

# MARMARA ÜNİVERSİTESİ

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### The Major Environmental Pollutants: Uncoupling Agents, Mechanisms of Toxicity and Decontamination

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Although, the dinitrophenols and other related compounds are deeply poisonous, they are still used as pesticides, drugs or even weight loss agents. Today, DNP is also used by bodybuilders, often illegally, to rapidly lose body fat before contests. It is thought that they uncouple the oxidative phosphorylation by carrying protons across the mitochondrial membrane, leading to a rapid consumption of energy without generation of ATP.

Uncoupling agents such as dinitrophenols determine a switch from a respiration mode to a fermentative one. As a consequence, lactic acid production is increased in animal cells, whereas plant and microorganisms cells adopt a biochemical pathway leading to alcohol. The microorganisms are producing ATP both aerobic and anaerobic way, and therefore are ideal living bodies to investigate the shift from cellular respiration to fermentation. In order to determine the level of toxicity of these chemical compounds we investigated their relationship with microorganism suspensions such as yeast *Saccharomyces cerevisiae* and *E. coli* bacteria.

Following the measurements, we concluded that the investigated microorganisms can be used as biodegradation agents in the contaminated environments with dinitrophenol pesticides and related compounds. The microbial biodegradation can be applied in the case of uncoupling dinitrophenols, whereas phytoremediation may be recommended to the others. Further research is still necessary to clarify the specificity of the biological activity of dinitrophenols. Our results showed that the supernatant resulted from the biodegradation process with microorganisms is less toxic than the original solution of dinitrophenols.



