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Biodegradation and biostability of mineral and biological fuels

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Abstract

Property of microorganisms to metabolize hydrocarbons of solid, liquid and gaseous petroleum products was known in the early XX century and named the field of oil producing, oil refining and petrochemistry, especially during exploitation of mineral and biological fuels. There is a necessary condition for development of microorganisms – higher temperature (20-35ºC), presence of water and nutrients in fuel. The appearance and development of microorganisms complex in fuels leads to deterioration of their physical, chemical and exploitation properties due to changes in their hydrocarbon composition, accumulation of microbial slime and sludge formation of stable emulsions. Today it is known 200 species of microorganisms that can use hydrocarbons as sole source of carbon and energy.

It is proved that biocontamination of fuel is connected to microbiological enzymatic oxidation of hydrocarbons with formation of organic acids that have surface active properties. Hydrocarbons with a linear structure of the molecules are destroyed faster than their branched isomers. Aliphatic hydrocarbons (paraffin's) are less biostable than aromatic. Therefore, fuels that contain mostly paraffin hydrocarbons can be destroyed by microorganisms faster than those containing more aromatic compounds. The processes of microbial oxidation of hydrocarbons are very complex, because the processes of biogenic oxidation have an influence of many factors: moisture, environment acidity (pH), temperature, osmotic pressure, and so on. From the physiological characteristics of each kind of microorganism depends orientation process of individual hydrocarbons destruction and their mixtures that have different degrees of resistance to oxidation.

Among the variety of protection methods of microorganisms was found that the most effective method of protecting mineral and biological fuels from microbiological contamination (biological stability of mineral and biological fuels) is the use of antimicrobial (biocide) additives.

Biography

Shkilniuk Iryna has postgraduate studies at National Aviation University. She is the chief of Testing Center of products "UCAH-SEPRO" of the National aviation university. She has published more than 12 papers in reputed journals and collections of conference.