

## THE CHARACTERISTICS OF *PSEUDOMONAS* BACTERIA IN THE PLANT RHIZOSPHERE

Tyagniryadno L., Rusakova M.

*Department of Microbiology, Virology and Biotechnology, Odessa National I.I. Mechnikov University, Dvoryanska str. 2, 65082 Odessa, Ukraine*

E-mail: tiagniriadno98@mail.ru

Antagonism is one of the main symbiotic relationship type in which one participant (antagonist) completely inhibits or slows the growth of another (Bukharin O., 2006). *In vivo* the most antagonistic relationships are in plant rhizosphere microbiota (Xing-Feng Huang, 2014). All of them are in close relations with plant roots that resulted in influence on plant growth and productivity in generally. Specific microorganisms are able to protect the plant either directly or indirectly against pathogens, but also they largely influence on the rest of the microbial community (Kamble K.D., 2015). The largest number of plant rhizosphere microbiota members includes *Pseudomonas* bacteria that are regarded as plant-growth-promoting rhizobacteria (PGPR) (Sivasalkhi S., 2014).

The *Pseudomonas* strains are able to solubilize phosphorous in soil and increase its availability to plants (Ben J., 2000). Non-symbiotic nitrogen fixation has a great agronomic significance. One main limitation that it faces is the availability of carbon and energy source for the energy intensive nitrogen fixation process (Kharkhun E., 2013).

*Pseudomonas* strains produce indole-3-acetic acid that is the member of the group of phytohormones and is generally considered the most important native Auxin. It functions as an important signal molecule in the regulation of plant development including organogenesis, tropic responses, cellular responses such as cell expansion, division, and differentiation, and gene regulation (Nehra V., 2011).

Selected strains of *Pseudomonas* trigger a plant mediated induced systemic resistance (ISR) response that is effective against of plant pathogens. ISR is a plant-mediated mechanism resembles classic pathogen-induced resistance, in which non-infected parts of previously pathogen-infected plants become more resistant to further infection (Weller D. M., 2007).

Some *Pseudomonas* strains produce chelating agents called siderophores with high affinity for iron absorption. *Pseudomonas* spp. produces diffusible and volatile antibiotics that inhibit pathogens. They include six classes of compounds: phloroglucinols, phenazines, pyoluteorin, pyrrolnitrin, lipopeptides and HCN. (Xuemei Shen, 2013).

The use of fluorescent *Pseudomonas* as PGPR or Biological Control Agents requires the precise understanding of the interactions between plant – bacteria, among bacteria – microbiota and how biotic and abiotic factor influence on this relationship. Recent advances in studies of the intra- and interspecies signaling are providing an important area for scientific research, as well as, relevant application (Usharani G., 2014).