

## A Prototype for Biological Breakdown of Plastic Bags in Desert Areas

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**Abstract :** Globally, humans produce millions of tons of waste per year. An important percentage of this waste is plastic, which frequently ends up in landfills and oceans. During the last decades, the greatest plastics production in history have been made, a few amount of this plastic is recycled, the rest ending up as plastic pollution in soils and seas. Plastic pollution is disastrous for the environment, affecting essential species, quality of consumption water, and some economic activities such as tourism, in different parts of the world. Due to its durability and decomposition on micro-plastics, animals and humans are accumulating a variety of plastic components without having clear their effects on human health, economy, and wildlife. In dry regions as the Atacama Desert, up to 95% of the water consumption comes from underground reservoirs, therefore preventing the soil pollution is an urgent need. This contribution focused on isolating, genotyping and optimizing microorganisms that use plastic waste as the only source of food to construct a batch-type bioreactor able to degrade in a faster way the plastic waste before it gets the desert soils and groundwater consumed by people living in this areas. Preliminary results, under laboratory conditions, has shown an improved degradation of polyethylene when three species of bacteria and three of fungi act on a selected plastic material. These microorganisms have been inoculated in dry soils, initially lacking organic matter, under environmental conditions in the laboratory. Our team designed and constructed a prototype using the natural conditions of the region and the best experimental results.

**Keywords :** biological breakdown, plastic bags, prototype, desert regions

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