic, Dragan J. Cvetkovic & Milorad D. Cakic , 2017).

***Culinary uses***

Basil is one of the most popular culinary herbs in North America (De Baggio and Belsinger, 1996). Basil is one of the most popular and useful culinary herbs due to its delicate aroma and fragrance. Cultivation methods vary depending on the part of basil used (fresh or dried leaves, essential oil, seeds, processing for industrial purposes and the climatic conditions in which it is grown. The main forms of use of the different types of basil are: fresh basil, frozen, dried, essential oil, medicinal and other uses (Raimo H., Yvonn H., 2005). In Mediterranean cuisine, basil is a highly valued spice. Fresh or dried, it is used in tomato sauces and white sauces, with which they eat pasta, pizza and some salads. Also, basil is highly appreciated, especially in Asian cuisine, as a flavoring in fruit salads, compotes and even jams. Added to salads, basil is combined with parsley leaves, mint, with finely chopped tomatoes and lettuce leaves In North Africa and the Middle East, an energy drink is prepared by

putting a liter of water, four tablespoons of honey and 1-2 dried basil sprigs in a bottle. Everything is left to macerate for 12 hours, after which the obtained preparation is filtered and drunk in several installments (Tudor I., Formula AS, 2019).

## MATERIALS AND METHODS

In order The four main decorative varieties of basil that are part of the collection of the Vegetable Research and Development Station Buzau are: *Ocimum basilicum* L. var. *violaceum* hort. Purple basil Seraphim, *Ocimum sanctum* Linn. - Holy basil, *Ocimum basilicum* var. *minimum* L. - 'Smarald' dwarf basil variety.
Purple basil variety 'Serafim' (Figure 1)
Species: *Ocimum basilicum L.* var. *violaceum* hort. - Semi-early variety, suitable for cultivation in the greenhouse, solarium, field, pots, for food, seasoning, ornamental-decorative; the shape of the bush is semi-erect, strongly branched.

Figure 1. *Ocimum basilicum* L. var. *violaceum*

The variety is highlighted by the special color of the foliage, purple-purple, pink-purple flowers and the specific aroma, mentholated, released by all the organs of the plant, especially the leaves and inflorescences.
Plant height: 60-70 cm, medium-rich foliage, with slightly serrated leaves, purple-purple color due to the high content of anthocyanins.
Resistant to specific diseases and pests.
Production capacity: over 12 t / ha average production of shoots, fresh substance. It can be grown all year round in heated sheltered areas or in pots.
It is recommended to establish the culture by seedling. Suitable variety in organic farming. It is sown between March 1-10, for field cultivation, emerges after 6-7 days and is planted at the end of April.
It is harvested in stages, from the beginning of the bush formation until the arrival of its total frost, at the technical or physiological maturity (Burnichi F., Vlad C., Strugariu C. G., Bebea P., 2014).

'SMARALD' dwarf basil variety (Figure 2)
*Ocimum basilicum* L. var. *minimum* - Semi-early dwarf basil variety obtained from S.C.D.L. Buzau, approved in 2021.
Annual plant, with average plant height 20 cm, average diameter of the bush 20 cm, globular plant shape, branched, dense bush. The foliage is small - rich, with slightly sharp leaves, the shape of the leaf tongue - elliptical.
The color of the leaves is emerald green, without anthocyanin coloration on the upper side of the tongue of the leaf. The flower has a white corolla. Flowering period - with the beginning of summer. The seeds are 2/1 mm elliptical, slightly blackish brown, matte.
The mass of 1000 seeds is 1.3 g, and in one gram there are 750 seeds. Pollination is free, entomophilic. It can be successfully grown both in pots and in protected areas and in the open field.
The production of fresh grass is 6-8 t/ha.
The variety is resistant to specific diseases and pests, the crop not registering 8 losses. Average seed storage capacity (3-4 years) without diminishing the germination capacity too much.
It is an aromatic, spicy, medicinal and ornamental plant - decorative. It is cultivated by direct sowing and by seedlings, the optimal planting distance being 20 cm between plants per row and 20-30 cm between rows.
It is used in the food, cosmetics and complementary medicine industries, and there is the possibility of its use in the perfume industry due to its specific, slightly pleasant, slightly mentholated aroma. It is suitable for growing in pots, being recommended for purifying the air in the rooms.
It can be cultivated in an ecological system, being insect repellent (authors: Floarea

Burnichi, Toma Dumitru Mitel, Staicu Bogdan Gabriel, Petre Constantin) (Figure 4).

Figure 2. *Ocimum basilicum* L.var. *minimum*

*Ocimum sanctum* Linn. - Holy Basil (Figure 3)

Holy basil is an important medicinal and religious plant closely related to the basil we use for cooking. *Ocimum tenuiflorum* is closely related to culinary basil (*Ocimum basilicum*), but differs in being a short-lived perennial with smaller flowers. Commonly known as holy basil or tulsi and tulasi in South Asia, it is an important sacred plant in Hinduism and, as with many plant species used in Asia, the religious uses are often linked with the medicinal uses. Historically, holy basil was frequently grown in large vessels in the courtyards of Hindu forts and temples to cleanse the body. One of the plant's synonyms, *Ocimum sanctum*, reflects this religious connection.

Holy basil is an aromatic, perennial herb up to 1 m tall, sometimes purplish in colour.

The leaves are elliptic (narrow oval) in shape. The fruits have four small brown nutlets,

which, unlike basil, do not produce a lot of mucilage when wet.

Figure 3. *Ocimum sanctum* Linn. - Holy Basil

| Nr. crt. | Period | Work | Execution mode | | Remarks |
|---|---|---|---|---|---|
| | | | Quantities per hectare | Used | |
| 1 | oct. – nov. | land preparation | - discussed the previous culture;<br>- basic fertilization with phosphorus 40-50 kg / ha s.a. and potassium 30-40 kg / ha s .;<br>- plowing 28-30 cm deep | - disc harrow G.D.-3.2;<br>- M.A. amendment spreader. –3.5;<br>- PRN-3 reversible plow | |
| 2 | mar. – apr. | preparation of the germination bed | - fertilized with 40 kg nitrogen, etc .;<br>- discussed;<br>- modeling the ground in raised furrows with a crown width of 104 cm + sowing - 4 kg of seed | - M.A. amendment spreader. –3.5;<br>- disc harrow G.D.-3.2;<br>- multifunctional aggregate 1.4 - made at S.C.D.L. Buzau, who performs both works in a single pass | - sowing scheme 11 + 18 + 18 + 18 + 18 + 11 x 4 15 cm => 250000 pl. / ha<br>Sowing is done when the average daily temperatures are 15 C. |
| 3 | apr. – mai | thinning | - when the plants are 6-8 cm tall, thinning is done, which coincides with the first manual pruning | - manual | |
| 4 | apr. – aug. | Watering | - 300-400 m3 of water, 4-5 times | - manually, on long furrows | |
| 5 | apr. - aug | hoeing | - 4-5 times, to restore the gutters after irrigation | - vegetable grower C.L. –1.4 | - watering, aerating, phytosanitary treatments, fertilizers |
| 6 | apr. – aug. | prăşit | - de 2-3 ori pe rând | - manual | |
| 7 | mai – aug. | disease and pest control | - treatments with specific pesticides | - M.P.S.P.-3.3 spraying and dusting machine | *- against: cercosporiosis, root rot, wireworm. It is good to avoid the attack of diseases and pests through cultural hygiene, higher agrotechnics, respect for crop rotation* |
| 8 | aug. - sept. | harvesting | - 1000-1200 kg of fresh grass | - manual, with sickle | - harvesting is done at the beginning of the opening of the flowers on the main inflorescence, after 10 o'clock, in clear weather |

Figure 4. Basil cultivation technology sheet - used at S.C.D.L Buzău

The experiment involved performing a germination test with eight study variants, in three repetitions for each variety studied, differing as follows:

V1 - Water (control);

V2 - Infusion (concentration 25 g plant/ 250 ml water);

V3 - Decoction (concentration 100 g plant/1000 ml water);

V4 - Infusion (concentration 25 g plant/ 500 ml water);

V5 - Decoction (100 g plant/2000 ml water);

V6 - Holy water;

V7 - Peat + water;

V8 - Peat + holy water.

The seeds from each repetition were placed for germination on the surface of a layer of filter paper (S), which at wetting (in equal quantities per variant) was about 2 mm thick, in Petri dishes, in the V7 and V8 variants the seeds were placed for germination on peat substrate.

Figure 5. Aspects during the experiment

Figure 6. Aspects during the experiment

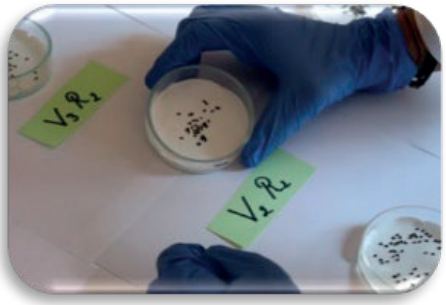


Figure7. Aspects during the experiment

In order to meet the requirements of germination, the moisture content of the germination substrate must be sufficient at all times, but not in excess. The studied seeds were moistened with equal amounts of liquid, avoiding variation between results.
The seed temperature was 25°C.
The results were statistically assured.

## RESULTS AND DISCUSSIONS

| SMARALD BASIL GERMINATION TEST | | | | | | | |
|---|---|---|---|---|---|---|---|
| NR. CRT. | Variant | | | | t | P% | MEANING |
| | | | | | | | |
| 1 | V1 Mt. | 20,33 | 100,00 | 0,00 | 0,00 | 92,00 | |
| 2 | V2 | 23,67 | 116,39 | 3,33 | 2,51 | 2,50 | * |
| 3 | V3 | 21,00 | 103,28 | 0,67 | 0,50 | 62,40 | |
| 4 | V4 | 22,00 | 108,20 | 1,67 | 1,25 | 24,80 | |
| 5 | V5 | 25,00 | 122,95 | 4,67 | 3,51 | 0,32 | ** |
| 6 | V6 | 26,00 | 127,87 | 5,67 | 4,26 | <0,10 | *** |
| 7 | V7 | 16,00 | 78,69 | -4,33 | -3,26 | 92,00 | |
| 8 | V8 | 19,67 | 96,72 | -0,67 | -0,50 | 92,00 | |
| | x mediu | 21,71 | | | | | |

Figure 8. Test values regarding the germination of 'Smarald' basil seeds

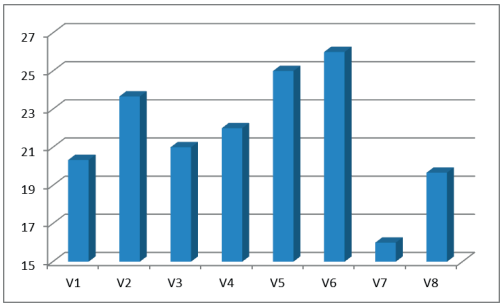


Figure 9. Graphic representation regarding the germination of 'Smarald' basil seeds

Following the research carried out in the Laboratory of Physiology, Agrochemistry and Ecological Cultures, from the Buzău Vegetable Research and Development Station, on the seeds of *Ocimum basilicum* var. *minimum* L.- The dwarf basil variety 'Smarald' was found that in the variant V6 - Sanctified water there were very significant differences, having the highest number of germs, compared to the variant V1 - Water (control). Distinctly significant differences were found in variant V5 - Decoct (100 g plant/2000 ml water), compared to the control, and significant differences were found in variant V2 - Infusion (concentration 25 g plant/250 ml water), compared to control variant, the other study variants showing insignificant differences.

| TEST GERMINAȚIE BUSUIOC SFÂNT | | | | | | | |
|---|---|---|---|---|---|---|---|
| NR. CRT. | Variant | | | | t | P% | MEANING |
| | | | | | | | |
| 1 | V1 Mt. | 42,67 | 100,00 | 0,00 | 0,00 | 92,00 | |
| 2 | V2 | 38,67 | 90,63 | -4,00 | -2,07 | 92,00 | |
| 3 | V3 | 41,00 | 96,09 | -1,67 | -0,86 | 92,00 | |
| 4 | V4 | 45,00 | 105,47 | 2,33 | 1,21 | 24,80 | |
| 5 | V5 | 45,00 | 105,47 | 2,33 | 1,21 | 24,80 | |
| 6 | V6 | 42,67 | 100,00 | 0,00 | 0,00 | 92,00 | |
| 7 | V7 | 11,33 | 26,56 | -31,33 | -16,24 | 92,00 | |
| 8 | V8 | 28,00 | 65,63 | -14,67 | -7,60 | 92,00 | |
| | x mediu | 36,79 | | | | | |

Figure 10. Test values regarding the germination of Holy basil seeds

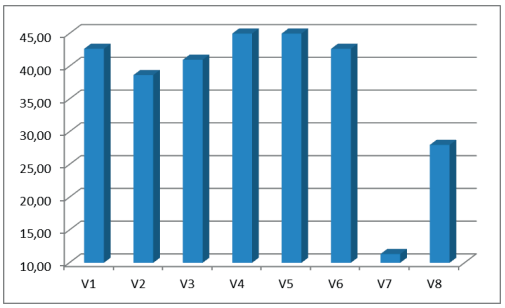


Figure 11. Graphic representation regarding the germination of Holy basil seeds

Following the research carried out in the Laboratory of Physiology, Agrochemistry and Ecological Cultures, from the Buzău Vegetable Research and Development Station, on the seeds of *Ocimum sanctum* Linn. - Basil, it was found that in variants V4 - Infusion (concentration 25 g plant/500 ml water) and V5 - Decoction (100 g plant/2000 ml water) were the highest values for the number of germs, compared to the variant V1 - Water (control), but the differences were not significant. The other variants in the studio showed lower values than the control.

| TEST GERMINAȚIE BUSUIOC SERAFIM | | | | | | | |
|---|---|---|---|---|---|---|---|
| NR. CRT. | Varianta | | | | t | P% | SEMNIFICATIA |
| | | | | | | | |
| 1 | V1 Mt. | 20,67 | 100,00 | 0,00 | 0,00 | 92,00 | |
| 2 | V2 | 20,00 | 96,77 | -0,67 | -2,42 | 92,00 | |
| 3 | V3 | 20,67 | 100,00 | 0,00 | 0,00 | 92,00 | |
| 4 | V4 | 22,00 | 106,45 | 1,33 | 4,84 | <10 | *** |
| 5 | V5 | 21,33 | 103,23 | 0,67 | 2,42 | 3,00 | * |
| 6 | V6 | 25,33 | 122,58 | 4,67 | 16,94 | <10 | *** |
| 7 | V7 | 22,33 | 108,06 | 1,67 | 6,05 | <10 | *** |
| 8 | V8 | 20,67 | 100,00 | 0,00 | 0,00 | 92,00 | |
| | x mediu | 21,63 | | | | | |

Figure 12. Test values regarding the germination of 'Serafim' basil seeds

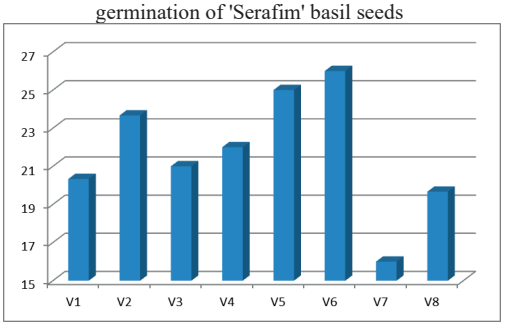


Figure 13. Graphic representation regarding the germination of 'Serafim' basil seeds

Following the research carried out in the Laboratory of Physiology, Agrochemistry and Ecological Cultures, from the Buzău Vegetable Research and Development Station, on the seeds of *Ocimum basilicum* L. var. *violaceum hort*. Purple basil 'Seraphim' was found that in the variant V6 - Sanctified water there were very significant differences, having the highest number of germs, compared to the variant V1 - Water (control). Very significant differences were also recorded in the variants V4 - Infusion (concentration 25 g plant/500 ml water) and V7 - Peat + water compared to the control. In the variant V5 - Decoct (100 g plant/2000 ml water) significant differences were found compared to the variant V1 - Water (control), the other study variants showing insignificant differences.

## CONCLUSIONS

The following conclusions can be drawn from the research:

- For the establishment of innovative cultivation technologies for *Ocimum basilicum* we must have the optimal method of germination.
- From the tests performed in the Laboratory of Physiology, Agrochemistry and Ecological Cultures, from the Vegetable Research and Development Station Buzău, regarding the germination of the seeds of the three basil varieties, it was found that the 'Smarald' basil seeds germinated in large numbers in the experimental variant V6, compared to the control variant. The same was found in the test carried out with 'Serafim' basil seeds. Holy basil seeds germinated well in the experimental varieties V4 and V5, but with a value very close to them was the study variety V6.

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