EFFECTS OF *Aspergillus niger* ON MECHANICAL, DIFFUSION AND THERMAL DEGRADATION PROPERTIES OF RECYCLED LOW DENSITY POLYETHYLENE

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ABSTRACT

Plastics have wide applications in our daily lives. However, plastics wastes accumulating in the environment pose great danger to stability of ecological system. The use of plastics, therefore, has generated serious global concern due to their nonbiodegradability. Considerable effort has been devoted to develop biodegradable polymeric materials. Microorganisms have been identified as potential biodegradative agents. In this proposed study, effects of *Aspergillus niger* inoculated at different times on the degradation of recycled low density polyethylene (rLDPE) will be investigated. Dynamical mechanical analysis (DMA), creep, thermal degradation and biodegradability measurement will be conducted. DMA will be carried out in the frequency range 0.3 to 30 HZ and temperature range from 0°C to 100°C. Creep measurements will be done at 30°C, 50 °C and 100°C. Time application will be 10 minutes and the recovery time will be 10 minutes. Diffusion measurements will be done by monitoring water uptake at room temperature by measuring mass difference at specific periods of time. Thermogravimetric Analysis (TGA) will be done using Lindberg Blue Tube Furnace from 25 ° C to 700°C at heating rate of 10°C/minute. The models of analysis for DMA and creep data will be Vogel-Fulcher -Tammann (VFT) / William–Landel-Ferrry (WLF) and Arrhenius laws while in diffusion measurements Fick's second law of diffusion will be used.