

# BIOTECHNOLOGY

UDC531/534/: [57+61]

## FEATURES OF THE FATTY ACID PROFILE OF NON-PATHOGENIC STRAINS *AEROMONAS ICHTHIOSMIA* ONU552, *BACILLUS SUBTILIS* ONU551-DESTRUCTORS OF PHENOLIC COMPOUNDS

N. B. RADYSH, E. V. LEBEDEVA, O. V. VOLIUVACH,  
O. G. GORSHKOVA, T. V. GUDZENKO

I. I. Mechnikov Odessa National University, Ukraine;  
e-mail: tgudzenko@ukr.net

**Introduction.** The search for new environmentally safe biological products designed to clean the environment from toxic organic pollutants remains a pressing problem of our time.

**Methods.** The modern method of gas chromatography using automatic MIDI Sherlock microorganism identification system (USA) based on the Agilent 7890 gas chromatograph on the composition of fatty acids confirmed the species identification of bacterial strains F-2, F-13, isolated from wastewater produced by pharmaceuticals. The non-pathogenicity of the isolated strains *in vitro* and *in vivo* was evaluated.

**Results.** The features of the fatty acid profile of the strains *Aeromonas ichthiosmia* ONU552 (F-2), *Bacillus subtilis* ONU551 (F-13)-destructors of phenolic compounds and antagonists of pathogenic microbiota were noted for the first time: the presence of 16:1 fatty acid strains in the cell lipids of each of the strains fatty acids 17:0 and iso and 17:0 anteiso. The minimum total content of branched fatty acids 17:0 in the form and iso and anteiso is fixed in the fatty acid profile of strain *A. ichthiosmia* ONU552 (w = 1.69%), and the maximum w = 17.35% - in strain *B. subtilis* ONU551.

**Discussion.** A thorough comparative analysis of the chromatographic results we obtained with the literature data showed that the strain *A. ichthiosmia* ONU552 we studied was close enough not to *A. hydrophila* with pathogenic properties, but to the non-pathogenic strain *A. sharmansp. nov.* GPTSA-6T: chromatograms of both bacterial strains detected fatty acids of 16:0, 18:1 w7c, 12:0, 14:0,  $\Sigma$ 14:0 3OH/16:1 iso I. A comparative analysis of the obtained fatty

acid profile of the *B. subtilis* ONU551 strain did not fix the isomers of saturated fatty acids: 12:0 iso, 13:0 iso and 13:0 anteiso, which are characteristic of the pathogenic strain *B. cereus*. Detailed analysis of the fatty acid profile of the strain *B. subtilis* ONU551 showed the presence of unsaturated fatty acid isomers: 15:1 w5c (1.85%); 16:1 w11c (1.21%); 16:1 w7c alcohol (1.08%); 17:1 iso w10c (3.18%) and the sum of acids  $\Sigma$ 17:1 iso I/anteiso B (2.57%). This distinguishes it from members of the genus *Bacillus* of group 2 (*B. sphaericus*, *B. fusiformis*, *B. insolitus*, *B. pasteurii*, *B. psychrophilus*), which are characterized by a significant content of isomers with unsaturated bonds (w = 17-28%) and made it possible to classify strain *B. subtilis* ONU551 to *Bacillus* of group 1 (*B. amyloliquefaciens*, *B. atropheus*, *B. licheniformis*, etc.), for which the content of unsaturated fatty acid isomers is less than 10%.

**Conclusions.** The identified features of the fatty acid composition of the strains *A. ichthiosmia* ONU552, *B. subtilis* ONU551 are systematized and distinguish them from other bacteria. An assessment of the pathogenicity of *A. ichthiosmia* ONU552, *B. subtilis* ONU551 strains *in vitro* (on a model of human cell culture lines - Hep2 and RD and animals - L20B) and *in vivo* (on white laboratory mice) showed that there are no bacteria-destroyer strains virulent and toxigenic properties. A positive result was also obtained as a result of biotesting on hydrobionts - on *Daphnia magna* test objects for 7 days. Discovered reveals the limits of practical use of the studied strains of microorganisms in environmentally safe biotechnology for cleaning the environment from highly toxic organic pollutants.