Isolation and Characterization of Antibiotic and Exoenzymes Producing Actinobacteria from Guts of Fungus-Cultivating Termites (*Macrotermes Michaelseni)*

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ABSTRACT

Termites are an important group of insects that harbor a complex community of gut microbes which contribute to digestion and termite nutrition. Fungus-cultivating termites harbour dense populations of bacteria and archaea in the gut. Actinobacteria are known to produce a wide variety of secondary metabolites including many commercially important enzymes and antibiotics. The aim of this study was to isolate Actinobacteria from guts of fungus-cultivating termites *Macrotermes michaelseni* using solid KMM1 medium and screen for their ability to produce industrially useful enzymes and antibiotics. The isolates were characterized using morphological, physiochemical, biochemical and molecular methods. A total of ten isolates were obtained. The isolates produced amylases, lipases, proteases and esterases. All the isolates, apart from KMM1, KMGC6, KMGC8 and KMGT9 produced gelatinases, xylanases and cellulases. All the isolates showed inhibition against *Escherichia coli* and *Staphylococcus aureus.* The isolates grew well at pH 6 and temperature of 40^{o}C. They preferentially utilized glucose and did not require sodium chloride for growth. Analysis of partial sequences of 16S rRNA genes confirmed isolate KMM2, KMM3, KMM4, KMM5, KMGC7, KMGC8 and KMGT10 belonged to the genus *Streptomyces* while KMM1 and KMGC6 were close relatives of Bacillus. These results confirmed that guts of fungus-cultivating termites harbor Actinobacteria that can produce enzymes and antibiotics.