



Antibacterial activity, time-kill profile and morphological effects of *Streptomyces* sp. SRF1 extracts against the foodborne pathogen *Bacillus cereus*

Sangdee K¹, Pimta J², Seephonkai P³, Sangdee A^{2,4*}

¹Microbiology Group, Biomedical Sciences Research Unit, Faculty of Medicine, Maharakham University, Muang District, Maha Sarakham 44000, Thailand

²Department of Biology, Faculty of Science, Maharakham University, Kantarawichai District, Maha Sarakham 44150, Thailand

³Nano Technology Research Unit, Department of Chemistry, Faculty of Science, Maharakham University, Kantarawichai District, Maha Sarakham 4415, Thailand and Center of Excellence for Innovation in Chemistry (PERCH-CIC)

⁴Microbiology and Applied Microbiology Research Unit, Faculty of Science, Maharakham University, Kantarawichai District, Maha Sarakham 44150, Thailand

Abstract : The soil bacterium *Streptomyces* sp. SRF1 is known to have activity against fungal pathogens of plants, but limited information is available on its medical and pharmaceutical potential. The objective of this study was to investigate the effects of the mycelial and culture filtrate extract of *Streptomyces* sp. SRF1 on growth of *Bacillus cereus*. Both extracts were active against *B. cereus* with low MIC and MBC values. The MIC values of the mycelial and culture filtrate extract were 0.39 mg/ml and 0.0195 mg/ml, respectively. The MBC values of the mycelial extract and culture filtrate extract were 0.39 mg/ml and 0.3125 mg/ml, respectively. The optimal concentration and duration of treatment to achieve *B. cereus* cell death were also determined. Concentrations of 4xMBC and 8xMBC of the extracts completely killed the bacterial cells after 2 hours exposure. Concentrations of 1xMBC and 2xMBC, by contrast, did not completely kill the bacterial cells. However, bacterial cell numbers were reduced after 24 hours treatment with both extracts compared with those of the 0.5xMBC treated and control groups. When *B. cereus* cells were examined by light microscopy after 2 hours treatment with the extracts, they were elongated to multiple times their original size and had a collapsed appearance. This study indicates that the isolate *Streptomyces* sp. SRF1 represents a potentially new source of antibiotics that could be developed as therapeutic agents.
Keywords: antibacterial, *Bacillus cereus*, *Streptomyces* sp., time-kill.

