

UNIVERSITI TEKNOLOGI MARA

**BIODEGRADATION OF LOW-DENSITY
POLYETHYLENE (LDPE) MIXED WITH CORN
STARCH BY *Aspergillus niger*, *Rhizopus oryzae* AND
THEIR BIOFILMS**

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of the requirements for the degree of
Bachelor of Science (Hons.) Biology

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AUTHOR'S DECLARATION

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the results of my own work, unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any degree or qualification.

I, hereby, acknowledge that I have been supplied with the Academic Rules and Regulations for Undergraduate, Universiti Teknologi MARA, regulating the conduct of my study and research.

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ABSTRACT

Current methods of plastics disposal are limited to dump into land fill, incineration and enzymatic technology. To overcome this, a polyethylene known as Low-Density Polyethylene (LDPE) mixed with biodegradable materials such as corn starch is extensively studied to replace current LDPE. However, biological factors which involved in the plastics degradation is still under study. Thus, the aim of this research is to look at the potential of fungi biofilm in the degradation of LDPE mixed with corn starch. Two potential biodegradable fungi which are *A. niger*, *R. oryzae* and their biofilms were formed and their potential in plastics degradation were evaluated using SEM, FTIR and enzymatic tests. LDPE mixed with corn starch were incubated with *A. niger*, *R. oryzae* and their biofilms in triplicates within 7 weeks and their weight loss were recorded before and after the fermentation. The fungi were further analysed using Scanning Electron Microscopy (SEM) while the LDPE mixed corn starch samples were analysed with Fourier Transform Infrared Spectroscopy (FTIR) before and after fermentation. Based on the weight loss and enzymatic study, their biofilms degradation is 1.87 % higher compared to *A. niger* and *R. oryzae*. This is due to the mixed colonies cultivations results in increase enzymatic activities compared to single colony. Meanwhile, the LDPE mixed corn starch without fungi medium fermentation showed low percentage of degradation. In short, the biodegradation of LDPE mixed corn starch is influenced by enzymatic activities. This study would provide greater benefits for the community, government and industries to solve the accumulation of plastics worldwide through cheaper, easier and environmentally friendly manner.

Keywords: *Aspergillus niger*, *Rhizopus. oryzae*, biofilms, LDPE mixed with corn starch

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