

A Study on the Chemical Composition of Kolkheti's Sphagnum Peat Peloids to Evaluate the Perspective of Use in Medical Practice

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Abstract : Peatlands are landscape elements, they are formed over a very long period by physical, chemical, biologic, and geologic processes. In the moderate zone of Caucasus, the Kolkheti lowlands are distinguished by the diversity of relictual plants, a high degree of endemism, orographic, climate, landscape, and other characteristics of high levels of biodiversity. The unique properties of the Kolkheti region lead to the formation of special, so-called, endemic peat peloids. The composition and properties of peloids strongly depend on peat-forming plants. Peat is considered a unique complex of raw materials, which can be used in different fields of the industry: agriculture, metallurgy, energy, biotechnology, chemical industry, health care. They are formed in permanent wetland areas. As a result of decay, higher plants remain in the anaerobic area, with the participation of microorganisms. Peat mass absorbs soil and groundwater. Peloids are predominantly rich with humic substances, which are characterized by high biological activity. Humic acids stimulate enzymatic activity, regenerative processes, and have anti-inflammatory activity. Objects of the research were Kolkheti peat peloids (Ispani, Anaklia, Churia, Chirukhi, Peranga) possessing different formation phases. Due to specific physical and chemical properties of research objects, the aim of the research was to develop analytical methods in order to study the chemical composition of the objects. The research was held using modern instrumental methods of analysis: Ultraviolet-visible spectroscopy and Infrared spectroscopy, Scanning Electron Microscopy, Centrifuge, dry oven, Ultraturax, pH meter, fluorescence spectrometer, Gas chromatography-mass spectrometry (GC-MS/MS), Gas chromatography. Based on the research ration between organic and inorganic substances, the spectrum of micro and macro elements, also the content of minerals was determined. The content of organic nitrogen was determined using the Kjeldahl method. The total composition of amino acids was studied by a spectrophotometric method using standard solutions of glutamic and aspartic acids. Fatty acid was determined using GC (Gas chromatography). Based on the obtained results, we can conclude that the method is valid to identify fatty acids in the research objects. The content of organic substances in the research objects was held using GC-MS. Using modern instrumental methods of analysis, the chemical composition of research objects was studied. Each research object is predominantly reached with a broad spectrum of organic (fatty acids, amino acids, carbocyclic and heterocyclic compounds, organic acids and their esters, steroids) and inorganic (micro and macro elements, minerals) substances. Modified methods used in the presented research may be utilized for the evaluation of cosmetological balneological and pharmaceutical means prepared on the base of Kolkheti's Sphagnum Peat Peloids.

Keywords : modern analytical methods, natural resources, peat, chemistry

Conference Title : ICDDCP 2020 : International Conference on Drug Development and Clinical Pharmacy

Conference Location : Zurich, Switzerland

Conference Dates : January 13-14, 2020