Thematic Section: Biochemical Research. **Full Paper**
Subsection: Biochemistry.
The Reference Object Identifier – ROI: jbc-01/19-60-12-1
The Digital Object Identifier – DOI: 10.37952/ROI-jbc-01/19-60-12-1
Submitted on Desember14, 2019.

Biodegradation of a phosphorus compounds by the culture of black aspergill

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Keywords:detoxication, white phosphorus, red phosphorus, phosphorus compounds, minimum inhibitory concentration, *Aspergillus niger*.

Abstract

The biological degradation of white phosphorus, which is being studied by our team is without a doubt a phenomenon of scientific novelty and practical significance. In a decade of studying this phenomenon, we have achieved significant results. However, the field of application of white and yellow phosphorus is rather a narrow one, and this imposes a limitation on the applicability of our method for the neutralization of industrial wastes. Accordingly, an interesting and important path of focus is to expand the spectrum of substances neutralized by the microbial cultures studied by our team. It is thus logical to commence such a major study with phosphorus compounds, since fungal cultures were adapted for the biodegradation of substances containing this element. In this regard, it should be pointed out that, white phosphorus cannot be metabolized to phosphate in one stage; metabolites are formed with intermediate oxidation states of phosphorus. Therefore, it can be assumed that microorganisms that neutralize white phosphorus should be capable of biodegradation of a whole spectrum of phosphorus compounds. We tested this hypothesis experimentally. It was uncovered that *Aspergillus niger* AM1 posseses the ability to use red phosphorus, triamide of phosphoric acid, phosphomolybdic acid,substituted dithiophosphate and organophosphorus matter as sources of phosphorus. In addition, in the present work, we describe attempts made to increase the concentration of white phosphorus in the culture medium to values above 1%. To do this, we added olive oil (a solvent in which white phosphorus is relatively soluble) to the culture medium. It turned out that in the presence of this component, the minimum inhibitory concentration of white phosphorus drops abruptly.

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