Degradation of Phenol and its Derivatives by Microorganisms of Caspian Sea

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One of the most distributed pollutants is phenol and its derivatives, which enter to surface water with drains of different factories and also with wastes of oil refinery. By entrance to water environment these substances render an opposing influence on hydrobionts as highly toxic compounds, and also transform the structure of their community and decrease the viable of water organisms [1]. Nowadays the problem of cleaning for sea from oil and also from phenol contamination is crucial. It predetermined our goal to study the ability of microorganisms (bacterium, fungi), isolated from coastal zones of Caspian Sea to degrade phenol and its derivatives. For isolation from sea coastal areas of the phenol degrading microorganisms to agar mediums it was applied to known microbiological methods [2]. Microorganisms were grown in the test-tubes in liquid medium. As a unique source of carbon and energy it was used phenol, pirocatechik, p - cresol, hydroxhinon, diphenilolpropan in concentration of 0.5-1%. Phenol and its derivatives were suitable for growth of isolated group of microorganisms (70%). Screenin g of isolated strains showed that the most active phenol degrading bacterium (Micrococcus sp., Bacillus sp., Pseudomonas sp., Arthrobacter sp.) and fungi (Penicillium sp., Aspergillus sp.). The intensity of the degradation process was represented on the base of achieved results by calculation of biomass generated by microorganisms during growth for a month on phenol. As a result, the biomass of bacterial strains was varied from0.2 -1.5 g/l and for fungi strains 0.4 -3.5 g/l. The degradation processes of the specimens were analyzed on the molecular level by means of two detector liquid -solid and thin -layer chromatography and NMR and IR spectroscopic measurements according to conventional procedures [2]. The results of research showed, that p - cresol biodegradation by fungi flows in accordance with the following scheme:

![Degradation Scheme](attachment:image.png)

The results of entire conducted research showed that reaction of phenol compounds degradation has general oxidation character, but the process flows on the side chains and also with opening of the aromatic ring. The results of this work are important both in microbiological and in chemical researches, which give possibility to analyze the mechanism of biodegradation of phenol compounds by microorganisms during utilization of phenol wastes in the environment.

References: