



Research Article

DETERMINATION OF STIMULANT PROPERTIES OF LOCAL RHIZOBACTERIA-BASED BIOPRODUCTS AGAINST CYNARA SCOLYMUS L.

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ABSTRACT

This article presents the results of research on laboratory cultivation of *Cynara scolymus* L, a PGPR-based bioproduct - elicitor and Zamin-M. Experiments have shown that plant seeds inoculated with Elicitor biological products continue to grow under sterile conditions in 1.6% agar feed compared to other options.

KEYWORDS

Cynara scolymus L., rhizosphere, immunity, stimulator, stress, PGPR, Elysitor, “Earth-M”, bioproduct, plant.

INTRODUCTION

Quality is important in the cultivation of medicinal plants, and yield is the second important stage. In addition, the environmental impact of overuse of chemical fertilizers, energy consumption, production costs, etc., is the reason for global choices in the use of biological fertilizers. There are currently a number of promising environmentally friendly tools used for plant protection. One of them is disease resistance inducers,

i.e. elysores, which are substances of a biotic and abiotic nature that are recognized by plants as signals and in response activate plant defense mechanisms, which reduce the effects of biotic and abiotic stress [14]. That is, once elicitors are recognized by plants, they activate signaling systems that lead to the expression of defense-related genes and, accordingly, increase plant resistance. These substances are non-

toxic and do not have harmful effects on the environment [1].

Plants have a complex innate immune system to prevent the entry of pathogenic microorganisms and colonization of their internal structures. The first signal of the inductive response is controlled by the plant, in which the microbe or modified molecules derived from the plant are received. To counteract the initial reaction of plant protection, special effectors are produced that disrupt the recognition of protective agents or plant protection mechanisms to stimulate susceptibility to successful microbial effects (ETS-effector-triggered susceptibility). However, when these pathogenic effectors, in turn, are recognized by plant resistance proteins, the second layer of the inductive response, i.e., immunity to the effect that triggers the hypersensitivity reaction (ETI- effector-triggered immunity) begins [4,10].

In addition to plant-derived elicitors, the use of bacterial-derived elicitors has also been shown to reduce pathogenic infection in plants. Extracellular polysaccharides (EPS- Extracellular polysaccharides) produced by the bacterium *Ralstonia solanacearum* have been shown to induce a protective reaction against lipopolysaccharides (LPS- lipopolysaccharides) in tomatoes [11] and gram-negative bacteria, as well as many other [3,5. 6]. PGPRs (rhizobacteria that help plant growth) induce the fight against plant pathogens using exudative elicitors [2] and filtrates derived from bacterial cultures such as *Bacillus subtilis* have also been reported in sources to have crop protection effects [12].

Bioelicycles are divided into different groups: based on bacterial cultures (agate-25, alirin, gamair phytosporin, extrasol), based on organic acids (immunocytophyte, obereg, novosil, zircon, succinic acid) and others.

Below are a number of recommended bactericidal-based bioelicycles.

Agate-25- This biological product accelerates the growth of plant seeds, improves the development of the root system, is used to increase productivity. Contains: Bacteria *Pseudomonas aureofaciens* and a balanced solution of macro- and micronutrients. Active ingredient: Contains 3-indolyl acetic acid + alanine + glutamic acid. The drug stimulates the protective properties of plants against fungal and bacterial diseases (rust, phytophthora, various types of root rot, rhizoctonia), improves mineral nutrition of plants, increases seed germination and growth energy, stimulates plant growth and development [8].

Alirin-B- biofungicide that kills fungal pathogens (root rot, septoria, rhizoctonia, phytophthora, alternariosis, sercosporosis, etc.). The active ingredient is the bacterium *Bacillus subtilis*, which is used to restore the soil microflora after the application of plant protection chemicals, thereby reducing the toxicity of the soil. [9].

Gamair is a biofungicide against bacterial and fungal diseases. Bacterial cancer is effective against mildew. Active ingredient - *Bacillus subtilis* bacterial strain M-22 VIZR, titer 109 KOE / g. It is recommended to be used in combination with Alirin-B [7]

Thus, it is important to assess the scale of the threat to the plant and receive appropriate and proportionate responses. These can range from responding to an attack, to expressing defense mechanisms based on PTI (or PAMP- or pattern-triggered immunity), to incompatibility if the microbe / pathogen is unable to suppress these responses. The use of elicitors in the cultivation of medicinal plants reduces the need for pesticides by using the plant's own defense system.

MATERIALS AND METHODS

Sterilization and bacterization of artichoke seeds

Artichoke seeds were sterilized in 3% hydrogen peroxide and 96% ethyl alcohol (1:1 ratio) for 5 minutes. The seeds were then washed 3-4 times with distilled sterile water and dried in a laminar box. The dried seeds were inoculated for 1 hour in a 1:100 ratio biopreparation with a cell titer of 10^{-9} containing sodium-carboxymethylcellulose (3%) and an elicitor in a

1:1000 ratio (Figure 1). Inoculated seeds were inoculated into 1 test tube prepared in a semi-liquid 1.6% agar medium according to the method recommended by the scientists of the Institute of Microbiology of the Russian Academy of Sciences [13]. Sown seeds were harvested for 3 days in a 28°C thermostat. The harvested seeds were grown in phytotrons.



Figure 1. Inoculation of seeds with biological products

RESEARCH RESULTS AND THEIR DISCUSSION

Laboratory research was conducted in the laboratory of Tashkent Agrarian University. 1.6% agar was added to sterile solutions. After the sterile seeds had dried for some time, they were inoculated with Elisitor and Zamin-M bioproducts for one hour. After inoculation, the seeds were sown in test tubes on the basis of 4 variants. Option 1 was Inoculated Seeds with Organika-S, Option 2 was Elisitor, Option 3 was Zamin-M bioproducts, and non-inoculated seeds were used

as control. Seeds sown in test tubes were stored in a thermostat at a temperature of 28°C. In variant 2 seeds, which were initially stored in a thermostat for 3 days, primary roots were formed from the sprouts. No root formation was observed in other variants. The test tubes were placed in the phytotron after 3 days and observations were made for 15 days. According to the observations, only semi-liquid (1.6%) agar continued to grow if the inoculated plant seeds with variant 2 Elisitor continued to grow, and the plants in the other variants lagged behind in growth and development (Fig. 2).



Figure 2. Growing prickly artichoke plant (1.6%) if with Elisitor bioproduct.

CONCLUSION

Hence, the use of elysitor stimulates the growth and development of plants even under sterile conditions and has a positive effect on their development. From this it can be concluded that the elisitor can be used as a natural stimulant in vitro and it does not interfere with maintaining sterile conditions.

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