THE EFFECTS OF ACETYLSALICYLIC ACID IN PHYSIOLOGICAL PROCESSES OF TRITICUM AESTIVUM L

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Abstract

Phytohormones or plant hormones are natural compounds which affect the plant's physiological processes. Recently discovered that salicylic acid, acetylsalicylic acid or other analogues of SA can function as a plant hormones. In this paper we studied the influence of aqueous acetylsalicylic acid extractive solution obtained from the bark of willow (Salicis cortex) in different concentrations to the wheat seeds on the growth of the embrionary roots.

Keywords: *Salicis cortex*, acetylsalicylic acid, wheat, root, growth

INTRODUCTION

The plant hormones are natural compounds which affect the plant's physiological processes, in much lower concentration than other nutrients and vitamins.

According this definition, near the known plant hormones, like auxines, giberelines or abscisic acid, it is recently discovered that not only these, but other compounds can be classified between them [6, 9, 10].

Since 1990 a lot of articles were published about the exogenous and endogenous acetylsalicylic acid physiological effects on plants.

Clarke et al. proved that in small dose acetylsalicylic acid stimulates the cell proliferation and inhibits the growing process of plants. But in higher doses it triggers the cell death. It involves in plants resistance against microbiological agents. They considered that acetylsalicylic acid is an important signaling molecule, involved in the plants growing processes [4, 12, 13].

While determining the quantity of acetylsalicylic acid in plants, it turned out that largest concentration can be found in leaves and flowers of the angiosperms [1, 7]. The application of salicylic acid, acetylsalicylic acid or other analogues of SA, to leaves of maize and soybean accelerated the growth of their leaf area, and the dry mass production, but plant height and root length remained unaffected [8, 11, 14].

Have been developed numerous techniques for quantitative and qualitative determining of the acetylsalicylic acid in plants [2, 3, 5].

The purpose of this work looks at the study of the physiological effects of treatment wheat seeds with aqueous acetylsalicylic acid extractive

solution obtained from the bark of willow (*Salicis cortex*) at various concentrations.

Investigations looked at the consequences of these treatments through the study of the studied solutions influences over the germination of wheat seeds and the following of morphological changes of the roots.

MATERIAL AND METHOD

The research was conducted with certified seed material with wheat having germinative capacity of 95%. We analyzed the effects of aqueous solution of *Salicis cortex,* over the studied parameters

The preparation of solutions to be analyzed it was prepared with distilled and deionized water solutions._*Salicis cortex* aqueous solutions concentrations : 10%; 5%; 2.5%; 1.25%;

The preparation of biological material:

Batches were made each of 30 seeds of *Triticum aestivum L*. sprouting 9 Petri dishes on filter paper soaked in common water boiled and cooled. There were kept 12 hours in darkness and temperatures of 20-24 ºC, time the root germinates and reaches less than 1-2 mm long.

After 12 hours we started the seeds treatment with solutions of different concentrations, together with a control (C) to which is still conducted by joint water soaking.

In four Petri dishes there were intended action *Salicis cortex* (SC) aqueous extract on germination capacity of seeds, in different concentration: S.C. 10%; S.C. 5%; S.C. 2,5%; S.C. 1,25%.

RESULTS AND DISCUSSIONS

The appearance of seeds, number, color and appearance of sprouts do not change compared to the control, differences are observed only on the length of the roots.

In Figures 1, 2, 3, 4, can observed the obtained results. Figure 5 shows the comparison between data obtained at different concentrations for the experimental solutions compared to the control in terms of average value in mm on the length of the roots.

Figure 1. Germination seeds (Control)

Figure 2. Germination seeds (SC 10%)

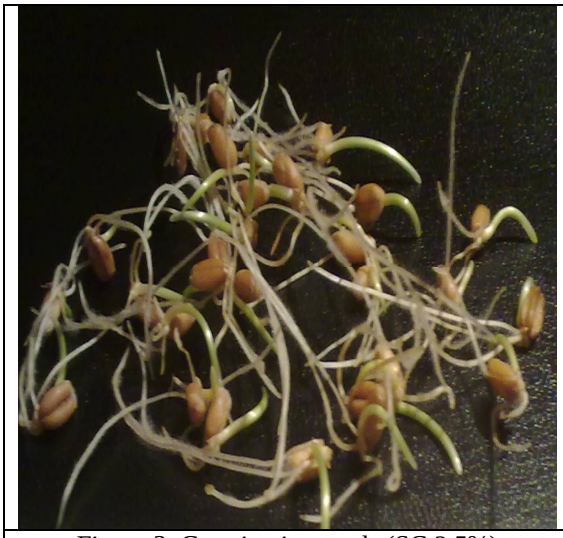

Figure 3. Germination seeds (SC 2.5%)

Figure 4. Germination seeds (SC 1.25%)

Compared with germination faculty of seeds in the control group, solutions whose effects were studied, solutions *Salicis cortex* significantly stimulated seed germination of *Triticum aestivum.*

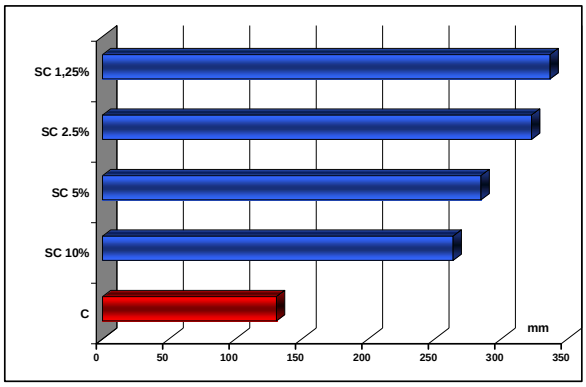

Figure 5. The comparison between data obtained at different concentrations for the experimental solutions compared to the control.

If we consider the germination of the control group 100%, we can say that 10% solution of *Salicis cortex* causes germination of 213.84%; 5% solution germination of 226.92%; solution of 2.5% a germination of 250% and 1.25% solution a germination of 257.69%.

There is a progressive increase in faculty germ wheat seeds with decreasing solution extractive concentration achieving maximum germination at the lowest concentration of 1.25%.

The results are shown in Table 1. to control, in Table 2. for samples test.

Table 1

Control	**Number of sprouts**	**Colour**	**Dimensions**
		Aspect	**Average value in mm**
	3 normal coleoptil	White-gray right-elongated	131

Table 2

Germination of seeds on filter paper with the solution humidified *Salicis cortex* (SC), at various concentrations

SC Solutions	**Number of sprouts**	**Color/ Aspect**	**Average value in mm**
10%	3	White-gray, equally elongated	264
5%	3	White-gray, equally elongated	285
2,50%	3	White-gray, equally elongated	323
1,25%	3	White-gray, equally elongated	337

CONCLUSIONS

It can be seen that extracting solutions of *Salicis cortex* (SC) has an increase of germination capacity, far exceeding the values obtained from the control.

We must note that the extraction solution of *Salicis cortex* is not a pure solution of acetylsalicylic acid, It contains salicin, a substance capable of glycosidic 0.3-0.8%, flavonoids, tannins, resins, heterosides. Probably the synergistic action of these principles determines the stimulation of germination

The results of researches conducted by us have put in evidence the fact that wheat seeds germination in contact with aqueous extraction of *Salicis cotrex* 1.25%, led to marking the most intense positive effects in terms of stimulating germination of grains, and the increase in length of embryonic roots.

Among the solutions and concentrations studied, this solution can be considered as an effective plant phytohormone.

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