

The Black Sea Sapropel and Sapropelic Sediments As a Raw Material for Production of New Types of Complex Fertilizers

Evgeniy F. Shnyukov¹, Volodimir O. Emelyanov², Tamara S. Kukovska¹(kukovska@bigmir.net) ,
and Albert P. Ziborov¹

¹SSI “Department of Marine Geology and Sedimentary Ore Formation of NAS of Ukraine”

²Institute of Geological Science, NAS of Ukraine

Formation of sapropels and sapropelic sediments in the Black Sea is confined to Holocene time. The geological study of these sediments has shown their wide distribution over the whole basin (from depths of 400-500 m), and in the vertical section of deep-water sediments. Their material composition and properties (established by different modern techniques), as the results of laboratory, vegetation, micro-field and field tests indicate the type of sediments which are similar to the lake sapropels upon the composition and useful properties. Agrochemical characteristics of marine sapropels demonstrate promising indicators on the content of: organic matter – up to 22-25 %; total nitrogen – 1,34 % of the dry weight (close to that of humus – 1.38%); calcium and magnesium – markedly higher than those ones for humus and lacustrine sapropels. Marine sapropels also contain zinc, copper, manganese, nickel and other trace elements valuable for plant nutrition with concentrations that are below their maximum permissible values for agricultural applications.

The pilot test to add sapropel-based fertilizer to alkaline soils of Polissya and to “black earths” of forest-steppe zone in the Right Bank of Ukraine, including those contaminated with radionuclides (up to 15 Ku / km²) has shown that application of this nitrogen-phosphorus-potassium sapropel-based fertilizer and some sorbents reduces necessary weight dose of a fertilizer by 17 times, and increase its efficiency by 20-30% and even 50%.

According to our preliminary estimates, the resources of this organic-mineral raw material in the Black Sea may reach 3.2×10^{11} m³.

Prospect area for sapropel production (10 km²) has been selected in the north-western Black Sea, in exclusive (maritime) economic zone of Ukraine. Preliminary assessment of sapropel resources was made using available data by the date. According to this assessment sapropel resources (for average thickness of deposits of 40 cm) consist of 500 thousands km².

The above results for the first time encourage geologist to be involved into development of the Black Sea sapropel deposits.

Nowadays, world practice has not an experience to use marine sapropel as minerals (for agriculture and industrial purposes). It is known only one fact of mining of diatomites on the Californian continental slope in the 60s of the last century. Diatomites were produced through the aerolifting system for 10 years with annual output of 1 mln ton at trial cost of 42-45 USD per ton.