

3rd International Conference and Exhibition on Materials Science & Engineering

October 06-08, 2014 Hilton San Antonio Airport, USA

Comparative study of the mesoporus matrix of underutilized African arrow root lilly as platform for imbedding nano silver and zinc oxide materials for antibacterial and drug delivery systems

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Native starch (NS) material obtained from African arrowroot Lilly was modified with monochloroacetic acid, steric acid, sodium stearate and ammonium phosphate in a bid to obtain a fat replacer. The modification using monochloroacetic acid was found to give the best material as good matrix with available nano mesopores for impregnation. The modified native starch (MNS) matrix was employed in the synthesis of nano silver modified starch (NSMS) and nano zinc oxide modified starch (NZOMS) systems where the MNS served as nano particle stabilizer, capping agent as well as the mesoporous structural support. The NSMS and NZOMS materials were characterized by XRD, UV-VIS spectrophotometer and FTIR instrumentation. The materials were also used against pathogenic micro organisms (E. Coli., S. aureus, P. Subtilis). The result of the XRD and UV-VIS analysis shows the nano size nature of the imbedded silver and Zinc oxide materials while the FTIR spectra highlights the presence of the COOH, OH and other functional groups as contained within the matrix of the MNS. The result of the antimicrobial test gave excellent antimicrobial activity for both NZOMS and NSMS towards the test organisms. The biocompatibility status of the MNS and the fact that it is obtained from an underutilized but rich source (relatively higher protein content) of starch material, presents the material as a value added carbohydrate-based polymer for effective drug delivery application with a multi-faceted utility end use which can be applied in a biological environment.

Biography

Ofoegbu O is a lecturer with the department of Chemistry, university of Agriculture Makurdi Nigeria. He has over thirteen (13) years experience working as a research Chemist with the National Research Institute for Chemical Technology, Zaria where he headed the department of Industrial and Environmental Technology. He is a Doctoral candidate with the Nnamdi Azikiwe University Awka, Nigeria. He is a chartered chemist and belongs to reputable professional bodies like the Chemical Society of Nigeria, Polymer Institute of Nigeria, Material Society of Nigeria and International Solid Waste Association amongst others. He has over 40 international and national conference paper presentations with more than 15 peer reviewed journal publications..

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Study of properties of material for ocean farming of macroalgae

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Floating structure is used for the construction of various facilities and accommodations. Floating structures has proved to have economical and dependable, operational advantages and it emerging to be more acceptable from an environmental point of view. This study outlines analysis about selection of suitable material for offshore technology farming, especially in seaweed farming. The study of properties of components for offshore aquaculture technology farming involved the properties of material selection that is suitable for floating offshore structure, and is conducted based on the case study area which is in Setiu, Terengganu. The materials are two types of rope; manila and polyester, and SHE-20 type of buoy. The result from the tensile test showed that manila rope has better usage for larger force and polyester rope can be use within smaller scale of force. The result from water absorption test showed that the buoy absorbed water with lower percentage, which means it can be used for longer period. This study also involved other tasks; for example data gathering, experimental test, field works, and prototype modelling. The result of the study hopes to contribute to ocean farming, especially seaweed farming in the future.

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