THE EFFECT OF LASER RADIATION ON THE PRODUCTIVITY OF THIN FIBER COTTON

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Abstract
The effect of laser radiation on the germination, development and yield of cotton seed was studied on the basis of experiments, and it was found that laser light has a positive effect on the yield of cotton.
Keywords:
Laser radiation, multiple radiation, positional radiation, thin fiber cotton, experiments, laser.

The effect of laser radiation on the development and productivity of vegetable crops has been well studied by scientists from Russia, Belarus and Kazakhstan. Although the data on the effect of laser light on the development and yield of the cotton crop are very limited, very good results have been obtained in this field [1].

It is known that the effect of red radiation on the development of plants was studied by Russian scientists at the beginning of the 20th century, and it was widely reported in the scientific literature that this wavelength (ie, red light) has a positive effect on plant growth [2].

However, more accurate information about the study of the effect of laser light on the development of thin fiber cotton is not found in the literature. In this article, as a result of irradiating thin fiber Ash-25 and T-16 cotton seeds with different doses of laser radiation with a wavelength of λ =0.63 mkm, the dependence of the germination, development and yield of these plants on the dose of laser radiation was studied and certain conclusions were drawn based on experiments. .

Fine fiber Ash-25 and T-16 cotton seeds were irradiated in two ways:

1 Multiple irradiation method.

2 Positional irradiation method.

These irradiation methods differ in radiation dose.

In the multiple beam method, the laser beam is converted into a linear image using optical devices. In this case, the dose power of the laser light is kept unchanged and the cotton seed is irradiated with this light depending on the time.

In the positional radiation method, laser light is spread over a certain surface using optical devices, and the radiation dose is very small at each point of this surface. In this case, the radiation time is longer to reach the required amount of radiation dose.

Table 1 below shows the changes in the germination rate of Ash-25 and T-16 fine fiber cotton seeds based on irradiation at different doses:

№	Cotton variety	Multiple radiation dose	Seed Germin	№	Cotton variety	Multiple radiation dose	Seed Germinatio

			ation %				n %
1	Ash-25	3 times	81	1	Ash-25	5 minutes	79
2	Ash-25	5 times	84	2	Ash-25	8 minutes	83
3	Ash-25	7 times	91	3	Ash-25	12 minutes	89
4	Ash-25	10 times	85	4	Ash-25	15 minutes	81
5	Ash-25	15 times	83	5	Ash-25	20 minutes	80
6	Ash-25	Unirradiated seed	73	6	Ash-25	Unirradiated seed	73

According to the obtained results, 91 percent germination of Ash-25 cotton seed was determined in experiments when 7 times irradiation of Ash-25 and T-16 varieties of fine fiber cotton seed was carried out by the method of multiple irradiation. This result is very high.

It was observed in the experiments that 89% of the seed germinated when the seed was irradiated for 12 minutes using the method of positional irradiation of Ash-25 grade cotton seed. It was found that only 73% of the seeds that were not irradiated with laser light germinated.

Similar results were observed in the irradiation of T-16 cotton seed. It was observed in the experiments that 90% of the seeds germinated when irradiated 7 times, and when irradiated for 12 minutes in a positional method, 89% germinated.

Irradiation with laser light also showed its effect on the productivity of fine-fiber Ash-25 and T-16 cotton. Table 2 below shows the dependence of the yield of thin fiber Ash-25 and T-16 cotton on the dose of laser radiation:

№	Cotton variety	Radiation dose	Cotton productivity, centner
1	Ash-25	Unirradiated seed	40
2	Ash-25	3 times	41
3	Ash-25	5 times	42
4	Ash-25	7 times	45
5	Ash-25	10 times	43
6	Ash-25	15 times	42

A similar change in cotton yield was determined based on experiments as a result of irradiation of cotton seed of thin fiber T-16 grade with laser light.

Thus, it was determined in the experiments that the germination of cotton seeds of thin fiber Ash-25 and T-16 varieties under the influence of laser light with a wavelength of λ =0.63 m.km depends on laser radiation.

Also, the yield of thin fiber cotton depends on the dose of laser radiation.

An increase of up to 8 percent was confirmed in experiments.

References:

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