Petrochemistry-2013

OMICS Group Conferences
Accelerating Scientific Discovery

World Congress on
Petrochemistry and Chemical Engineering

November 18-20, 2013 Hilton San Antonio Airport, USA

Formation of n-alkanes by bacteria *Arthrobacter* sp. RV and *Pseudomonas aeruginosa* RM

Gordadze G N and Stroeva A.R.

Gubkin Russian State University of Oil and Gas, Russia

Abstract

Processes of petroleum hydrocarbons (HC) formation in literature have been discussing for 200 years. At present time there are two main theories of oil formation: organic (sedimentary-migration) and inorganic (abiotic). It is believed that n-alkanes formed from n-saturated fatty acids by decarboxylation. It is known that in the original organic matter (OM) fatty acids with an even number of carbon atoms in the molecule are prevail. In case sapropelic OM, low molecular weight acids (n-C_{16}, n-C_{18} and n-C_{20}) are mainly produced and if OM is humus higher molecular (n-C_{26}, n-C_{28} and n-C_{30}) are produced. It is important to note there are high molecular n-alkanes C_{23}, C_{25}, C_{27}, C_{29}, C_{31} and C_{33} in soil OM. Bacterial synthesis of n-alkanes could be accounted by decarboxylation with relatively high temperatures. However, this phenomenon doesn't support by experiment. In this work we studied, if n-alkanes with an odd number of carbon atoms in the molecule formed by bacteria.

The objects of study were the hydrocarbon aerobic bacteria *Arthrobacter sp.* RV and the bacteria *Pseudomonas aeruginosa* RM, that are able to both aerobic and anaerobic growth in the process of denitrification. Both strains were grown in a mineral medium with glucose. As a result of vital activity of *Arthrobacter sp*. RV and *P.aeruginosa* RM n-alkanes with an odd number of atoms of "C" in the molecule formed. Both strains synthesized n-C_7, n-C_9, n-C_{11}, n-C_{13}, n-C_{15} and n-C_{17}. At the same time unsaturated n-fatty acids with an even number of atoms, n-C_8, n-C_{10}, n-C_{12}, n-C_{14}, n-C_{16} and n-C_{18} are generated in both species of bacteria. *Arthrobacter sp.* RV and *P.aeruginosa* RM synthesized unsaturated irregular izoprenan - squalene (2,6,10,15,19,23-geksametiltetrakoza-2,6,10,14,18,22-hexaen).

Thus, n-alkanes with an odd number of carbon atoms are dominated not only by decarboxylation process, but during bacterial synthesis

Biography

Guram N. Gordadze is a Doctor of Geological and Mineralogical Sciences and Candidate (PhD) of Chemical Sciences, professor, member of the Russian Academy of Natural Sciences, a laureate of numerous awards, such as the Academician Gubkin Prize (2011), Vernadsky Prize (2010), etc. Head of the Laboratory of Chemistry of petroleum hydrocarbons (Department of Organic Chemistry and Petroleum Chemistry of the Gubkin Russian State University of Oil and Gas). Member of Scientific Councils of the Gubkin Russian State University of Oil and Gas and VNIIgeosystem. A member of editorial board of the journal «Petroleum Chemistry». Author of over 300 scientific publications. The areas of my research interests are the origin of petroleum, oil and gas exploration and reservoir geochemistry, the study of biomarkers and cage hydrocarbons (diamondoids), modeling of oil formation.