Comparative analysis of industrially produced and reference humic substances

Upska K.[1], Klavins M.[2], Viksna A.[1]
[1]Faculty of Chemistry, University of Latvia, Riga, Latvia, karina.upska@lu.lv, arturs.viksna@lu.lv
[2]Department of Environmental Science, University of Latvia, Riga, Latvia, maris.klavins@lu.lv

Keywords: humic substances, authentification, stable isotopes

doi: 10.36291/HIT.2019.upska.129

Humic substances have a wide spectrum of biological activity and therefore have found applications in agriculture, veterinary, medicine, environmental technologies. Large quantities of humic substances are produced in many countries around the world and their use in various areas of the economy is developing. However, it should be noted that the structure and properties of humic substances depend on their origin. However, as humic substances can be obtained from diversity of different sources using different extraction, concentration and purification methods, their properties and structure have high variability. All these factors can influence properties and thus also application areas. Some manufactures do not always correctly identify the sources of the humic substances, and their use is not always justified. The aim of the study is to compare properties of industrially produced humic substances with properties of humic substances of known origin (soil, peat, water etc.). Another aim of the study is to develop authentication methods of humic products, based on identification of their origin. In the study were used potassium humates, humic acids and fulvic acids isolated from well characterized and known sources: low rank coal, peat of different origin (low moor, raised bog peat), soil, compost, vermicompost and others. The methods used for characterization includes elemental analysis, spectroscopic characterization, UV, FTIR, fluorescence) and stable isotope (δC, δN, δO) ratio analysis. The results of the study indicate possibilities to identify sources of industrially produced humic substances.

Acknowledgements: This work has been supported by the Latvian Council of Science, Fundamental and applied research project Nr. lzp-2018/1-0009 “Properties and structure of peat humic substances and possibilities of their modification”.