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# Changes in the nitrocellulose molecule induced by sulfate-reducing bacteria Desulfovibrio desulfuricans 1388. The enzymes participating in this process

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## Abstract

The appearance of unsubstituted glucopyranose residues in nitrocellulose (NC) induced by Desulfovibrio desulfuricans was established by 13C-NMR spectroscopy. After contact with bacterial cells, the degree of substitution by nitro groups in NC decreased from 2.59 to 2.40. The bacteria possess intra- and extracellular nitroesterase activities, which are responsible for denitration of the polymer. The presence of NC in the growth medium influences the extracellular nitroesterase activity. It is shown that inhibition of enzymatic activity in the presence of NC is caused by appearance of nitrates in the culture medium. Nitrate and nitrite reductases of dissimilatory type reduce nitrates. The data suggest consideration of bacteria belonging to the Desulfovibrio genus as the initial agent in utilization of an unnatural polymer - nitrocellulose - in a microbial consortium.

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## Keywords

Desulfovibrio desulfuricans, Nitrate reductase, Nitrocellulose, Nitroesterase, NMR spectroscopy