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THE SECRETION OF SIDEROPHORES BY SOME STRAINS OF *PANTOEA AGGLOMERANS*

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Pantoea agglomerans is distributed in nature as a commensal, epiphyte, and endophyte of plants and animals. The strains of *P. agglomerans* are sensitive to polyvalent virulent phages, such as phages of plant pathogen *Erwinia amylovora*.

The *P. agglomerans* strains are the most promising among the biocontrol agents, since they can be antagonists to phytopathogens and they have antibacterial and antifungal activity, they are capable of competition in the colonization of plants.

The identification and study of antibacterial properties of *P. agglomerans* metabolites can become one of the methods for solving urgent agriculture problems. It is known that the strains of *P. agglomerans* produce a large amount of biologically active substances. Among them there are also siderophores.

Siderophores are low-molecular substances that chelate ions that are released by microorganisms and plants with deficiency of iron ions in the environment. Some studies have shown that the production of siderophores by bacteria, that are stimulised the plant growth was the most effective mechanism in phytopathogen control [3]. The relationship between siderophores and virulence of microorganisms is proved, and approaches for their clinical application are being developed[1].

The plant strain *Bacillus megaterium* 484 was used as a control for the presence of siderophores.

To isolate the bacterial siderophores, a daily culture was prepared in 5 ml of LB medium and incubated at 28 ° C for 24 hours with aeration. Chromium azurol S (CAS) 60.5 mg was dissolved in 50 ml of H2O and mixed with 10 ml of solution (1 mM FeCl3 6 H2O in 10 mM HCl). NDTMA solution 72.9 mg was dissolved in 40 ml

of H2O. A solution of chromium azurol was added at constant instillation to a solution of NDTMA. The resulting solution was autoclaved at 0.5 atm for 30 min. The total volume of the solution was 100 ml. To 900 ml of sterile solution was added 900 ml of LB medium at pH 6.8. The resulting non-hot solution was poured into sterile Petri dishes and waited for complete hardening. After that, 5 µl of 24 hours of culture was dripped in the center of a Petri dish and left to dry for 5-10 minutes in a laminar box. Cultivation was carried out at a temperature of 28 ° C for 5 - 7 days [2].

It is shown in the literature that bacteria which can produce siderophores absorb iron ions of the medium and form yellow or orange zones around the colonies. The control dish with the medium had a bright blue color (Fig. 1 (B)). The strain of *B. megaterium* 484 was used as a control, its colonies formed a yellow zone (iron utilization zone) around them, while the other environment had a brightly colored blue color (Fig. 1 (A)). Such a characteristic yellow zone is formed precisely at the expense of secretion with the membrane siderophores, which are inherent *B. megaterium*.

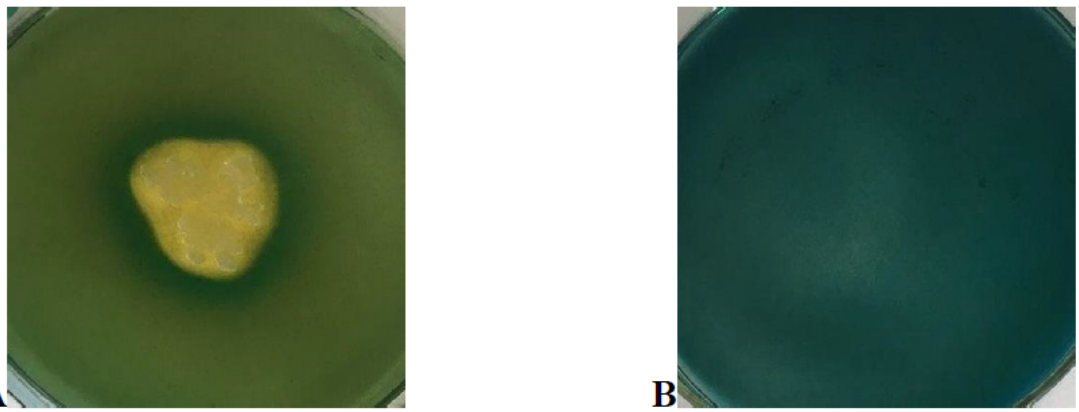

Fig. 1. The production of siderophores: A) the control strain *B. megaterium* 484; B) the control medium with iron ions (Fe^{3+})

The *P. agglomerans* strain №9№7(0)2 was characterized by the smallest zone of iron utilization around the colony in comparison with other strains. The largest zone of iron utilization around the colonies was noted in 3 strains of *P. agglomerans:*

g157(1)2, g157(2)3 and *№2* (fig. 2 (A, B and C). The other studied strains were characterized by the same zones of iron utilization.

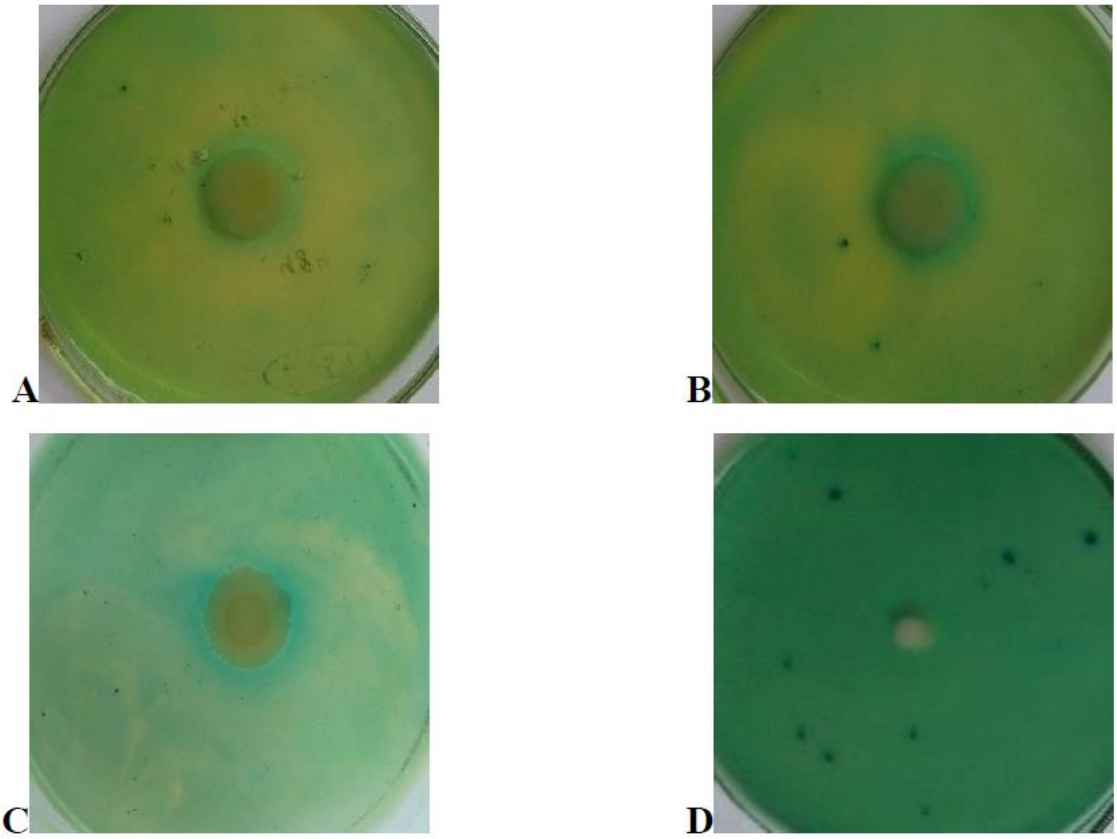

Fig. 2. The production of siderophores by strains of *P. agglomerans:* A) *P. agglomerans* g157(1)2; *B*) *P. agglomerans* g157(2)3; C) *P. agglomerans №2*; D) *P. agglomerans* №9№7(o)2.

The blue aureole was formed around the colonies of *P. agglomerans* and the other selective medium had a yellow color. Probably the siderophores formed by the *P. agglomerans* strains are not bound to the membrane and are secreted into the environment.

Nowadays, there are many studies that have shown positive properties of *P. agglomerans*. These properties also include the ability to produce siderophores. Certain strains isolated from plants positively influenced the germination of wheat seeds and inhibited the growth of fungal microphlora. Based on the work results, it is possible to use *P. agglomerans* in agriculture in order to increase yields.

LITERATURE

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MARKER LIPIDS IDENTIFICATION FOR THE DETECTION OF RESISTANT AND ANTIBIOTICSENSITIVE *STREPTOCOCCUS PNEUMONIAE*

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Streptococcus pneumoniae is an important pathogen that causes respiratory-tract infections, sepsis, meningitis and pneumonia. *S. pneumonia* commonly causes diseases in the youngest and oldest sections of the population and patients with immunodeficienciesin both more and less developed countries [1].

Autolysis is one of the virulence factors that is induced by specific enzyme LytA during stationary phase of growth. Autolysis occurs due to drug treatment or nutritional starvation and not shown in logarithmic phase. Autolysis facilitates spread of toxins in infected organism [2].

The aim of this study was to find differences in lipid profiles of drug resistant and non-resistant *Streptococcus pneumoniae* and a possible target for a new antibacterial compound 2A.