
Effect of natural enzymes on the biodegradability of cellulose containing polymer composites

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Low Density Polyethylene (LDPE) is the most common thermoplastic material use in the world today. It is an organic polymer which has the chemical formula of $(C_2H_4)_n$. It does not have any active regions; therefore, natural tendency to degrade in normal environment of polyethylene is very low and creates serious environmental problems after the usage. Disposal of plastic waste is a serious concern in world today. New technologies have been developed to minimize their adverse effect on the environment. Currently, worldwide accepted technologies used for the plastic disposal are incineration and mechanical recycling. However, these methods have several limitations and create several environmental issues. Biodegradable polymers are solution to waste disposal problem. Most of the natural polymers are biodegradable. Cellulose and hemi cellulose are two types of natural polymers and they were extracted from rice straw which is highly available in Sri Lanka. Biodegradability imparted by cellulose and hemi cellulose further increased by radish peroxidase natural enzyme. It was extracted from radish roots. Cellulose – hemicellulose, radish peroxidase and LDPE were mixed by using laboratory scale internal mixer by varying radish peroxidase concentration form 0.5% wt. to 2.5% wt. and measured the degree of degradation and variation of mechanical properties. Degradability of the product increased with the increase of radish peroxidase concentration. Tensile strength and percentage elongation decreased during the soil burial test. Optimum results were obtained with 4% wt. cellulose -hemicellulose and 2.5% wt. radish peroxidase with LDPE. This product can be used as a packaging material to protect the environment.

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