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Characterization of bioflocculant produced by *Actinobacterium* sp. Mayor

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Bioflocculants promote aggregation that leads to eventual sedimentation of suspended particles in solutions. They have an added advantage over chemical flocculants in that they are non-toxic, biodegradable and environment friendly. As a consequence thereof, the potential application of bioflocculants in various industrial processes such as water/wastewater treatment as alternatives to chemical flocculants has continued to receive serious attention. This study reports on the evaluation of *Actinobacterium* species isolated from Tyume River in the Eastern Cape Province of South Africa for enhanced bioflocculant production. The species identity was confirmed by 16S rDNA nucleotide sequence analysis which showed 96% similarity to *Actinobacterium* species and subsequently deposited in Genbank as *Actinobacterium* sp. Mayor (accession number JF799090). Optimum bioflocculant production with a maximum flocculating activity of about 91% was achieved under the following culture conditions: sodium carbonate as carbon source, complex nitrogen source (composed of ammonium sulfate, urea and yeast extract), Ca2+ as cation source and initial culture medium pH of 8. In addition, a purified bioflocculant yield of 4.19 g/l was recovered with 0.3 mg/l being optimum dosage for the clarification of Kaolin suspension (100 ml) following Jar test. The bioflocculant retained about 70% of its activity after heating at 100oC for 30 min with FTIR spectrometry indicating the presence of carboxyl, hydroxyl and amino groups amongst others. The findings suggest that *Actinobacterium* sp. Mayor holds immense promise as a source of bioflocculant that could serve as alternative to synthetic flocculants.

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