

The use of humic substances to suppress the vital activity of mycelial fungi as part of a consortium

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There is a pool of studies confirming the inhibitory effect of HSs on various mycelial fungi (Table 1 [1-4]). The inhibition of fungi is carried out, among other things, due to the non-covalent binding of hydrolytic enzyme molecules to HSs and the inactivation of these biocatalysts, leading to a decrease in the number of available substrates entering fungal cells [5,6]. At the same time, sufficiently high concentrations of HSs (5-10 g/l) must be introduced into the system.

Table 1. Inhibition of growth of filamentous fungi by the HSs

Fungi	Influence of HSs	Reference
<i>Aspergillus</i>	Inhibition of cell growth and enzyme synthesis	[1]
<i>Penicillium</i>	Inhibition of cell growth	[2]
<i>Fusarium</i>	Inhibition of growth	[3]
<i>Alternaria</i>	No growth inhibition in presence of 200 mg/L of HSs	[4]

When suppressing cells in stable consortia, great efforts are required [6]. Thus, in addition to the introduction of HSs, potassium persulfate and hexahistidine-containing organophosphate hydrolase were additionally introduced to suppress the metabolism of landfill consortia containing fungi of the genera *Aspergillus*, *Trichoderma*, *Penicillium*, *Fusarium*, *Alternaria*, hydrolyzing lactose-containing molecules responsible for quorum in the consortium [6].

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