

Advanced and Critical Applications with Developments of Clay Species in Waste Water Treatments



Suresh Aluvihara*, C.S. Kalpage

Department of Chemical and Process Engineering, University of Peradeniya, Peradeniya, 20400, Sri Lanka

Water pollution has been identified as an impact on the environmental equilibriums including the ecosystems. The waste water treatment has become an essential part of the handling of water. According to the nature of the pollutants, the treatment method is selected such as the chemical treatment, physical treatment or biological treatment. In most of chemical treatments, some chemical agents are externally added since having some demerits for the consumers of treated water because the chemical treatment methods must be performed with well established procedures and the physical treatment methods may have higher operational cost. Therefore, the investigation and development of some cost effective earth materials for the water treatment applications is becoming a huge chapter in the modern research world. Clay is a dominant earth material that having multi-purpose characteristics as the solutions for most of science and technological issues and currently different clays are being experimented for different water treatment uses. In the existing research, there were expected to chemically characterize three selected clay types based upon the disclosing of their important behaviors. The clay samples were collected from three different regions in Sri Lanka and those clays were named as anthill clay, brick clay and roof tile clay based upon their uses. The clay samples were chemically characterized using X-ray fluorescence (XRF) spectrometer, Fourier transform infrared (FT-IR) spectrometer and X-ray diffraction (XRD) spectrometer. As the outcomes of the research, there were found the presence of at least 75% of Fe contents in each clay, at most 6% of Ti in each clay, at most 5.30% of Ba in each clay, at most 13% of K only in both anthill and roof tile clays and only 7.5% of Ca in brick clay with respect to the X-ray fluorescence (XRF) spectroscopic results, presence of kaolinite, muscovite and quartz as the minerals in each of clay according to the available bonds with respect to the Fourier transform infrared (FT-IR) spectroscopic results and also that mineralogy was confirmed through the X-ray diffraction (XRD) spectroscopic results. According to the recent researches there were found kaolinite and muscovite as the strong adsorbing agents for some other metals such as heavy metals and also there were investigated the K⁺ and Ca²⁺ are strong exchangeable ions. Therefore, it is possible to recommend these clays for the experimentations and applications for the waste water treatments based upon the tasks of the removal of heavy metals, removal of some pathogens and removal of some unnecessary dissolved cations.

Biography:

Mr. Suresh Aluvihara obtained his first degree B.Sc. (Hon's) in the year 1977 from a recognized government university in Sri Lanka. Then he commenced his postgraduate studies at the department of Chemical and Process Engineering, University of Peradeniya, Sri Lanka. At present he is having an excellent research profile with about 45 journal papers, approximately 50 abstracts and a few of conference papers in highly reputed conferences around the world. In the consideration of his conference history he has been appointed as a keynote speaker, invited speaker and featured speaker in world recognized research conferences in various venues in the world. In addition that he has participated in a few of training workshops in the world. His research interests are Earth Engineering, Material Engineering, Environmental Engineering, Water Engineering, Agricultural Soil Science and relevant disciplines.