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Plantain-based integrated bio refinery

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In view of the emerging research trend in bio-energy, to circumvent the effects of the impending decline in world's petroleum reserves and environmental challenges associated with the resource, there is need for African countries to exploit their huge biomass resources towards integrated biorefinery. Nigeria is an agrarian nation with enormous biomass resources that are grossly unexploited for energy generation. Therefore, this present research is investigating the viability of the agricultural residues such as plantain biomass, rice husk, peanut skin and coconut coir from Nigeria for biorefinery operation. These residues were preliminarily analyzed for their monomeric sugar, however, in-depth investigation was focused on plantain biomass due to the enormous yields of wastes from this crop (9,455,000 ton per annual)) compared with other residues under investigation. Our preliminary work demonstrated that the various parts of the plantain biomass namely; flower (inflorescence), leaf and trunk (stem) can be excellent sources of C5 sugars – both in terms of C5 selectivity and yield. The morphology and structural composition of the biomass before and after hydrolysis were studied using SEM and FTIR analysis. The remnant fiber of the biomass was subjected to torrefaction and carbonization processes to produce value-added carbon products such as biochar, carbons for water treatment etc., BET analysis on the produced carbons showed that surface areas up to 900 m^2/g can be achieved. Our work showed that developing a plantain–based biorefinery in Nigeria will impact positively on the economy of the nation with significant agriculture based opportunities in the rural areas.

Biography

Ogunsuyi Helen is an Associate Professor in the Department of Chemistry, School of Sciences, Federal University of Technology Akure, Nigeria. She is a Lecturer and Researcher with over 20 years of teaching experience. Her current research specialty is on Fuel Chemistry which embraces both conventional and non-conventional energy options. She has authored and co-authored many scientific papers published both at local and international referred journals. She had attended several seminars, training workshops, symposia and conferences within and outside Nigeria where she presented many of her scientific findings orally and through poster exhibitions. She is a Member of many professional bodies among which are: Institute of Chartered Chemist of Nigeria Science Association of Nigeria; Organization for Women in Science for the Developing World, Trieste Italy; Royal Society of Chemistry (United Kingdom) Professional Member of African Scientific Institute, Fellow of African Women in Agricultural Research and Development, Member of Chemical Society of Nigeria.

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