

Microbial evaluation of geophagic and cosmetic clays from Southern and Western Nigeria: Potential natural nanomaterials

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Geophagic and cosmetic clays are among potential nanomaterial which occur naturally and are of various forms. The use of these nanoclays is a common practice in both rural and urban areas mostly due to tradition and medicinal reasons. These naturally occurring materials can be valuable sources of nanomaterial by serving as nanocomposites. The need to ascertain the safety of these materials is the motivation for this research. Physical characterization based on the hue value and microbiological qualities of the nanoclays were carried out. The microbial analysis of the clay samples showed considerable contamination with both bacteria and fungi with fungal contaminants taking the lead. This observation may not be unlikely due to the ability of fungi species to survive harsher growth conditions than bacteria. 'Atike pupa' showed no bacterial growth. The clay with the largest bacterial count was Calabash chalk (Igbanke), while that with the highest fungal count was 'Eko grey'. The most commonly isolated bacteria in this study were *Clostridium* spp and *Corynebacterium* spp. while fungi included *Aspergillus* spp. These results are an indication of the need to subject these clay materials to treatments such as heating before consumption or topical usage thereby ascertaining their safety.

Biography

Mary A. Bisi-Johnson has obtained B.Sc. (Honours) and master's degree in Microbiology. She completed a Ph.D. in Medical Microbiology from Walter Sisulu University, South Africa. She is an experienced academia of over 10 years. She is currently a lecturer at Obafemi Awolowo University, Ile-Ife Nigeria and her area of specialization is environmental health, public health, antimicrobial resistance, natural drug screening and molecular biology. She has been a recipient of several awards and merit-based scholarships. She has to her credit more than 12 peer-reviewed articles in accredited journals and several conference presentations. She is a member of various prestigious professional bodies.

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Synthesis and characterization of bimetallic Fe/Cu nanoparticles

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Interest in nanotechnology has been increasing due to various advantages including usefulness for environmental remediation. Therefore, this research is carried out to synthesize and characterize nano zero valent iron (NZVI) particles and bimetallic iron with copper nanoparticles. The synthesized nano zero valent iron by reduction of ferric chloride by sodium borohydride under nitrogen purging environment has a median diameter 41.884 nm. As an electrochemical reaction occurs between oxidant of higher standard potential E^0 and a reductant of lower E^0 and copper has greater theoretical standard potential value than that of iron, copper is used for synthesizing bimetallic system of iron. When different copper ratios ranging from 5% to 20% have been applied to synthesize bimetallic nanoparticles of iron with copper, the different median diameters are found from 44.583 nm to 85.149 nm according to particle size distribution (PSD) analyses by PSD analyzer HORIBALA-920 at circulation speed 5 with ultrasonic 01: 100(3) and laser T% 91.8%. Surface areas of NZVI and bimetallic Fe/Cu particles are detected by using Quantachrome NovaWin, NOVA instruments. According to multi-point BET plot, the surface area of synthesized NZVI is 32.323 m²/g while the bimetallic Fe/Cu particles have surface areas ranging from 44.02 m²/g to 55.247 m²/g. According to XRD phase analyses, the peaks are identified as the synthesized nano particles composing phases of iron and copper. TEM images of synthesized nanoparticles show single particles as well as tendency to agglomerate to create the nanoclusters due to magnetic and electrostatic properties inherent in.

Biography

May Thant Zin is a AUN/SEED-net JICA (Japan International Cooperation Agency) scholar pursuing her Ph.D. at De La Salle University, Manila, Philippines and Tokyo Institute of Technology, Tokyo, Japan. She was also granted Thailand International Cooperation Agency (TICA) scholarship for her master's degree in Thailand. She is a Myanmar citizen and also a lecturer from Chemical Engineering Department, Mandalay Technological University, Myanmar. She has published 2 papers in international conference proceedings and submitted to publish 1 paper in a CAS indexed journal.

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