Influence of polymeric lactic acid derivatives on seed similarity and vegetative growth of wheat seedlings

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Influence of Polymeric Lactic Acid Derivatives on Seed Similarity and Vegetative Growth of Wheat Seedlings

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Abstract. Plant growth stimulants are now becoming increasingly popular. They promote to incising of yield of various agricultural crops, improve the quality of agricultural products.
Keywords. Stimulants, vegetative growth, lactic acid, presowing treatment.

INTRODUCTION

The economic advantage from the using of domestic synthetic growth stimulants is in many times higher expenditures of their purchase in foreign countries. Many of them have found application in practice. However, their widespread distribution is hampered, the fact that under the current conditions, at sharp reduction of production of many synthetic drugs, including plant growth stimulants, they become scarce, which, caused leads to increasing their cost.

EXPERIMENTAL PART

Experiment by Determination the Stimulating Properties of Polymers on the Base of Lactic Acid on Wheat Harvest

The study of the effect of polyacrylamido-N-methylene lactic acid on seed germination and vegetative growth of wheat seedlings was carried out in the laboratory of experimental biology of Gulistan State University. The experiment b was carried out as follows:

Preparation of seeds to soaking. Before soaking and germinating the seeds must be measured and washed. [1] Measure enough seeds to spread them in a thin layer on the tray.

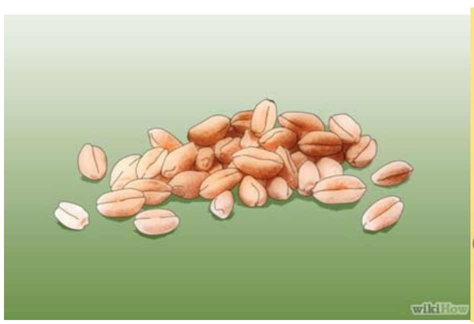

FIGURE 1. Wheat seeds.

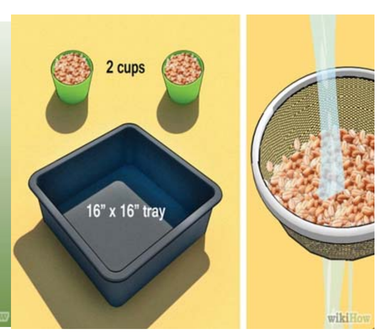

FIGURE 2. Washing wheat seeds.

For tray will dimensions 40x40 sm about two cups of seeds will require. The seeds are washed in cool, clean water using colander with very small holes or sieve. Drain the water thoroughly and seeds are place bowl. Pour the seeds in a bowl with cold, preferably filtered water. The amount of water should be in three times exceeded of seeds quantity. Cover the bowl is covered with lid or plastic film and leave for 10 hours or overnight. [2] After that the seeds were treated by aqueous solution of lactic acid or it's polymeric. For this, 1 kg of soaked seeds is sprayed by 50 ml of growth stimulant solution of the required concentration.

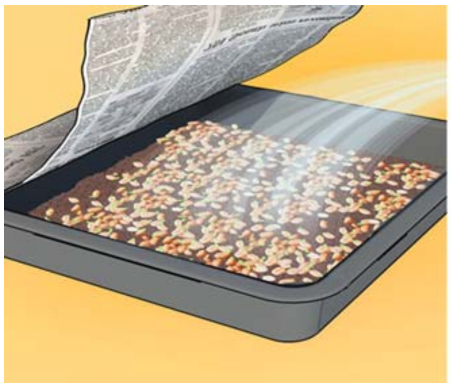

FIGURE 3. Spraying the polymer solution on wheat seeds

FIGURE 4. Repeated spraying of polymer solution on wheat germ

Planting Seeds

The seeds are spreader in an even layer by all surface of the compost or soil and then they are bared completely. The tray is poured lightly by water and at this the moisture should reach all seeds.

Moisture Support

The seeds should not dried out for the first few days after planting. The tray must be poured by water thoroughly in by mornings. The soil should be moist, but not saturated with water [3].

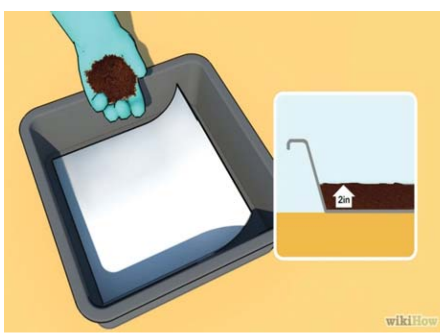

FIGURE 5. Placing the soil for planting wheat.

FIGURE 6. Wheat grain sowing process.

After wheat ripening in the control in the absence of a growth stimulant and it's presence, the harvests were gathered and their indexes were compared.

DISCUSSION AND RESULTS

Like any biologically active substances, growth stimulants require very careful treatment. At their overdose of, it is possible not only get the expected effect, but also face with directly opposite results. At the same time, the range of concentrations of growth stimulants is usually very narrow and specific for different stages of plant development, so the probability of overdose is quite high. But the most important thing is that the mechanism of influence of stimulants on the growth processes in plants is still not fully understood, it is impossible to predict the impact on living organism (human or animal) of agricultural products grown with the using of growth stimulants. In table 1 results of the influence of various carboxylic acids, including hydroxy acids, on the yield of radish are presented [1]. As can be seen that hydroxy acids have exhibited greater stimulating activity than dicarboxylic acids. To extend their period of action, hydroxy acids are modified with various polymers [4]. In this regard the influence of polyacrylamido-N-methylene lactic acid on seed germination and vegetative growth of wheat seedlings was investigated. The researches were carried out in the laboratory of experimental biology of Gulistan State University. The results of the research are shown in table 2, from which shown that lactic acid itself and it's polymeric form have a significant effect on seed germination and vegetative growth of wheat seedlings. For example, the germination capacity of wheat seeds of the sort Saihun has been increased from 70 to 85%, and in case sort Dustlik - from 65 to 80% in sulphate-chlorine medium salty soils. In the case of sowing seeds on chloride-sulfate salty soils for the sort Saihun, seed germination has increased from 70 to 90%, and for sort Dustlik from 75 to 95%. The polymeric effect is most clearly manifested at considering the influence of the studied drugs on the vegetative growth of wheat seedlings. So if lactic acid itself increases the growth of seedlings for the sort Dustlik from 3.9 to 5.7 sm, then its polymer form has increased the growth of seedlings to 6.5 sm.

TABLE 1. Influence of presowing treatment of seeds by solutions of succinic, citric, lactic and malic acids on the radice productivity

Acid concentration, mole / l	Mass part of dry compound	Middle mass of root	Productivity	Absolute value, c/g	% to control	-
Absolute value,%	% to control	Absolute value, g	% to control	Absolute value, c / ha	% to control	% to control
		Amber acid				
10^{-3}	5,73	98	5,78	44	186	113
10^{-7}	6,33	108	6,41	49	271	175
10^{-11}	5,02	85	6,56	50	281	202
10^{-15}	6,22	106	8,19	63	340	354
10^{-17}	5,86	99	5,1	45	84,5	100
		Lemon acid				
10^{-3}	6,53	112	9,10	70	23,7	28
10^{-7}	6,05	103	8,15	63	27,7	32
10^{-11}	6,37	109	9,20	71	33,1	39
10^{-15}	6,18	105	11,70	90	30,4	35
10^{-17}	5,85	99	12,8	98	83,8	96
		Lactic acid				
10^{-3}	7,17	122	9,05	70	35,3	41
10^{-7}	6,60	112	13,20	101	52,6	61
10^{-11}	6,82	116	5,10	39	25,0	29
10^{-15}	6,72	114	6,60	51	29,0	34
10^{-17}	5,87	100	4,9	33	84,0	97
		Apple acid				
10^{-3}	7,27	124	12,10	93	42,3	59
10^{-7}	6,68	114	9,95	77	43,7	51
10^{-11}	5,40	92	16,40	31	91,6	107
10^{-15}	4,98	85	16,90	130	91,0	106
10^{-17}	5,86	99	12,9	99	85,0	98
Control	5,87		13,0		84,5	

TABLE 2. Effect of a polymer derivative of lactic acid on seed germination and vegetative growth of wheat seedlings

Concentration	Sort of wheat	Germination, %	Growth of seedlings at the vegetative stage (cm)		
			3 days	5 days	10 days
		Sulfate-chloride salty soils			
Control	Saihun	70	1,2	2,3	4,4
	Dustlik	65	0,9	1,8	3,9
$CH_3CHOHCOOH$ 1×10^{-7} M	Saihun	80	1,7	3,3	5,5
	Dustlik	80	1,9	3,2	5,7
Polyacrylamido-N-methylene	Saihun	85	1,9	4,8	6,1
lactic acid, 1×10^{-6} M	Dustlik	80	2,0	4,4	6,5
		Chloride-sulfate salty soils			
Control	Saihun	70	1,4	2,7	5,9
	Dustlik	75	1,8	2,3	5,8
$CH_3CHOHCOOH$ 1×10^{-7} M	Saihun	85	2,3	3,9	7,0
	Dustlik	80	2,6	3,7	6,7
Polyacrylamido-N-methylene	Saihun	90	3,1	4,8	7,9
lactic acid, 1×10^{-6} M	Dustlik	95	3,3	4,4	8,1

CONCLUSION

Such carried out biological tests have shown possibility of using polymer on the base on lactic acid as stimulator of plants, growth [5]. On the based results of carried ont invertigation the polymer derivative of lactic acid has been introduced in farming "Tukhtaev Komil Tukhtaevich" of Shakhrisabz region of Kashkadarya province. Using of this polymer as stimulator of plants growth on the area 10 hectares has been characterized by economical effect about 1600000 sums

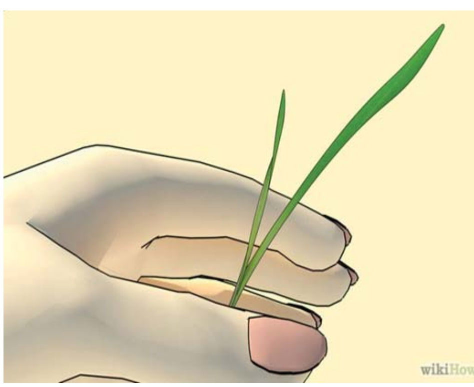

FIGURE 7. Comparison the lengths of wheat seeds

FIGURE 8. The order of growth of wheat seeds

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