

# RELATIONS BETWEEN OIL-DEGRADING BACTERIA *ALCANIVORAX BORKUMENSIS* AND NEMATODE *TURBATRIX ACETI*

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*Alcanivorax borkumensis* belongs to an important group of hydrocarbon-degrading microorganisms. This bacterium is found in low quantities in all the oceans of the world and is the dominant specie living in oil-contaminated environments [1]. There are studies that demonstrate more effective biodegradation of petroleum products during the cooperation of primary oil destructors with a higher level organism in the food chain [2]. For example, it has been demonstrated that the nematode *Caenorhabditis elegans*, cousin of *Turbatrix aceti*, increases the degradation of oil in oil-contaminated soil by regulating the number of soil microorganisms [3].

The goal of this work was to study a non-trivial model of the mutual relations of oil-degrading marine bacteria *Alcanivorax borkumensis* (*A. borkumensis*) with free-living soil nematodes *Turbatrix aceti* (*T. aceti*).

According to the results of nematode chemotaxis using the bacteria *A. borkumensis* ( $2.2 \times 10^9$  CFU) and *Escherichia coli* ( $2.2 \times 10^9$  CFU) as a control, it turned out that *A. borkumensis* is not a repellent (chemotaxis index was -0.2), and nematodes have approximately the same preference for both - control (52%) and experienced bacteria (48%).

Nematodes of the same age were cultivated in three different medium: in oil-contaminated standard nutrient medium NGM (nematode growth medium) with bacterial food and without bacterial food and in not oil-contaminated medium with bacterial food.

Observation of the growth and development of nematodes was carried out using stereo- and inverted microscopy. The distribution of oil in the digestive system of the nematodes was visualized using hyperspectral and inverted microscopy. During the microscopy, oil was detected along the entire length of the nematode's digestive system (Fig. 1).

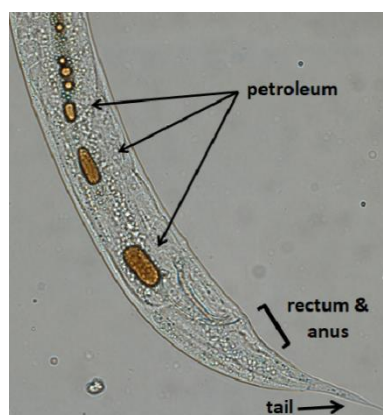


Fig. 1. The aboral part of *T. aceti* with petroleum in the digestive system.

It was found that nematodes, cultured in the absence of bacterial food in oil-contaminated medium passed through all stages of development, although they had a low reproductive potential. In oil-contaminated medium with oil-degrading bacteria nematodes developed in the same way as in a standard nutrient medium enriched with bacterial food.

Therefore, nematodes *T. aceti* can be cultivated in cooperating with the bacteria *A. borkumensis*, moreover, due to the *A. borkumensis*, reproductive potential of nematodes in oil-contaminated medium increases, which can be explained by the fact that nematodes move oil-degrading bacteria to the food source and influence their colonization.

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