Introduction

Polyethylene terephthalate (PET) is the most important polymer used for the production of synthetic textile fibres. In 2002, the worldwide production of synthetic fibres was 33.6 million tons, which is a market share of 55% of the total textile market. Within the group of synthetic fibres, total PET production was 21.0 million tons, accounting for a 38% share (Engelhardt 2003). Potentially a great variety of enzymes could be used to modify the surface of PET: Amongst the hydrolytic enzymes, besides esterases and lipases, enzymes acting on natural polyesters such as cutinases or polyhydroxyalkanoate depolymerases could have potential (Brazz et al. 2003).

Though PET are made to be nonbiodegradable, it is still possible to find a potential microorganism that can degrade it naturally. Nanda et al. (2010) have reported natural and synthetic PE degradation activity of Pseudomonas sp. that isolated from sewage sludge and household garbage dump. The degradation activity from each Pseudomonas sp. isolates were different between natural and synthetic PE 31,4%-46,2% and 29,1% - 16,3% respectively in loss weight. Some kind of enzymes had a PE degradation activity reported by Guebitz and Cavaco-Paulo (2008) cutinase. Cutinase has recently received much attention because of its potential application for surface modification and degradation of aliphatic and aromatic polyesters, especially polyethylene terephthalate (PET), which is a synthetic aromatic polyester composed of terephthalic acid (TPA) and ethylene glycol); however, the number of cutinases, which have been studied regarding PET modification, is still limited, and this limitation may result in the delay of the research toward the practical use of cutinases.

Our team project is designing a new bacteria that has an ability to degrade the plastics especially PET. In other case, our project used the local biodiversity resources so the megabiodiversity of microorganism in Indonesia is more explored.

Materials & Method

**Sampling**

Polyethylene terephthalate (PET) is the most important polymer used for the production of synthetic textile fibres. In 2002, the worldwide production of synthetic fibres was 33.6 million tons, which is a market share of 55% of the total textile market. Within the group of synthetic fibres, total PET production was 21.0 million tons, accounting for a 38% share (Engelhardt 2003). Potentially a great variety of enzymes could be used to modify the surface of PET: Amongst the hydrolytic enzymes, besides esterases and lipases, enzymes acting on natural polyesters such as cutinases or polyhydroxyalkanoate depolymerases could have potential (Brazz et al. 2003).

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**Result**

Twenty sampels were collected from Galuga garbage dumping area, Bogor West Java. Six sampels were selected as potential bacteria in plastics degradation activity. The most potential isolate was identified with 16S rRNA gene and then compared with the GenBank 16S rRNA gene database and found belong to group of Bacillus subtilis (query coverage 93%). It is possible to be a new strain of Bacillus subtilis.

The activity of degradation assay by the crude extracellular enzyme of bacteria measured by loss of weight of the plastics during 24 hours. The highest degradation activity occured in sample C 1.093% and sampel F 0.43%. One of the potential enzyme that have been studied as PET degrading enzyme is Cutinase. We also indentified our selected sampel which may contain the cutinanse gene, there are two isolate contain the cutinase gene base on the PCR test with specific primer (Fig. 3). On the next step we will continue our research by introducing the cutinase gen from the isolate to plasmid pSB1C3 and to E. coli. E. coli which contain the cutinase gene can be cloned to produce the large numner of cutinase.

**Conclusion**

There are six samples which potentially have a crude extracellular enzyme to degrade PET based on loss weight of the plastics. The existence of cutinase genes in selected isolate tested with specific primer, and two sampel have the gene which encode the cutinase enzyme. Then, Cutinase genes can be introduce to E. coli to produce the more enzyme to degrade PET.

**References**


**Acknowledgement**

We thanks to The Directorate of Student Affairs, Departent of Biology, Department of Computer Science, Faculty of Mathematics & Natural Science, Bogor Agricultural University.