

## ABSTRACT

The aim of the study is to isolate, characterize endophytic bacteria isolated from star fruit (*Averrhoa carambola* L.) and evaluate biochemical, antioxidant and pharmacognostic activity of the metabolites extracted from endophytic bacterial isolates (EBI). In total, three EBIs were isolated from surface sterilised star fruit tissue and these isolates were identified as *Pseudomonas aeruginosa*, *Bacillus cereus* and *P. fluorescens* using 16S rDNA based bacterial identification method. Biochemical tests and bioassays revealed the presence of terpenoids, saponins, alkaloids, phenolics and flavonoids in all three (AC1, AC2 and AC3) extracts. Out of these three extracts, AC2 and AC3 were devoid of tannin. Ethyl acetate extract of AC2 showed the presence of high amount of phenolics ( $718.43 \pm 0.79$   $\mu\text{g}$  of GAE/g) and flavonoids ( $132.5 \pm 6.42$   $\mu\text{g}$  QE/g). The AC2 extract also showed high antioxidant activity (DPPH:  $50 \pm 1.02\%$ ; ABTS:  $49.24 \pm 0.16\%$ ; FRAP:  $1033.33 \pm 1.05$   $\mu\text{M}$  Fe(II)/g). The antioxidant potential of the three extracts was further estimated *in vivo*. Extract AC2 400 mg ( $95.28 \pm 3.76$  %) and AC3 400 mg ( $82.56 \pm 6.72$  %) exhibited significant ulcer inhibitory activity in ethanol and salicylic acid induced ulcer model. Meanwhile, the two extracts, AC1 and AC2 (500 mg) were found to efficiently lower the serum lipid and lipoprotein levels such as TC, TG, LDL-C, VLDL-C and AI values upon 58<sup>th</sup> hour of extract administration. The metabolic extract of *P. aeruginosa* (AC1 extract) at the dose of 400 mg significantly restored the liver enzyme levels (AST, ALP and ALT), total protein and total bilirubin in both CCl<sub>4</sub> and paracetamol induced toxicity models. Histopathological findings further provided supportive evidence for the biochemical results. Based on the study, star fruit does house bacterial endophytes that have antioxidant, anti-microbial, anti-hyperlipidemic, anti-ulcer and hepatoprotective effect.

Keywords: Antioxidant, *A. carambola*, Anti-hyperlipidemic, Anti-ulcer, *B. cereus*, Endophytic bacteria, Hepatoprotective effects, *P. aeruginosa*, *P. fluorescens*, star fruit