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Method of isolation of soil microorganisms - destructors of biopolymers

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Biological degradation of plastic by microorganisms and their enzymes is one of the ways to eliminate the waste resulting from mass production of plastic (Carr C. M., Clarke D. J., 2020).
We analyzed the soil microflora in the presence of fragments of oxo-biodegradable polyethylene with the addition of d2w. The experiment was conducted in the historical center of the city with medium-rise buildings and mass landscaping. We took soil samples at a depth of 10 cm in accordance with GOST 17.4.4.02-84. The soil was classified as heavy sandy loam with the pH of 7.4. Soil suspension (1 g of dry soil per 100 ml of sterile water) in an amount of 100 ml was distributed on solid nutrient media Nutrient dry agar, Nutrient broth with agar addition, GMF broth with agar addition (pH 7.3), sterilized in an autoclave for 20 min at 121 °C. The cultivation regime consisted of keeping the Petri dishes in a thermostat at a temperature of 37 ° C in the range from 1 to 7 days. When using dry soil, bacteria could not be isolated. We repeated the experiment using raw soil. The highest number of diverse colonies had grown on the Nutrient Dry agar medium. After the growth of a large number of microorganisms on Petri dishes, 20 non-repeating colonies of bacteria were isolated.

Next, we placed 5-7 polyethylene discs with the diameter of 7 mm on Petri dishes with 20 isolated colonies. We washed the discs with soap, soaked them in alcohol and rinsed them with autoclaved water. The bacteria were cultured in a thermostat at 37°C for 1 - 7 days. The maximum reliable biofouling of the polymer was recorded on day 7 in 50% of the cups with a double complete repetition of the experiment.

We can conclude that in order to isolate the soil bacteria aiming to find out their destructive activity against biodegradable plastic, it is effective to use a soil from a depth of 10 cm in suspension with sterile water (1g per 100ml) and cultivate it on Nutrient dry agar (pH 7.3) at 37 ° C

for 7 days.