Cleaning Up the Environment from Plastic by Encapsulated Bacteria

Solomianiuk, Dmytro (School: Lviv Lyceum of Technology)

Used plastics have become a global environmental challenge. So, the purpose of my project is to create a way of spreading microorganisms which can feed on plastic waste and accelerate the degradation in different places of its accumulation in nature. After ? deeper study it was determined that bacteria should be placed in capsules, thus ensuring better adaptation to the new environment and climatic conditions. The main part of the work is devoted to the methods of simple formation of capsules for the bacteria. Several technologies were tried. The first method that we tested was the technology of creation of double spill capsules, such as medical ones. But it turned out that such way requires pure raw materials. So, we have tried film extrusion method with different variants of capsule formation, namely twisting the film around the core and multiple folding methods, because they allow to use different types of plastic waste. A special machine was created for the capsule production with such technology. The thin film from crushed plastic waste is created by the extruder. Afterwards, this film is been cut into small pieces and the system of manipulators produce capsules in which a portion of a mixture of plastic powder and bacteria nutrient broth are placed. Then capsules are spot soldered by special clamps that do not allow them to unfold independently. Consequently, ready-made capsules with bacteria can be spread on the dumps. After the process of adaptation, microorganisms will begin to degrade plastic and improve soil bioremediation in landfills.

Awards Won: