Current Topics in Biophysics vol. 30 (supplement A), 2007, 24-36

Phenols Transformations in the Environment and Living Organisms

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Phenols are the organic compounds, which possess hydroxyl residue at first position of carbon within the aromatic ring. These compounds are widely represented in natural environment. Most of the phenols show negative action towards living organisms including humans. The presence of these compounds in the biosphere lead to their transformation undergoing under the influence both abiotic (the activity of bacteria, fungi, algae, some higher plants) and abiotic (metal oxides - MnO, Fe2O3, clays, radiation) factors. The transformation processes most often lead to the total degradation (mineralization) of these compounds. The possibility of phenols degradation by microorganisms is due to creation of enzymes capable to transform phenolic xenobiotics and use them as the source of aliment and energy. When phenols reach the human organism undergo detoxication processes leading mainly by microoxidases within the cytochrome P450. The reactions lead to inactivation of phenols by oxidation and binding them with sulphates, glucuronide acid, glucose and aminoacids what increase the solubility of phenols in body fluids and finally lead to the efficient excretion of these compounds out of the organism. Both in the environment and in living organisms some transformations may lead to creation of most harmful products of these processes.