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Scaling up the production of myco-coagulant using solid-state fermentation for water treatment
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Abstract
Aims: Providing safe drinking water is an ongoing global concern. Coagulation is an essential process in water treatment. However, most of the coagulants are chemical in nature and have negative impacts on human health and the environment. This study investigated the production of myco-coagulant in solid-state fermentation using a fungal strain. Methodology and results: A scale-up was performed using the tray method to investigate the influence of substrate thickness (from 2-30 mm) on myco-coagulant production. The results revealed that the turbidity removal efficiency of myco-coagulant in kaolin suspension was found to be increasing with the increase in thickness of the coco peat substrate. However, the myco-coagulant extracted from the media with a thickness of 30 mm was able to remove the highest turbidity by 96%. Three different subculturing methods for mycelium inoculation were evaluated. The surface inoculation approach produced better results than other inoculation processes. The effect of initial turbidity values (50- 300 NTU) on turbidity removal was studied too. The myco-coagulant was found to be the most suitable for high-turbidity water (300 NTU) with turbidity removal of 52%. Subculturing of fungus from solid-state to solid-state was also studied, which showed that the strategy was just as effective as an inoculum-based subculture. Conclusion, significance and impact of study: Excellent bio-coagulation activity has been shown for the myco-coagulant that was isolated from the fungus strain. Subculturing using existing substrates will be more economical than subculturing using fresh inoculum. This strategy saves time, labour and cost of the coagulant production.

Author Keywords
Bio-coagulant; fungus; solid-state fermentation; turbidity removal

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