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Novel Myco-Coagulant Produced by *Lentinus squarrosulus* for Removal of Water Turbidity: Fungal Identification and Flocculant Characterization

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Abstract

Several river water fungal strains (RWF-1 to RWF-6) were isolated to investigate the potential of having coagulant properties from the metabolites produced by the fungus. The myco-coagulant produced from the liquid-state process was characterized and tested for flocculation of kaolin water. Molecular identification of the fungal strain isolated from river water and characterization of the myco-coagulant produced by the strain are presented in this paper. The genomic DNA of the fungal 18S ribosomal ribonucleic-acid (rRNA) and 28S rRNA genes were used and the species was identified as *Lentinus squarrosulus* strain 7-4-2 RWF-5. The characterization of myco-coagulant by Fourier-transform infrared spectroscopy (FTIR) showed that hydroxyl, carbonyl, amide and amine groups as principal functional groups were present in the new myco-coagulant. The mean zeta potential value of the myco-coagulant was -7.0 mV while the kaolin solution was -25.2 mV. Chemical analyses of the extracellular myco-coagulant revealed that it contained total sugar (5.17 g/L), total carbohydrate (237 mg/L), protein (295.4 mg/L), glucosamine (1.152 mg/L), and exhibited cellulase activity (20 units/L) and laccase activity (6.22 units/L). Elemental analyses of C, H, O, N and S showed that the weight fractions of each element in the myco-coagulant was 40.9, 6.0, 49.8, 1.7 and 1.4%, respectively. The myco-coagulant showed 97% flocculation activity at a dose of 1.8 mg/L, indicating good flocculation performance compared to that of polyaluminum chloride (PAC). The present work revealed that the fungal strain, *L. squarrosulus* 7-4-2 RWF-5 is able to produce cationic bio-coagulant. The flocculation mechanism of the novel myco-coagulant was a combination of polymer bridging and charge neutralization.

Keywords

Author Keywords: *Lentinus squarrosulus*; myco-coagulant; flocculation mechanism; turbidity; water treatment

Keywords Plus: MOLECULAR-IDENTIFICATION; BIOFLOCCULANT; PERFORMANCE; SLUDGE; OPTIMIZATION; REDUCTION; ENZYMES; STRAIN

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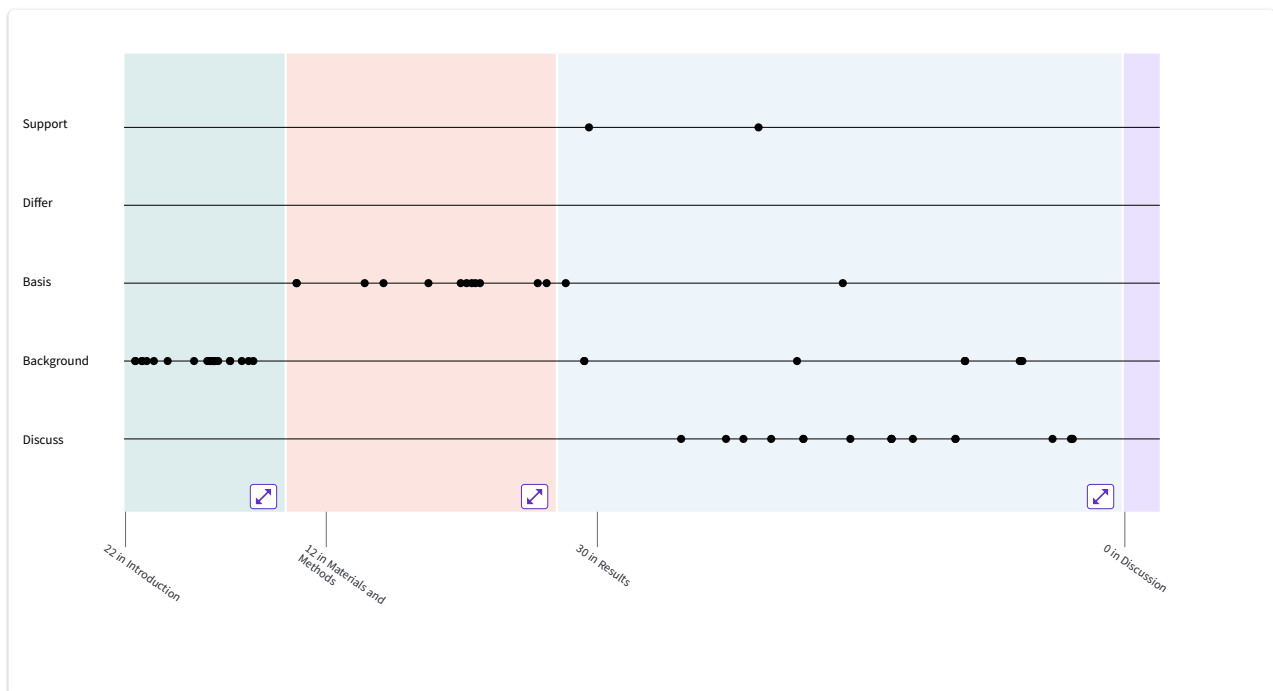
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