

BIOMARKERS FOR SPECIES-SPECIFIC DETECTION OF A SOIL STRAIN OF *BACILLUS MEGATERIUM* 22-DESTRUCTOR OF ORGANIC COMPOUNDS

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The progress of environmental biotechnology depends critically on the formation and constant replenishment of the stock of cultures of microorganisms possessing. The ability to decompose and utilize toxic compounds has been studied. The aim of the work is to offer reliable criteria - biomarkers for species-specific detection of a non-pathogenic strain of a microorganism isolated from an oil contaminated soil that has an oxidizing ability with respect to most organic compounds (petroleum products, synthetic surfactants, phenols).

The fatty acid analysis of the strain under investigation was carried out by comparing it with known standards using an automatic microorganism identification system Sherlock (MIDI, USA) based on the Agilent 7890 gas chromatograph (Agilent Technologies, USA).

The dominant in the fatty acid profile of the bacterial strain 22 were the isomers of saturated fatty acids (56.6%), of which 16.9% and 23.3% were the C13:0 and C15:0 isomers. The total content of isomers of saturated fatty acids with an odd number of carbon atoms in the hydrocarbon radical (43.3%) was 3.25 times higher than the total isomer content of saturated fatty acids with the even number of carbon atoms in the hydrocarbon radical (13.3%). Among the fatty acids of the normal structure, fatty acids with the even number of carbon atoms in the hydrocarbon radical are found, namely: lauric (dodecanoic) C12:0, myristic (tetradecanoic) C14:0 and

palmitic (hexadecanoic) acids C16:0 in an amount of 1.1, 6.6 and 2.6%. The fraction of the acids C13:0 anteiso and C15:0 anteiso from the total area of the peaks was 3.1 and 5.2%. With the total content of saturated fatty acids - 75.2% from the number of cellular lipids of the strain 22 under study, their exaggeration with respect to unsaturated fatty acids (17.8%) is quite noticeable. A characteristic feature is that with the same number of carbon atoms in the hydrocarbon radical (C16), the total proportion of saturated fatty acids C16:0 (2.6%) and C16:0 iso (4.8%) is 1.78 times less than the fraction of unsaturated C16 fatty acids: 1 w6c/C16:1 w7c (13.3%). The saturation factor (K_{nas}), calculated from the ratio of total saturated fatty acids to unsaturated fatty acids, can serve as a biomarker value, for strain 22 it is 4.2. Biomarkers for detection of selected biochemically active strain 22 with organic compounds are hydroxy acid C15:0 2OH ($\omega = 0.6\%$) and a fragment of hydroxy acid C14:0 3OH, ω (C14:0 3OH/C16:1 iso I) = 3, 3%.

According to the obtained fatty acid composition, deciphered using the Library RTSBA6 6.21 program Version 6.2. Of the Sherlock MIDI system, the microorganism studied was identified with a high similarity index to the genus *Bacillus megaterium* 22. Reliable biomarkers were detected for species-specific detection of the soil strain of *B. megaterium* 22-destroyer of organic compounds.