N E W S
OF THE NATIONAL ACADEMY OF SCIENCES OF THE REPUBLIC OF KAZAKHSTAN
SERIES OF AGRICULTURAL SCIENCES
ISSN 2224-526X
Volume 3, Number 27 (2015), 57 – 59

UDC 643.13

THE ROLE OF NICOTINIC ACID DERIVATIVES AS A PESTICIDE ON RICE (*ORYZA SATIVA L.*)

K. K. Shekeyeva

Kazakh National Agrarian University, Almaty, Kazakhstan

Keywords: nicotinic acid derivatives, nicotinamide, pesticide, plant growth regulator.
Abstract. This article presents application of nicotinic acid derivativesas a pesticide, regulating the growth of rice, which, when used on rice crops increase yield and improve its quality.

Introduction. The nicotinic acid derivatives play important role in modern chemistry. In modern agriculture, people have established the benefits of extending the use of plant hormones to regulate growth of other plants. When natural or synthetic substances used in this manner, they are called plant growth regulators. From the regulatory control perspective, plant growth regulators are classified under " pesticides "Nicotinic acid derivatives applied as a pesticide, regulating the growth of plant to the cereals. However, plants that can be treated with nicotinic acid derivatives are not limited to cereals, but it can be applied effectively to leguminose crops such as soy bean, red bean and corn and vegetables such as radish, turnip, spinach, cucumber and lettuce. Pesticide promotes the growth in these plants, and which, when used for treatment of various seeds, promotes germination and rooting in these seeds, and which further has an activity of increasing the chlorophyl content in plants and strengthening the chlorophyl-retaining property in plants.

Goals and objectives of the study. The harvesting time can be adjusted by accelerating the growing rhythm. Accordingly, it is made possible to shorten or change the cultivation period of crops in cold districts. Further, by increasing the chlorophyl-retaining property, it is made possible to retain freshness for a long time in fresh crops, moreover, since the active ingredients exhibit effects of heightening the tillering property, growing plant organs accelerating the chlorophyl synthesis, preventing decomposition of chlorophyl and preventing aging of leaves, the manufacturing efficiency can be highly increased with use of the plant growth regulator. Therefore, the plant growth regulator can also be used as a harvest-increasing agent.

Still in addition, since each of the active ingredients of this pesticide is a composite vitamin, its application causes no environmental pollution and hence, it has characteristics of a pollution-free chemical.

When attainment of other agricultural effects is intended, it is possible to use the plant growth regulator in combination with other suitable agricultural chemicals such as other plant growth regulators or modifiers, fungicides and insecticides, and fertilizers and the like.

Materials and methods. The nicotinic acid derivatives areuseful plant growth regulators comprising as an active ingredient at least one member selected from nicotinic acid derivatives represented by nicotinamide known as a vitamin B complex (B_5) and as one component of a coenzyme and related analogues.

Although it has been known that nicotinamide is present in a plant body, it has not been elucidated what function it performs in a plant body. As the object of study selected rice with varieties "Akmarzhan" We found nicotinamide takes a very important role in biological metabolism of plants and noticed that an unknown organic substance contained in rice chaff has a great contribution of nutrition and growth regulation of rice at the initial stage of germination, and examined a substance extracted from "Akmarzhan" and found that the substance contains some organic compound at a large content. As a result, this substance is nicotinamide. At first, chaff of "Akmarzhan"was pulverized by means of a grinder, and the resulting powder was dipped and agitated in a 70% methanol solution to effect extraction. The resulting

extract was subjected to silica gel thin layer chromatography by employing a developer comprising 10:2 ratio mixture of isopropanol and 14% aqueous ammonia, to conduct the histogrammatic examination. As a result, it was confirmed that the extracted substance has a conspicuous growth-promoting activity.

Although, study of growth-regulatory action of 2thioaryl (alkyl) potassium nicotinate was conducted under laboratory conditions. As a test compounds were used:Hydroxy-4-methyl-6-2-methyl-fenilsul-fanilnikotinat potassium(Compound 1),

4-hydroxymethyl-6-methyl-2- [4- (tert-butyl) fenilsulfanil] nicotinate potassium (Compound 2), 4-hydroxymethyl-6-methyl- 2- (2-hydroxy ethylsulfanyl) potassium nicotinate (Compound 3).

Effect of treatment of rice seeds 2-thioalkyl (aryl) nicotinate potassium on the intensity of germination (laboratory experiment)

Variant	Concentration, %	Germination energy, %	Germination, %	Length, cm		Weight g / 100 pieces.Seedlings	
				rootlet	shoot	rootlet	shoot
Control	–	90,8	92,8	4,0	1,3	0,19	0,20
Nicotinic acid	0,001	98,0	94,0	4,4	1,4	0,20	0,20
Compound **1**	0,01	92,8	92,8	3,6	1,4	0,18	0,20
	0,005	94,0	94,8	4,0	1,4	0,20	0,20
	0,001	94,0	94,8	4,3	1,5	0,24	0,24
	0,0005	94,8	96,0	4,6	1,6	0,25	0,25
Compound **2**	0,01	92,0	92,8	4,1	1,4	0,20	0,20
	0,005	94,8	96,8	4,6	1,5	0,24	0,24
	0,001	92,8	92,8	4,2	1,4	0,20	0,24
	0,0005	92,0	92,8	4.0	1,4	0,18	0,21
Compound **3**	0,01	94,8	94,8	4,4	1,4	0,21	0,24
	0,005	96,8	98,8	4,9	1,6	0,26	0,25
	0,001	94,8	94,0	4,8	1,5	0,24	0,24
	0,0005	92,0	92,8	4,6	1,4	0,22	0,24

As an analogy, a solution of nicotinic acid in a concentration of 0.001%. In the embodiment, the control seeds were soaked in water. Seeds were germinated in petri dishes on filter paper in an oven at a temperature of 25 ° C. In each plate 50 laid out on the pieces of seeds treated with water (control option), and solutions of the test compounds (experimental variants) with a mass fraction of solute: 0.01; 0.005; 0.001; 0.0005%. Exposition processing (soaking) seeds - 1h. In a laboratory experiment determined vigor and germination, because of the growth - the length and weight of roots and shoots and their mass. Based on these data, the optimal concentration of the solutions of the test compounds.

From the data in Table 1 it is clear that the processing of rice seeds before sowing the test compounds 2-tioalkyl (aryl) of nicotinate potassium increased the germination of rice seeds. The degree of exposure to the test compounds shown in Table, in performance as largely dependent on the chemical structure of substances and concentrations of the solutions. The maximum values of quality of seeds in the embo-diments are marked with the processing of the seeds before sowing of compound 1 concentrations of 0,0005%, compounds 2 and 3 in a concentration of 0.005%. These concentrations are optimal for the test substances. It should be noted that the most effective set of indicators was the seed treatment compound 3, which resulted in the values of these indices were highest (vigor - 96.8% in the control - 90.8; germinati on - 98.8 and 92.8 % length of the spine 4.9 and 4.0 cm, germ - 1.6 and 1.3 cm; weight co-Tails - 0.26 and 0.19 g, germs - 0.25 and 0.20 g / 100 pcs. seedlings, respectively).

The integrity of the plant organism provided by the system of regulation and control. Plant hormones and their synthetic analogues have a significant influence on the formation of the root system of plants.

Nicotinic acid derivatives directly applied as it is, and also used in the form of a dust, a wettable powder, an emulsifiable liquor or a granule prepared according to an ordinary agricultural chemical preparation method with use of ordinary agricultural additives such as solid or liquid carriers, diluents,