Growth of a Possible Bacteria That Degrades Polyethylene Terephthalate (PET) Particles in a Controlled Environment

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Polyethylene terephthalate (PET) is one of the most used plastics in manufacturing many products because of its advantageous properties. However, PET's long durability of 450 years proves to have a massive detrimental impact on the environment and marine health. Approximately 51 trillion pieces of plastics roam around for many years, making marine animals vulnerable to intoxication. In addition, studies have shown that plastics enter the food chain, posing a threat to public health. Unfortunately, most available waste disposal programs are not effective in eliminating plastics, and this causes plastics to remain in our ecosystems. Bacteria that can degrade plastic are known to exist and offer a promising solution for practical waste management. This study sought to identify bacteria capable of degrading PET by examining bacterial growth in a PET plastic agar environment. The experimentation included selecting plastic samples from two different sites, a beach region, and a recycling center. Then, developing a bacterial culture with the samples collected from a specific agar made with Agar-Agar and PET particles, the purification of the bacterial cultures, and identifying the bacteria on the cultures with MALDI-TOF technology. The results revealed that Proteus Mirabilis, a Gram-negative bacterium, can grow using Polyethylene Terephthalate (PET) as its source of energy in a controlled environment. This bacterium is known to reside on catheter equipment, where it makes biofilms on its surfaces. Identifying this bacterium outside of catheters indicates that bacteria slowly and gradually evolve to consume plastics because of the overabundance of plastics in the environment.

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