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Research on Conversion of Natural Wastes to Useful Products by Application of Radiation Processing for Agricultural Sector of Myanmar

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Myanmar is an agricultural-based country and its economic development mainly depends on productivity of agricultural sector. People are trying to improve their productivity by using variety of fertilizers. Some kinds of fertilizers cause decline of soil fertility and rest of fertilizer in food that are the main problems for our country. Moreover, temperature of our country is increasing yearly due to global warming. It is also challenging for our agricultural sector since water is essential for agricultural sector. Radiation technology can be used to produce useful products to solve these problems and the main aim of the research is to produce plant growth promoter and super water absorbent from natural wastes by application of gamma radiation. Myanmar has many stream and rivers as well as coconut trees are available in all part of country. Therefore, natural wastes such as prawn shell and coconut (coin dust) shell were used as raw materials. The first step for the production of irradiated chitosan (plant growth promoter) is deproteinization and demineralization processes. Effect of concentration of sodium hydroxide and temperature on deproteinization process and effect of concentration of hydrochloric acid at ambient temperature on demineralization process were studied. Characteristics of products are determined by Fourier Transformed Infrared Spectroscopy (FT-IR). The best chitin was used for the production process of chitosan in which different radiation dose and different concentration of sodium hydroxide were applied to obtain optimum condition for the deacetylation process. The degree of deacetylation (DD) was determined by band ratio method of FT-IR spectra. It was found that the degree of deacetylation (DD) of chitosan decreased with increase of radiation dose. Coir dust cellulose was produced from coin dust shell by using soda process in which various concentration of sodium hydroxide and various temperatures were used to determine the best cellulose. The product cellulose was applied for production of super water absorbent by using potassium hydroxide, acrylic acid and gamma radiation. Effects of acrylic acid concentration and radiation dose on product SWA were studied and determinations of their characteristics were done. Characteristics of cellulose and super water absorbent were determined by Scanning Electron Microscope (SEM) and Fourier Transformed Infrared Spectroscopy (FT-IR). It was noticed that useful properties of SWA increased with radiation dose. Production of useful products such as plant growth promoter and super water absorbent for agricultural sector were studied in the research. Field or pot test of the two products will be studied. It can be concluded that the research is effective not only for agricultural sector but also for environmental monitoring since raw materials used in the research were natural wastes.

Keywords –plant growth promoter, super water absorbent, acrylic acid, Fourier Transformed Infrared Spectroscopy (FT-IR), Scanning Electron Microscope (SEM)

Country/Organization invited to participate

Myanmar

Primary author: Ms LAY, Khin Khin (Department of Nuclear Engineering, Mandalay Technological University, Mandalay, Myanmar)

Presenter: Ms LAY, Khin Khin (Department of Nuclear Engineering, Mandalay Technological University, Mandalay, Myanmar)

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