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THE DEVELOPMENT OUTLOOK
IN THE 21st CENTURY**



ABSTRACTS BOOK

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THE POSSIBILITY OF USING THE STRAIN *BACILLUS MYCOIDES* 2₄ FOR BIOREMEDIATION OF SOIL CONTAMINATED BY OIL AND RESINOUS-SUBSTANCES ASFALTENOVYH.

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To date, bioremediation of oil-contaminated soils may provide a cost-effective and environmentally safe reduction of the concentration of the most common and highly toxic environmental pollutants - oil spills to their background values. Obstacle in achieving this goal is the lack of experimental data to study the ability of resistant to extreme environmental conditions biochemically-active microorganisms to decompose the oil, turning it heavy fraction can be readily oxidized in an emulsified state due to the production of biosurfactants.

The object of the research was selected the bacterial strains isolated from salt soil of the area of the Zmiiny island with chronic oil pollution and high content of resin-asphaltene substances. On the totality of morphological, cultural and physiological-biochemical characteristics the strain was identified to the species *Bacillus mycooides* 2₄.

The method of IR-spectrometry with using the "ИКС-29" confirmed: biodegradation of 0.1% oil (10 mg oil/10 ml of bacterial suspension) density 0,84 g/cm³ in the presence of strain *Bacillus mycooides* 2₄ in conditions of high salinity is 75-77%. Additionally installed: on a nutrient medium M-9 in the absence of peptone and yeast extract of the strain *Bacillus mycooides* 2₄ produces the biosurfactants is largely exogenous type. This was evidenced carried out by the method by Wilhelmy strain studies of surface active properties bacterially suspensions of strain *Bacillus mycooides* 2₄ and its supernatant.

A feature of the isolated strain of *Bacillus mycooides* 2₄ was a manifestation of his low sensitivity to most antibiotics (with the exception of class IV - tetracyclines) from different classes: beta-lactams, penicillins, macrolides, aminoglycosides, polypeptides, chloramphenicol and lincosamides.

Detected biochemically-active multifunctionality and antibiotic resistance of the strain *Bacillus mycooides* 2₄ allows to recommend its use in biotechnology clean up the environment from petroleum products, including from the resinous-asphaltene substances, in conditions of high salinity.

Gritsay R.V., Varbanets L.D.

LIPOPOLYSACCHARIDES FATTY ACID COMPOSITION OF *RALSTONIA SOLANACEARUM* STRAINS OF DIFFERENT GEOGRAFIC ORIGIN AND THEIR SENSITIVITY TO POLYMYXIN B.

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Gram-negative bacteria lipid A composition features are responsible for intensity of its biological properties, in particular the involvement in outer membrane barrier function. Quarantine bacteria *Ralstonia solanacearum* lipid A chemical composition it is not well established yet, considering appreciable area of distribution of the phytopathogen.

Investigation of lipid A of *R. solanacearum* six strains of different geographical origin reveals a high level of heterogeneity by its quantitative and qualitative chemical composition. All studied lipopolysaccharides contained tetradecanoic, hexadecanoic, octadecanoic and octadecenoic acids. Key difference among the strains consisted in presence of hydroxyl fatty acids, which are obligatory for lipid A. 3-hydroxydodecanoic acid was present in all lipopolysaccharides of study, strains of Vietnamese origin – TX1 та TS3 distinguished by lack of 3-hydroxytetradecanoic acid, whereas strain 35, isolated in Ukraine, characterized by absence of 3-hydroxyhexadecanoic acid.

Well known, that lipid A glucosamine C4'-phosphate substituents, in particular L-Ara4N, are responsible for bacteria resistance against several polycationic antibiotics including polymyxins. Only 4 of 6 studied *R. solanacearum* strains demonstrated sensitivity to polymyxin B, according to growth delay zones on Petri dishes in 1,3-2,0 cm diameter formed, which indicate about absence of L-Ara4N in their lipopolysaccharides. The antibiotic resistant strains – 7954 та TS3 characterized by presence of dodecanoic acid.

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LEAF BLIGHT DISEASE OF APPLE TREES AND ITS AGENT *RHYNCHITES BACCHUS* L.

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The crucial task of today is the increase of quality apple production in Ukraine. The creation of the greater variety of plant production as well as the improvement

of the systems of plant protection against pests and diseases call for special attention. In recent years such plant pests as leaf-rolling weevils (*Attelabidae*): *Coenorhinus pauxillus* Germ. and *Rhynchites bacchus* L. cause significant damage to fruit trees, feeding in fruit-buds, terminal shoots, or are leaf miners. In fact, *Rhynchites bacchus* L. is a disease excitant of fruit rot (*Monilia frustigena*). In the course of our research it was found out that in some private apple saplings of Cherkasy region the sapling leaf-blight disease is observed *Erwinia amylovora*. The disease not always declares itself in accordance with organ response to pathogenic agent. This phenomenon depends on environmental conditions, in particular on temperature and moisture content.

In Ukraine the above-mentioned conditions for phytopathogenic progression are observed during the healthy plant growth, consequently the reducing trend in the number of leaf-blight should be observed. However, in the course of our research it was found out that there is a disease excitant, which appears in unpredictable periods. The comprehensive analysis of this phenomenon becomes the one of immediate interest. The research reveals that the disease excitant of *Erwinia amylovora* is *Rhynchites bacchus* L. Therefore, in order to reduce the number of pests (*Attelabidae*) as well as to reduce the apple saplings damages, the strict methods to regulate and control the number of pests should be introduced in each nursery-garden. Currently the chemical method of pest control is the main regulator of the number of plant pests in each farm ecosystem. The previously obtained results of the research reveal that the use of such pest control chemicals as Kalipso 480 SC, (0,25 liter per hectare), Mospilan SG, (0,5 kg per hectare), Konfidor 200 SL (0,25 liter per hectare) and Proteus 110 OD (1,0 liter per hectare) is the durable effective method to reduce the number of plant pests and apple saplings damages in nursery-gardens.

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IDENTIFICATION OF THE AGENT OF TOMATO BACTERIAL SPECK IN THE FARMS OF ZAPOROZHYE REGION.

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In 2014-2015 in Zaporozhye region farms on the leaves of tomato plants has been found lesions in the form of spots of dark brown-to-black color. Some spots were surrounded by a yellow halo on the leaf edges. When spots are numerous, foliage turns yellow and eventually dies, leading to defoliation of the lower portion

of the plant. Fruit lesions were small black spots with a water-soaking area. The symptoms are typical for bacterial speck (caused by *Pseudomonas syringae* pv. tomato) and black bacterial spot (caused by *Xanthomonas vesicatoria*). It is difficult to reliably distinguish bacterial spot from bacterial speck based on visual symptoms.

The aim of the work was the identification of bacterial speck agent among isolates from infected tomato plants.

Tomatoes with bacterial lesions were obtained from Zaporozhye region farms in different periods of the growing season. Studies carried out by standard microbiological and phytopathological methods. Serological properties were determined using reaction microagglutination with antiserum to type strain *P. syringae* pv. tomato R140. Antigens for agglutination were live bacterial cultures isolated from infected tissues of tomato. Agglutination test was positive if like flakes or grains precipitate were formed on the experimental glasses.

From plants with bacterial lesions were selected isolates that form gray-white round smooth shiny surface colonies. Such colonies typical for bacteria of the *Pseudomonas* genus. Two bacterial isolates – IZ28, IZ46 – have cultural and biochemical properties such as *P. syringae* pv. tomato. It has been established that bacterial isolates IZ28, IZ46 gave agglutination reaction with antiserum to *P. syringae* pv. tomato R140.

Thus, bacteria, isolated from infected tomato plants, have been identified as *P. syringae* pv. tomato, based on morphological, biochemical and serological properties. So, the caused agent of bacterial speck has been determined in the Zaporozhye region farms.

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IMMUNOMODULATORY PROPERTIES OF BACTERIAL LIPOPOLYSACCHARIDES IN *ARABIDOPSIS THALIANA* PLANTS.

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The role of bacterial lipopolysaccharides (LPS) as a major outer membrane component of gram-negative bacteria is important in plant host recognition of pathogenic microorganisms and their further interactions. It is known that LPS biological activity and molecules' physical condition is influenced by the LPS isolation method. The correlation between LPS molecule conformation and its

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