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White phosphorus as a new object of biological destruction

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Abstract

Possibility of white phosphorus degradation under the effect of waste water sludge (WWS) of waste-water treatment facilities is shown for the first time. White phosphorus suppresses the micro-organisms growth not immediately after application, but in several days or even weeks. It means that toxic effect is caused by the presence of intermediate products of degradation, which are accumulated in substrates. Considering the change in evolved gaseous products composition one can make a conclusion about greater stability of eubacteria to white phosphorus compared to that of methanogens. Micro-organism cultures are obtained, growing on substrate with white phosphorus content of 0.01 and even 0.1%. The P_4 concentration decrease in media is in inverse proportion to the duration of microflora growth lag-phase, as it was demonstrated by GCMS method. This fact indicates the white phosphorus biodegradation process. Besides, in the present work the research work is presented, devoted to the search for the white phosphorus metabolites, and the probable way of the phosphorus metabolism is proposed for the first time. Inoculation of stable bacteria on synthetic medium, containing white phosphorus as a unique source of phosphorus, has demonstrated the possibility of their growth in such conditions. *Streptomyces* species A8 strain, isolated from the white phosphorus containing sludge, contrary to the other ones, did not suppress at all the growth of the higher plants, i.e. habitat affected this antibiotic activity.