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## Prospects for Using *Ideonella sakaiensis* 201-F6 for Recycling Plastic in Nature

The problem of plastic decomposition in nature is very up-to-date at the moment. The use of specific strains of microorganisms for these purposes is a promising direction of research.

Chemists from Japan have discovered a new kind of bacteria (*Ideonella sakaiensis* 201-F6), which are capable of decomposing plastic. Polyethylene terephthalate is its most common form. They were found during the screening of soil, water and silt samples taken from the place of processing bottles consisting of PET in Sakai, Japan.

*Ideonella sakaiensis* 201-F6 uses polyethylene terephthalate in its carbon and energy metabolism. Bacteria secrete two enzymes that decompose this compound (polyethylene terephthalate) to environmentally safe terephthalic acid and ethylene glycol. These gram-negative, aerobic and rod-like bacteria can promote the decomposition of the film from Poly (ethylene terephthalate) for 6 weeks at a temperature of 30 ° C under the action of its enzymes. This is quite a long time. A huge number of bacteria will be required. Besides, other types of plastic require recycling i. e. mixed with paper, aluminum and other impurities.

In the future study, it is necessary to accelerate the process, for example, by integrating the identified genes of the *Ideonella sakaiensis* 201-F6 bacteria involved in the decomposition of plastics into a rapidly multiplying bacterium like *Escherichia coli*. It is also possible to cross genes of the filamentous fungus *Fusarium oxysporum* [en], which can grow on a mineral medium containing Poly (ethylene terephthalate) filaments, or *Pestalotiopsis microspora* [en], capable of absorbing polyurethane. It is necessary to have several types of such microorganisms for different types of debris, and in accordance with it a different kind of final product.

After the planned partial-synthetic strain of bacteria, it is mandatory to control the population of this bacterium and its further existence in the environment. This study offers incredible prospects for processing waste and debris with the help of living organisms. The bacterium *Ideonella sakaiensis* 201-F6 will help to get rid of millions of tons of plastic debris in the World Ocean, turning it into an ecologically safe part of the environment.

No longer do we need to dig in or burn garbage. It will become a useful fertilizer for our soil. This small microorganism makes a big step towards the preservation of our planet Earth.