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FACTORS AFFECTING QUALITY IN THE PRODUCTION OF ORGANIC PRODUCTS FROM BUDS AND FRUITS OF CAPERS (CAPPARIS SPINOSA)

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Abstract
The article provides practical and theoretical information on agrotechnologies for the cultivation of the medicinal plant Caper (Capparis spinosa), the yield of buds and technically ripe fruits in the cultivation of organic products, the factors affecting product quality, 2018 and the results of the 2020 experiment are described and the necessary conclusions are given.

Keywords and phrases: Caper, activated charcoal, buds, fruit, sorting, washing, marinating, salt, spices, sterilization, pasteurization.

Introduction

Capparis spinosa is a common shrub that grows in Mediterranean regions in cultivated and non-cultivated forms. [4; 17]. In the world, more than 650 species are found, its originated place is considered as Western or Central Asia [2] Today, wild varieties and civilized sorts of the caper plant are grown in small areas in France, Spain, Italy, Turkey, Iran, Georgia, Azerbaijan, North America, and Africa, where they are used to make salted canned goods [7]. According to historical sources and research scientists Hillman and Hansen (1989-1991), the assimilation of the kavar plant by humans goes back a very long time. Archaeological finds from the Paleolithic period in ancient Egypt suggest that Capparis spinosa was consumed by humans 17,000 years ago [5; 6]. According to Renfrew and Jiang et al, the seeds of Capparis spinosa are originally found in Tell es-Savwan (Iraq, 5800 BC) and in the Yanghai tombs (2800 BC) in the Turpan district of Xinjiang, China [16], According to M. Zohary, Capparis spinosa in the Middle East is interpreted as a natural flora distributed in Africa and Southwest Asia [22], Van and Bakker-Jerez, According to Sozzi, the fruits of sapparis spinosa have been used in Tell es Swaikhat-Syria since the ancient Greeks, Hebrews and Romans, and the consumption of pickled buds dates back to the Bronze

Age [21; 20], According to M. Jacobs, the sapparis spinosa plant has been distributed by humans to the territories of Malaysia and Australia. [8]

Naturally growing caper plant species in different regions and soil conditions of the country grow well in steppe and desert regions according to their biological characteristics, and in these conditions they grow for 10-15 years at the expense of natural moisture. The yield of 10-12 t/ha was studied.[11; 14; 18] (1995-2021). Experiments were conducted in different soil conditions of Namangan region to study the impact of fertilizer types and standards on the growth and development of caper plant, yield, product quality. [3]

Caper cultivation began in the 1970 s in Spain and Italy. Worldwide, caper production averages 15,000 to 20,000 tons a year and is processed and canned in more than 60 countries around the world. Turkey and Morocco are the world's leading caper producers and exporters [13]. Caper plant has been used as a medicinal plant since ancient times and used for medicine by folks [1], According to the data, in 2019, 5,000 hectares of land around the world will be planted with varieties and varieties of kavar as a vegetable crop, with an average yield of 30-40 s/ha. According to Mahmoud Babili, more than 60 countries are participating in trading caper products, the amount of trade is growing 6% per year. [9], Capers is also used in Mediterranean countries cuisine, including Turkey, Greece, Spain, Italy, Morocco and especially applied to wine sauce and salads [13] The seeds contain protein, oil and fiber in a huge amount and its roots rich in minerals [15], 150 species of Caper have been identified, of which 2 species Carraris spinosa and Carraris rosanova grow naturally in Uzbekistan. [19] The root of the plant goes to a depth of 10-12 meters, the stem is horizontal, thorny, the flower is large white or pink, a perennial vegetable plant. Cultivated varieties and agro-techniques of its cultivation, chemical composition of fruits, their importance in the food and pharmaceutical industries, methods and technologies of processing are not fully studied. [10]

Materials and Methods

The amount of humus in the soil (Tyurin), the amount of total nitrogen (Tyurin and Kononov), phosphorus (Mochigin), the amount of potassium were determined plotenno photometrically in the conditions of the central laboratory of scientific diagnostics.

For high yields of vegetable crops, depending on the type of crop and soil cartogram, 25-30 t / ha of organic fertilizers and 100-120 kg of nitrogen, 200-300 kg of phosphorus and 50-60 kg of potassium fertilizers are applied. During the growth and development stages of plants, various chemicals are used to control pests, diseases

and weeds. As a result of the chemicals used, the beneficial microflora and microorganisms that actively participate in the life of plants and ensure the natural fertility of the soil are destroyed and they are not regenerated. The resulting organic fertilizer does not turn into humus. Mineral fertilizers are only 45-50 percent beneficial to the plant, and the rest form salt cations in the soil, gradually leading to salinization or secondary salinization of the soil. Under such conditions, the quality of the products is low, and during storage, vegetable products can lose up to 55-60% due to various diseases.

The use of biological fertilizers, including biohumus fertilizer, to improve soil reclamation, increase soil fertility and increase productivity is advisable to ensure the production of relatively environmentally friendly products. Organic fertilizers and compost used in agriculture can increase yields by 1.2-1.3 s / ha. Biohumus fertilizer increases the yield by 15-20 s / ha. This relative difference is explained by the fact that biohumus fertilizer is prepared using California worms by processing organic fertilizers, plant residues, various product wastes, and soil mixtures. It poisons the worms, nematodes, microbes and fungi in the mixture by releasing various enzymes and gases during the recycling process, and enhances the antibiotic properties of the recycled fertilizer. As a result, the plant absorbs it more easily and increases its productivity. In the soil, the exchange of air, moisture and heat is activated, and fertility begins to grow naturally. Due to the fact that biohumus contains 30% humus, 1-3% nitrogen, 1-5% phosphorus, 1.2-1.4 potassium and 2-5% calcium, the need for plant mineral fertilizers is not felt. Biohumus fertilizer significantly increases the yield of vegetables as it ensures normal growth and development of the plant [12]

Three different variants and three iterations were performed to study the nutrients in the soil. In this case, 0-20 to 100-120 cm from the areas fed with organic fertilizers and biohumus in the experimental variants, without control fertilizers; 20-40; 40-60; soil samples were taken from depths of 60-80 and 80-100 cm.

Results

The soil sample before sowing of caper plant seeds contained 1.165-1.560%, and at a depth of 100 cm it contained 0.200-0.223% humus, 1.110-0.148% nitrogen, 0.170-0.176 phosphorus and 1.181-1.1900% potassium. It was observed that this amount of nutrients was sufficient for the growth of the caper plant and was insufficient for its development (harvested branches, buds, flowers and fruits).

Biometric indicators of the plant growing in such natural conditions, the main horn of the plant is 35-40 cm, the side branches are 15-20 cm, the leaf surface is 160-200 cm^2, the number of fruits is 4-8 observed.

A number of studies have been conducted on the basis of a set program to cultivate caper plants, increase productivity and product quality. An area of 1.0 hectares was used for each option. Phenological observations were performed regularly for three years.

The control variant yielded up to 8.0 tons, with a yield of 64.0%; In the experimental variant of organic fertilizer, 16.3 t / ha, of which up to 80.3% was produced. This indicator is 3.0-3.2 t / ha in the case of biohumus fertilizer with a yield of 19.2 t / ha, which increases the yield of the product by 94.7% and 12.9% compared to the control. detected. (See Table 1)

Table 1. Influence of types and norms of fertilizers on crop yield and quality (Uzbekistan-20) 2018-2021.

Option	Planted area, ha	Fertilizer rate, t/ha	The yield obtained, t/ha	This is a branded product		The difference with respect to control, +-
				%	t	
Fertilizer (control st)	1.0	-	8.0	64.0	5.1	-
Organic fertilizer	1.0	20.0	16.3	80.3	13.1	+8.0
Biogumus	1.0	3.0	19.2	94.7	18.0	+12.9

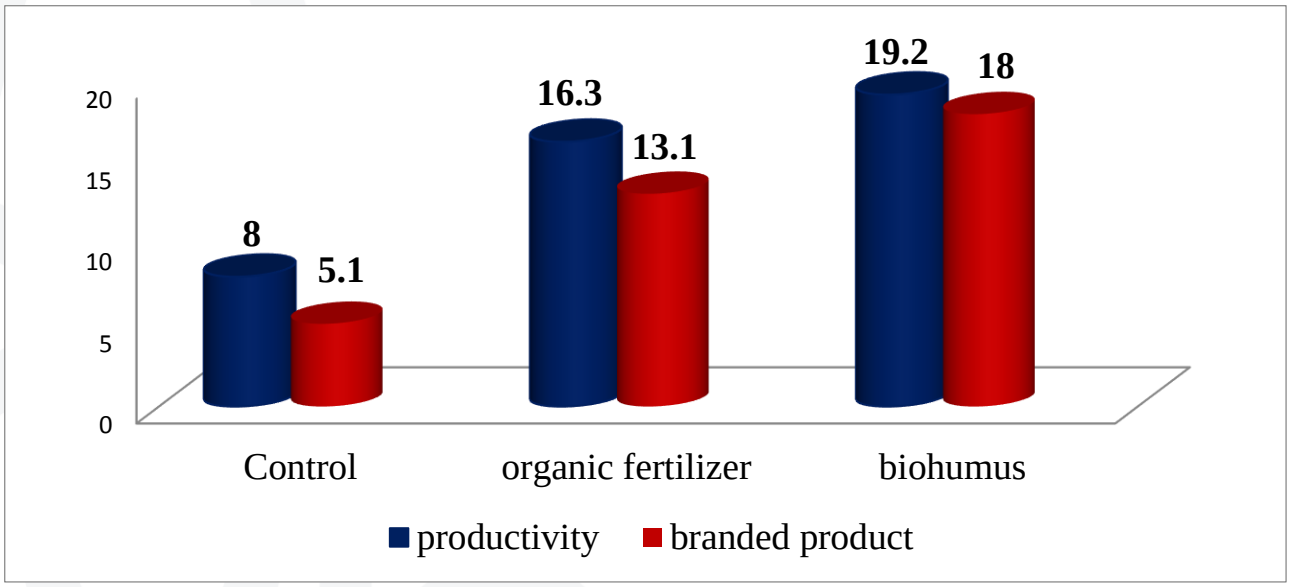

Figure 1. Influence of fertilizer types and norms on kavar plant yield and quality.

Research has shown that capers are just as demanding of organic and mineral fertilizers as other vegetable crops. Under these conditions, the plant can grow up to 180-200 cm in height, and the viability and productivity of the stems are high.

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The use of organic and biohumus fertilizers for the cultivation of caper plant was considered expedient, and the yield was found to be 11-12 t/ha higher than the variant grown without fertilizer.

To study the effect of the yield of the caper plant and the marketability of the fruit on the quality of the canned product, three biometric observations were performed in two variants.

For the control variant, the method of cultivating the soil under natural conditions was used, and in the experimental variant, the method of wire combing of plant stems was used. The number of seedlings cared for in both variants was 27-28 thousand bushes, which were cared for in 90x30 cm schemes.

According to the results of the study, the yield in the control variant was 18.3 tons, of which 45.6% was suitable for processing and 54.4% for non-standard products. In the experimental variant, due to the fact that the plant stem was comb, the yield was 20.6 tons due to the uniform exposure of sunlight, and the product suitable for processing was 40% (87%) higher than the control variant. (See Table 2)

Table 2 Influence of care methods on kavar plant yield and quality indicators.

Option	Planted area, ha	number of seedlings, thousand bushes	Productivity, t / ha	hence			
				branded product		non-standard product	
				%	т	%	т
A method of cultivating the soil under natural conditions	1.0	28.0	18.3	45.6	8.3	54.4	10.0
Combing	1.0	28.0	20.6	85.7	17.7	14.3	2.9

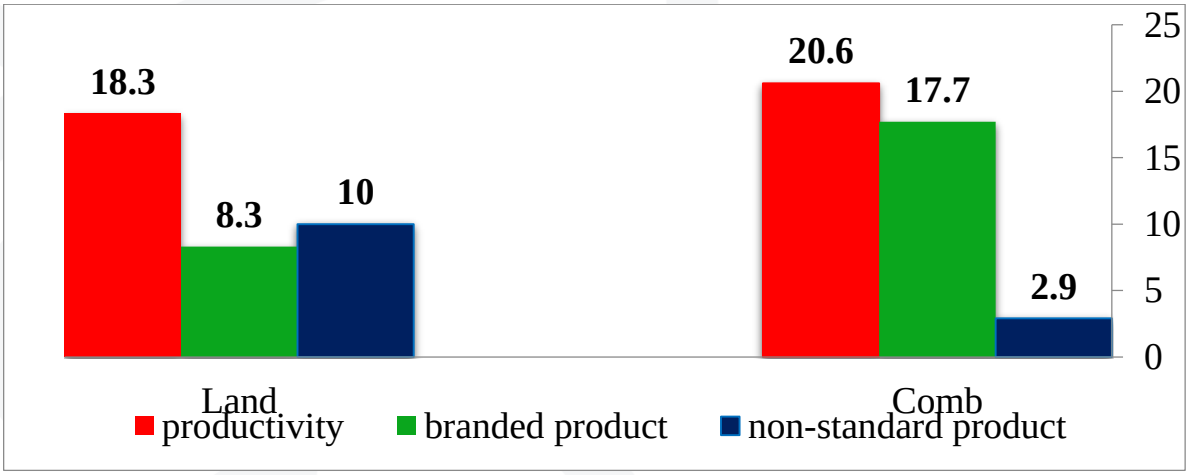

Figure 2. Influence of care methods on kavar plant yield and quality indicators.

According to the results of this study, in order to get a high yield from the caper plant and increase the marketability of the product, it was found that lifting and combing

the plant to a height of 70-80 cm above the ground according to its biological and physiological properties is very effective.

According to the soil and climatic conditions of the Republic of Uzbekistan, the caper plant bolls and blooms in the first ten days of May, and in the second ten days it forms fruit buds. During these phases, it has been observed that caterpillars can damage the crop by 55-60% due to the nectar in the fruit and nectar formed on the fruit when the plant is grown in the ground.

No such cases were observed when the caper plant stems were grown using the methods of lifting from the ground, but the fruits that were not harvested in time entered the biological ripening phase and reached 18-21 grams and the non-standard yield was 14.3% (2.9 t /ha) of the total yield.

Based on the results of this study, it was found that the method of combing is highly effective in the cultivation of caper.

To study the impact of irrigation norms on caper plant yield and quality indicators, a crop grown culturally in soil climatic conditions of Namangan region in 2018-2021 was used.

The caper plant belongs to the group of vegetable plants and is distinguished by its drought tolerance. It uses less water because its leaves are coated with hard and thin lipid oil. This ensures that the plant grows and develops properly. However, the yield of plants grown under such conditions was lower than that of irrigated plants. Several studies have been conducted to study these theoretical and practical concepts from a scientific point of view. To do this, in the control option, a plant area that grows due to natural moisture was selected. For the experimental variants, biometric parameters such as plant growth, development, yield, and product viability were studied in three different variants, three repetitions, i.e., 5,000, 8,000, and 10,000 m^3 during the growing season, based on irrigation systems.

Despite the fact that the planting schemes are homogeneous (90x30 cm), the number of available seedlings in the control option is 18.0 thousand bushes, the average height of existing seedlings is 68-70 cm, the weight of fruit on a single plant Although 450 grams, the total yield was found to be 9.5–10.0 t / ha lower than in the experimental variant. This difference is due to the lack of seedlings and the large size of the fruit, which grows sparsely.

In the existing areas of the experimental options, there are an average of 25-26 thousand seedlings, and when irrigated during the growing season from 5000 m^3, the plant grows to an average height of 110-120 cm, and 152 seedlings per plant. The yield was up to 153 grams, the total yield was 18.3 t/ha, the marketability of the product was 16.0 tons. At the rate of irrigation of 8000 m^3, 16.1 t/ha, of which 15.0 tons of

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consumer goods, and at the rate of 10000 m³ of irrigation, 12.5 t / ha, of which 10.0 tons of consumer goods was obtained. (See Table 3)

Table 3.Influence of irrigation norms on caper plant yield and quality indicators.

Option	Planted area, ha	number of seedlings, thousand	Average height of the plant, cm	Yield in a bush, gr	Productivity, t / ha	Hence the standard product t / ha	Difference to control, + -
Control (due to natural humidity)	1.0	18.0	70.0	450	8.1	6.5	-
5000 м³	1.0	26.0	120.0	703.0	18.3	16.0	+9.5
8000 м³	1.0	26.0	130.0	617.1	16.1	15.0	+8.5
10 000 м³	1.0	26.0	150.0	480.7	12.5	10.0	+3.5

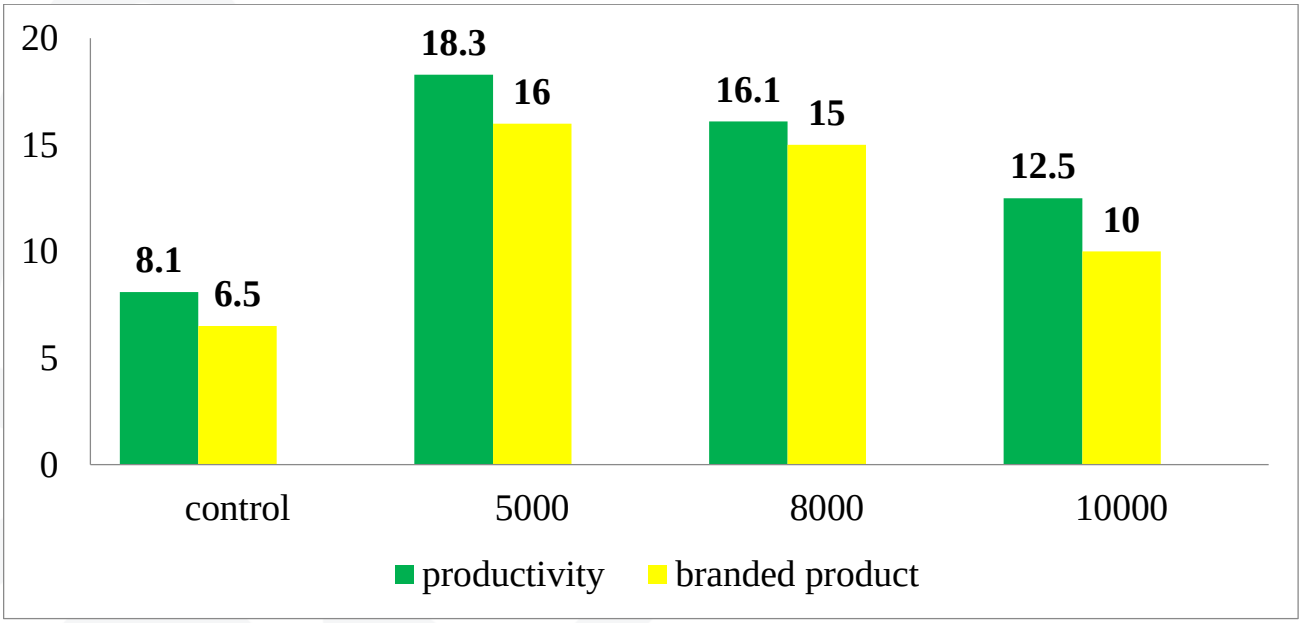

Figure 3. Influence of irrigation norms on Kavar plant yield and quality indicators.

According to the results of the study, irrigation of 5000-8000 m³ during the growing season is highly effective in the cultivation of caper.

Irrigation at the rate of 10,000 m³ is explained by the lack of harvested branches due to the high growth of vegetative parts of the plant. It is recommended to sow the seeds of kavar plants in 90x30 schemes and ensure a yield of 18-20 tons.

Discussion

In order to increase the marketability of the plant, it was found that 85-86% of the products are grown using the methods of combing.

Based on the physiological and biological characteristics of the caper plant, it was found that for the cultivation of the plant during the growing season, it is possible to produce 16-18 tons of commodity products at the expense of irrigation norms in the amount of 5000-8000 m^3.

References

1. Aktan N., Bilgir B & Elgin E. (1981) Pickling product and keeping of capers flower buds. Ege University Agricultural Faculty Journal 18: 259-273.
2. Alkire B (1998) Capers, new crop factsheet. Purdeu University Center for New Crops and Plant Products, http://www.hort.purdue.edu/newcrop/cropfactsheets/caper.html.
3. Asatov I. (2021)Technology of caper (capparis spinosa) seed preparation for cultivation and cultural growth. E3S Web of Conferences 244, 02022 (2021)EMMFT-2020 https://doi.org/10.1051/e3sconf/202124402022
4. Aytac, Z., G. Kinaci, and A. Ceylan. 2009. Yield and some morphological characteristics of caper (Capparis Spinosa L.) population cultivated at various slopes in Aegean ecological conditions. Pak. J. Bot. 41:591-596.
5. Hansen J. (1991). The Palaeoethnobotany of Franchthi Cave. Bloomington: Indiana University Press.
6. Hillman G. C. (1989). “Late Palaeolithic plant foods from Wadi Kubbaniya in Upper Egypt: dietary diversity, infant weaning, and seasonality in a riverine environment,” in Foraging and Farming: The Evolution of Plant Exploitation, ed D. R. Harris and G. C. Hillman (London: Unwin Hyman), 207–239.
7. Inocencio C., Rivera D., Obo´n M.C., Alcaraz F & Barren˜a A. (2006) A systematic revision of Capparis section Capparis (Capparaceae). Annals of the Missouri Botanical Garden 93(1):122–149.
8. Jacobs M. (1960). Capparidaceae. Flora Malesiana. 1, 61–105.
9. Mahmoud Babili, Benefiting Commercially from Untapped Plant Natural Resources: Caper as a Case study, 2015, Damascus.
10. Merganov A.T. and others. Scientific basis of technology of cultivation and processing of caper (Sarraris srinosa) plant. Monograph. Arjumand Media Publishing House Namangan 2020 75 B.

11. Merganov A.T. Recommendation on the technology of cultivation and processing of Caper (Capparis spinosa) variety "Uzbekistan-20" in the steppe, Namangan MTI, 2018. 35p
12. Merganov A.T. Recommendations for the use of biological (biohumus, biomak and biomic) fertilizers in the cultivation of ecologically pure potatoes and vegetables. NamMII Publishing House. Namangan 2010 y.
13. Merve Polat. Capparis spinose L. : A review. 2006
14. Muminova M., Abdullaev V. Caper plant-based drugs. Problems of Bioorganic Chemistry IX-Republican Conference of Young Chemists, Volume III, Namangan 2019. 46-49 b.G.K.
15. Psaras & I. Sofroniou. Wood Anatomy of Capparis spinosa From an Ecological Perspective IAWA Journal, Vol. 20 (4),1999: 419-429
16. Renfrew J. M. (1973). Palaeoethnobotany. The Prehistoric Food Plants of the Near East and Europe. New York, NY: Columbia University Press.
17. Romeo, V., M. Ziino, D. Giuffrida, C. Condurso, and A. Verzera. 2007. Flavour profile of capers (Capparis spinosa L.) from the Eolian Archipelago by HS-SPME/GC-MS. Food Chem. 101:1272-1278
18. Salikhov SA, Karimov I.R, Hakimova A.Z, Influence of drying methods on the quantity and quality of products in the drying of fruits of capparis (Capparis spinosa) grown in extreme conditions. Namangan State University Scientific Bulletin No. 4, 2020 Namangan 2020, pp. 123-126.Jacobs M. (1960). Capparidaceae. Flora Malesiana. 1, 61–105.
19. Saxobiddinov S.S. Systematics of plants.//T; 1968. 545 p.
20. Sozzi O.G. (2001). Caper bush: botany and horticulture. Hortic. Rev. 27, 125–188. doi: 10.1002/9780470650813.ch4.
21. Van Z. W., and Bakker-Heeres J. A. H. (1988). Archaeobotanical studies in the Levant. 4. Bronze Age sites on the North Syrian Euprates. Palaeohistoria 27, 247–316.
22. Zoxari M. The species of Capparis in the Mediterranean and the Near Eastern countries. Bull. Res. Counc. Isr. 8D, 49–64. 1960 y.