

Partner Search ENV-PT-SMCP-14 Israel (Ambiente)

01 dicembre 2017

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----- PARTNER SEARCH ENV-PT-SMCP-14 -----

<Reference n.: ENV-PT-SMCP-14>

<Deadline: 31/12/2008>

<Programme: Ambiente e cambiamento climatico>

<Project Title: Biodegradation of polyethylene and polystyrene by isolated soil bacteria>

<Financial Scheme: Progetti in collaborazione - Small or Medium>

<Description: Topic 6.3.1.2 or 6.3.1.3

Keywords: Plastic, biodegradation, polyethylene, polystyrene, polipropilene

We have isolated a biofilm-producing strain (C208) of the actinomycete *Rhodococcus ruber* that degraded polyethylene and, to some extent, polystyrene. This strain adheres to polyethylene within minutes upon exposure to the polyolefin and formation of an initial biofilm that differentiates (in a stepwise process that lasts about 20 h) into cell-aggregation-forming

microcolonies. Further organization yields "mushroomlike" three-dimensional sessile structures on the mature biofilm. The ratio between the population densities of the biofilm was about 60:1, indicating a high preference for the biofilm mode of growth. Analysis of the extra cellular polymeric substances (EPS) in the biofilm of C208 revealed that the polysaccharides level was up to 2.5 folds higher than that of the protein. The EPS also contains DNA that is actively excreted from live bacterial cells. Most of the excreted DNA originated from the biofilm cells and accumulated in the biofilm. A major reduction in biofilm content (but not in cell viability) was obtained following addition, to the growth medium, of Dnase 1 (0.005 units/ml). The biofilm showed a high viability even after 60

days of incubation in a salt medium without any additional carbon source. This relatively high durability of the biofilm is apparently due to polyethylene biodegradation. production of biofilms (but not in their growth performance) was developed in the course of this study . Indeed, using the Crystal Violet staining and conofcal microscopy we have shown that such mutants, not only contains reduced amounts of biofilm but also alters biofilm architecture. The above characterization of wild type and mutant strains can be utilized to determine the role of biofilm on the biodegradation of polyethylene. We plan to study the mechanisms involved in the biodegradation of polyethylene. We will also attempt to scale up the biodegradation system by determining the factors that contribute the biodegradation process long term experiments

<Organisation Type: Università>

<Partner Sought: No information>

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