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BIOLOGICAL ACTIVITY OF PEDIOCOCCI ISOLATED FROM TRADITIONAL UKRAINIAN FERMENTED FOODS

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Abstract. Some technological properties of *Pediococcus* spp. strains were investigated in this study to evaluate their potential for practical use in the food industry. The antagonistic activity towards opportunistic pathogens, anti-listeria activity, NaCl resistance and fermentative activity suggest that *Pediococcus* spp. strains have great potential as starters for the production of fermented foods.
Keywords: *Pediococcus*, antagonism, *Listeria monocytogenes*, fermented foods.

Bacteria of the genus *Pediococcus* are Gram-positive, catalase-negative cocci belonging to the family *Lactobacillaceae*. Compared with other members of the lactic acid bacteria (LAB) group, pediococci are not as widely used, but are no less promising for the food and pharmaceutical industries. Bacteria of the genus *Pediococcus* are frequently found in fermented milk products, meat, sourdoughs, and fermented vegetables and fruits (Lu et al., 2024). Due to their biological activity, bacteria of the genus *Pediococcus* have a wide range of applications (Plessas et al., 2020; Nakashima et al., 2024).

As well as providing typical organoleptic characteristics to fermented foods, *Pediococcus* spp. are known as producers of effective biopreservatives, as demonstrated in numerous studies (Porto et al., 2017). This property is mediated by pediocins – peptide bactericidal agents involved in the mechanisms of interspecific competition. In addition to its antagonistic activity against common opportunistic and enteric pathogens, *Pediococcus* spp. inhibits the growth of *Listeria monocytogenes* – the pathogen that causes listeriosis, a serious form of foodborne infection (de Azevedo et al., 2020). The fermentation of foods by *Pediococcus* spp. not only improves their organoleptic qualities but also prevents the proliferation of undesirable microbiota in raw materials, thereby preventing spoilage and food poisoning.

Sixteen *Pediococcus* spp. strains from the LAB culture collection of the Department of Physiology of Industrial Microorganisms, isolated from spontaneously fermented milk, cottage cheese, tomato juice, cabbage and apples, were used in this work. Some of these strains were previously selected as potential producers of gamma-aminobutyric acid (GABA) based on results of a rapid colourimetric glutamatedecarboxylase assay, which evaluates the ability for intracellular GABA synthesis. The aim of the study was to determine the technological characteristics of *Pediococcus* spp. strains to evaluate their potential for use as starter cultures in the food industry.

The results of the antagonistic activity assay using the well diffusion method showed inhibition of *L. monocytogenes* and varying degrees of growth inhibition of Gram-positive and Gram-negative opportunistic bacteria, such as *Pseudomonas aeruginosa*, *Escherichia coli*, *Salmonella enterica*, *Klebsiella pneumoniae*, *Bacillus cereus* and *Staphylococcus aureus*. All *Pediococcus* spp. strains used were resistant to 6 % NaCl and fermented fructose and maltose. Sucrose was fermented by 75 % of the *Pediococcus* strains, whilst lactose was fermented by only 25 % of the strains. The low β-galactosidase activity was confirmed by a slight increase in total titrable acidity (TTA) of milk during growth in milk; with the exception of some *Pediococcus* strains, the TTA of the milk inoculated with them reached

33–40 °T. Due to the ability to ferment maltose, the *Pediococcus* strains used are promising candidates for use in sourdough starters; during the fermentation of a flour/water mixture, the acidity levels reached the required values (12–16 °T, depending on the type of flour).

Thus, pediococci isolated from traditional fermented foods in Ukraine exhibit important technological properties and are promising candidates for the development of bacterial preparations for the production of fermented foods. Further research is required to assess their safety for human health and their probiotic properties.

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BACTERIA FROM HOSTILE HABITATS AS PRODUCERS OF AUXIN-LIKE COMPOUNDS

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Abstract. The ability of four bacterial strains isolated from habitats with adverse conditions (leachate from the Lviv municipal solid waste landfill, Antarctic substrates, and soils disturbed by military operations) to synthesize auxin-like compounds was investigated. We used LB and NB media for culturing the bacteria. It was found that *Pseudarthrobacter* sp. 3B-K-54 accumulated up to 100 μg/mL of auxins in both media, whereas *Kocuria* sp. S309 was more efficient on LB. Oxygen conditions affected biosynthesis: under stationary cultivation, auxin levels decreased 3–7 times compared to aerated samples. Optimizing the L-tryptophan content (1–5 %) stimulated biosynthesis and increased product yield by 5.5–9.7 times, confirming the biotechnological potential of the studied strains as a basis for PGPR preparations.
Keywords: auxin-like compounds, *Kocuria*, *Micrococcus*, *Ochrobactrum*, *Pseudarthrobacter*.

Background. Auxins, in particular indole-3-acetic acid, are key phytohormones that regulate plant growth and development (Etesami & Glick, 2024). The use of rhizosphere and endophytic bacteria capable of synthesizing phytohormones is considered an environmentally safe alternative to chemical fertilizers and growth stimulants (Zhang et al., 2022;