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**Abstract** – The results of solving the problem of cleaning up industrial waste waters of nitrocellulose (NC) manufacturing by biodegradation method are presented. The purpose of the study was to select a microorganism or a combination thereof, capable of oxidizing the persistent biopolymer – NC, to the maximum oxidation degree and as quickly as possible. In the present study, NC waste samples with a nitrogen content of 13.38 wt.% were subjected to biological oxidation using a filamentous fungus *Fusarium solani*. The time of incubation of the NC samples with *F. solani* was 5, 16, 38, and 65 days. The maximum decrease in the N content was ca.3%; the maximum concentration of nitrate ions formed in the solution was 11.40 µg/ml; pH values were shifted to the acidic region. The molecular mass of the NC samples reduced significantly: from 324216 (for the initial sample) to 37300. The heat release value decreased to 770 cal/g within 36 days compared to 975 cal/g for the initial sample. The greatest changes were observed after the first 5 and 16 days of incubation, which can be considered a promising result in terms of practical use of the method.

**Keywords:** nitrocellulose, biological oxidation, *Fusarium solani*, purification of industrial wastewater.