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Determination of Growing Substances Standards in Preparation for Planting Seeds of Capers (Sapparis Spinosa L.)

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Abstract: The article is written based on the results of experiments conducted to determine the optimal norms and times of working with seed-growing substances for the propagation of the Capersr (Capparis spinosa L.) plant by planting it from its seeds. In the article, to increase the fertility of plant seeds, IMK (indolyl butyric acid), IUK (indolyl acetic acid) and Retsuper growth agents (25, 50, 100 mg/l) were used for different periods of time (24, 48, 72 hours) the effect of saturated sowing on seed germination was determined, and the results of the research conducted in 2024-2025 are presented.

Keywords: capers, capparis spinosa, growth agent, indolyl butyric acid, indolyl acetic acid, retsuper, strification.

Introduction. Today, the capers (*Capparis spinosa. L.*) plant is grown in France, Spain, Italy, China, Turkey, Iran, Georgia, Azerbaijan, the United States of America, Mexico, Argentina, Morocco, and Egypt, as wild species and cultivated varieties in small areas. It is boiled and various marinades and salty preserves are prepared from its fruits. The production of capers fruit in the world is on average 15-20 thousand tons per year, it is processed and canned products are made in more than 60 countries. species and varieties of the kavar plant were grown as a vegetable crop, and its average yield was 30-40 s/ha [5, 7, 10.13].

In the world, many developments have been developed on the cultivation of the caparis (*Capparis spinosa.L*) plant and increasing the fertility of its seeds. In these studies, various mineral acids were used to increase seed germination. In particular, scientists from Iran,

Argentina, Tunisia, Morocco, and Italy have achieved a number of achievements in the establishment of cultural plantations. In particular, a number of methods, such as working with different standards of nitric and sulfuric acids on seeds, are scientifically based [7, 9, 11, 12]. Today, China is the world leader in the export of these plant products, and its annual export reaches 865.7 million dollars.[13]

Materials and methods. In 2021-2023, the effects of growth agents (IMK (indolyl fatty acid), IUK (indolyl acetic acid) and Rutsuper) on the seeds and growth of caper species Capparis spinosa were studied.

In this case, 9 variants of 3 types of these substances were compared with each other.

The experimental system is as follows: 25, 50 and 100 mg/l standard of indolyl fatty acid. The rate of indolyl acetic acid is 25, 50, 100 mg/l. 25, 50, 100 mg/l of Rutsuper was taken. As a control variant, a variant saturated with plain water was taken. At the same time, the time of saturation (thaw) of seeds for 24, 48 and 72 hours was also studied in the control and in the standards of each growing substance. [2]

The description of the growing substances used in the experiment is as follows:

IMK - indolyl butyric acid is a stimulant produced in the Czech Republic, international name is Indolyl-3-maslyanaya acid, chemical formula $C_{12}H_{13}NO_2$, physical properties; molar mass is 203.24 g/mol, boiling point is 125 0C, it is synthesized from animal livers in industry.

IUK - indolyl acetic acid was obtained from urea by synthesis method since 1965 at the Kurgan Chemical Plant of Russia. International name indole-3-acetic acid, chemical formula $C_{10}H_9NO_2$, physical properties; molar mass is 175,184 g/mol, boiling point is 168-170 ^{0}C. This growing substance is still widely used in the field of fruit and vegetable growing.

Rutsuper - active substance Indolebuteric acid, 8 g/l, Sinovey International Co. Ltd is made in China. International name 1 N-indole-3-butanoic acid, chemical formula $C_{12}H_{13}NO_2$, physical properties; white to pale yellow crystalline substance, melting at 125 0C, molar mass 203.241 /mol, insoluble in water, soluble in 75% alcohol. This growing substance is now widely used to accelerate the growth and development of plants in fruit and vegetable growing.[3, 4]

Results. Kavar plant seeds are fundamentally different from other vegetable seeds, the seeds are hard and contain up to 30% oil, they are very difficult to absorb water due to the presence of unsaturated carbonic acids linole ($C_{17}H_{31}COOH$), linolene ($C_{17}H_{29}COOH$) . Therefore, the seeds of naturally growing species are preserved in the soil for years until a temperate environment. The seeds are dispersed by rodents and birds, but they are dispersed as undigested waste on buildings and in steppe and desert regions.[9]

Researches were conducted in order to increase the fertility of the seeds and to study the stratification periods for the cultivation of kavar plant in the cultural form and for the establishment of plantations in extreme conditions.

Using IMK, IUK, Rutsuper growth substances at the rate of 25-50 mg/l, the low level of seed germination is explained by the fact that the seeds are covered with a hard chitin coating and the oil solubility in it is passive.

It was observed that the level of germination increased by 80-86% or increased by 50-55% compared to the control due to the softening of the chitin layer in the seeds and the activation of water absorption due to the increase in the rate of the used growth substances by 100 mg/l. .

According to the results of the experiment, it was determined that the germination rate of the seeds in the specified period of time was 10% when processed for 24 hours in the control option, and up to 30% when processed for 72 hours.

In the experimental version, it was found that when saturated with IMK growing substance at the rate of 25 ml/l, it increases the fertility of seeds up to 38±3% in the version processed for 24

hours, and up to 50±5% when processed for 72 hours. 50 ml/g of IMK growing substance saturated, germination rate was 50 ± 5 % after 24 hours, and 70 ± 5 % after 72 hours, saturated with 100 mg/l of this substance 60±5% germination and sprouting were found when treated in the solution for 24 hours, and up to 85±5% when treated for 72 hours (Table 1).

It was found that when saturated with IUK growing substance in the experimental version at the rate of 25 ml/l, it increased to 38±3% in the 24-hour version, and to 50±5% in the 72-hour processing.

It was determined that when treated with 50 ml/g of IMK growing substance for 24 hours, the germination rate is up to 50±5%, and when treated for 72 hours it is 70±5%. In a solution saturated with this growth agent at the rate of 100 mg/l, it was observed that the seeds were germinated and germinated to 60±5% when treated for 24 hours, and to 85±5% when treated for 72 hours. (Table 1).

The germination of seeds and the appearance of seedlings in these experimental variants were +23% in seeds treated with 25 mg/l of IUK growing substance for 24 hours, 18% in 48 hours, and 72 hours in comparison to the control option. 13%, +27% at 50 mg/l for 24 hours, +28% for 48 hours, 28% for 72 hours, and 25, 45, 25, 45, 100 mg/l 50% higher (Table 1).

Table 1 The effect of growing medium standards and time on the fertility of capers seeds (2024-2025).

Variants	Sterilization time and germination of seeds saturated with growth substances						Difference in germination compared to control.+ -
	hours	germination, %	hours	germination, %	hours	germination, %	
Saturated with normal water (st)	24	10±5	48	20±5	72	30±5	-
IMK 25mg/l	24	38±3	48	45±3	72	50±3	+20
IMK 50 mg/l	24	50±5	48	55±5	72	70±5	+40
IMK 100 mg/l	24	60±5	48	75±5	72	85±5	+55
IUK 25mg/l	24	33±3	48	38±3	72	43±3	+13
IUK 50 mg/l	24	37±2	48	48±	72	58±2	+28
IUK 100 mg/l	24	45±5	48	65±5	72	75±5	+45
Rutsuper 25mg/l	24	35±5	48	45±5	72	58±5	+28
Rutsuper 50 mg/l	24	40±5	48	53±5	72	65±5	+35
Rutsuper 100 mg/l	24	48±5	48	65±5	72	83±5	+53

In the experiments saturated with Rutsuper growth substance in the experimental version at a rate of 25 ml/l, it was found that the seed germination increased to 35±3% in the 24-hour version, and to 58±5% in the 72-hour processing. (Table 1).

It was determined that the seeds were saturated with Rutsuper growing substance at the rate of 50 ml/g, and it was 40±5% after 24 hours of treatment, and 65±5% after 72 hours of treatment. In a saturated solution of this growing substance at the rate of 100 mg/l, 48 ± 5% germination and sprout formation were found after 24 hours of treatment, and 83 ± 5% after 72 hours of treatment. Compared to the control options, the germination of seeds and emergence of seedlings in these experimental options was +25% in seeds treated with 25 mg/l for 24 hours, 25% in 48 hours of treatment, and +28% in 72 hours of treatment, 50 mg/l +35% when processed for 24 hours at the rate of l, +33% when processed for 48 hours, +35% when processed for 72 hours,

and 38, 45, 53% higher at the rate of 100 mg/l, respectively was observed.

Conclusion. As it can be seen from the experiments conducted on preparation of kavar plant seeds for sowing, according to the physiological and chemical characteristics of the seeds, the growing substances used to increase their fertility and their rates compared to the control option 13 It has been found to increase fertility by up to -50%. Extending the period of saturation of seeds with the standards of growing substances up to 72 hours, increasing the level of seed germination and increasing the germination of seeds due to the complete saturation of the cell with water due to the increase in the solubility of the oils contained in it was determined.

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