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## Investigation of the antifungal effect of sodium dodecyl sulphonic acid (SDS) coated iron oxide nanoparticles on fungi extracted from painted walls

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Beauty of a building always depends on the quality of the colour and the cleanliness of its walls. The quality of the appearance of a wall is frequently destroyed by the growth of fungi. The term "sick building syndrome" was recently coined to describe buildings in which various physical, chemical and biological factors, including growth of fungi or their spores have severely compromised air quality leading to discomfort or illness of the occupants. A key issue in the paint industry is to develop paints which can deter or prevent fungal growth. Currently applied methods include chemicals such as mercury, zinc oxide and Dialuric acid. A drawback of most of the currently used antifungal agents in the paint industry is that they are as toxic to higher organisms as they are to the target fungi. The more target specific antifungal agents tend to be very rare or costly. Although significant advancement has been made in identifying various natural and synthetic chemical agents that possess antifungal activity, there is no indication that any such molecule could be used successfully in paints.

With the development of nanoscience and nanotechnology, applications of magnetic iron oxide nanoparticles have attracted extensive interest due to their potential applications in many industries. The physical properties of iron oxide nanoparticles such as solubility can be tuned by surface modification. The present work describes the application of SDS functionalized water soluble magnetic iron oxide nanoparticles as an antifungal agent. For this purpose five fungal species were isolated from a painted wall. We thereafter investigated the effect of nanoparticles on the growth of isolated fungi by measuring the colony diameter at 24/48 hr intervals. Fungal biomass production was also determined using liquid cultures through the dry weight of mycelia in order to quantify the effect of nanoparticles on the fungi. All experiments were carried in triplicate for a series of nanoparticle concentrations. Even though the mechanism of action is unknown, the investigation revealed that there was a rapid inhibition of growth of the test fungi with the increase in concentration of nanoparticles. These results suggest that SDS coated iron oxide nanoparticles have a potential application in the paint industry as an antifungal agent.

**Keywords:** nanoscience, nanotechnology, iron oxide, SDS, antifungal activity