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Metabolism of phosphorus compoundsand taxonomic position of the *Aspergillus niger* AM1 mold

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Abstract

White phosphorus is one of the most dangerous environmental pollutants. However, it is used in industry and for military purposes; therefore, it is impossible to overlook the fact that this substance is constantly released into the environment. In our works, cultures of microorganisms growing in media with a content of white phosphorus up to 1% were obtained for the first time. This exceeds the TLV in wastewater by 5000 times! These cultures are unique, and they are only in our possession. For the first time, cultures were grown in media containing white phosphorus as the sole source of phosphorus. In these environments, microorganisms grew without experiencing phosphorus starvation. That is, they oxidized white phosphorus to phosphate, which is necessary for vital activity! This is first ever example of the inclusion of white phosphorus in the biospheric circulation of the phosphorus element.

It turned out that microorganisms that neutralize elemental phosphorus are able to biodegrade most of the spectrum of phosphorus compounds. Our studies of the metabolism of phosphorus-containing compounds of various classes confirm this. Since the chemistry of phosphorus is diverse, it is necessary to collect significant material on the metabolism of many classes of compounds. In this article, we describe the continuation of this work. It turned out that *Aspergillus niger* AM1 is able to utilize dithiophosphate of the simplest structure as sources of phosphorus, but is not able to utilize substituted dithiophosphonate. In addition, in the present work, we clarified the previously obtained results on the metabolism of phosphoric acid ester and phosphoramide.The NMR method demonstrated that *A. niger* AM1 slowly metabolizes hypophosphite resulting from the biodegradation of white phosphorus, but does not metabolize phosphite. The NMR data conforms to fungal growth dynamics with these substances in media. Also, was first studied phylogenetic relationship of *A. niger* AM1 with biodegradable *A. niger* and *A. bombycis* strains from the NCBI database.

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