



Multi proxy chemical properties of freshwater sapropel

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Freshwater sapropel is organic rich lake sediment firstly named “gyttja” by Hampus van Post in 1862. It is composed of organic remains such as shell detritus, plankton, chitin of insects, spores of higher plants and mineral part formed in eutrophic lake environments. The most appropriate environments for the formation of sapropel are in shallow, overgrown post-glacial lakes and valleys of big rivers in boreal zone, while thick deposits of such kind of organic sediments rarely can be found in lakes on permafrost, mountainous regions or areas with increased aridity. Organic lake sediments are divided in 3 classes according the content of organic matter and mineral part: biogenic, clastic and mixed. The value of sapropel as natural resource increases with the content of organic matter and main applications of sapropel are in agriculture, medicine, cosmetic and chemical industry. The research of sapropel in Latvia has shown that the total amount of this natural resource is close to 2 billion m³ or ~500 million tons. Sapropel has fine, dispersed structure and is plastic, but colour due to the high natural content of phosphorus usually is dark blue, later after drying it becomes light blue. Main research of the sapropel nowadays is turned to investigation of interactions among organic and mineral part of the sapropel with living organisms thus giving the inside look in processes and biological activity of the formation. From the chemical point of view sapropel contains lipids (bitumen), water-soluble substances that are readily hydrolyzed, including humic and fulvic acids, cellulose and the residual part, which does not hydrolyze. In this work we have analyzed the class of organic sapropel: peaty, cyanobacterial and green algal types, as well as siliceous sapropel, in order to determine the presence of biologically active substances, including humic substances, proteins and enzymes as well as to check free radical scavenging activity. Samples were collected from lakes which are recognized as promising for sapropel extraction and the study may benefit the use of sapropel for soil amendments, feed additives and chemical processing.