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ANTIMICROBIAL AND ANTIOXIDANT ACTIVITIES OF SELECTED UNDERUTILIZED FRUITS IN MALAYSIA

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ABSTRACT

Underutilized fruits are defined as fruits that are rarely eaten, unknown and unfamiliar because some of the species only exist at a certain region. There is a lack of the antimicrobial and antioxidant studies on underutilized fruits. Therefore, this study was carried out to examine the antimicrobial and antioxidant activities of the methanolic extracts of seven underutilized fruits namely *Sonneratia caseolaris, Phyllanthus acidus, Averrhoa bilimbi, Spondias dulcis, Cynometra cauliflora, Barrington racemosa* and *Syzygium malaccense.* The antimicrobial activities were determined by using the Kirby-Bauer disc diffusion method at four concentrations of 200 mg/ml, 300 mg/ml, 400 mg/ml and 500 mg/ml. The extracts were tested on four foodborne pathogens of *Escherichia coli, Staphylococcus aureus, Bacillus cereus* and *Salmonella enterica* serovar Typhimurium. The antioxidant activities were determined by 2, 2-diphenyl-1-picrylhydrazyl (DPPH) radical scavenging activity. All of the methanolic extracts showed a positive antimicrobial activity on the four foodborne pathogens except on *S. enterica* ser. Typhimurium where the extracts of *B. racemosa* and *S. malaccense* did not produce any inhibition zone. The extracts of *S. caseolaris, A. bilimbi, S. dulcis* and *C. cauliflora* were the most effective on *E. coli* while the extracts of *P. acidus* and *B. racemosa* were the most effective on *S. aureus.* The extract of *S. malaccense* was the most effective on *B. cereus.* There were significant differences among the extracts at each concentration ($P<0.05$) on the foodborne pathogens tested except at 200 mg/ml on *S. enterica* ser. Typhimurium. The minimum inhibitory concentration (MIC) was determined by the broth microdilution techniques. MIC values for *E. coli* and *S. aureus, B. cereus* and *S. enterica* ser. Typhimurium of the extracts ranged from 25 mg/ml to 62.5 mg/ml, 25 mg/ml to 50 mg/ml and 50 mg/ml to 100 mg/ml respectively. The minimum bactericidal concentration (MBC) values for *E. coli, S. aureus, B. cereus* and *S. enterica* ser. Typhimurium of the extracts ranged from 50 mg/ml to 500 mg/ml, 50 mg/ml to 125 mg/ml, 50 mg/ml to 400 mg/ml and 100 mg/ml to 400 mg/ml respectively. In the DPPH test, the highest antioxidant activity was demonstrated by *S. caseolaris* with half-maximal inhibitory concentration (IC_{50}) at 0.67 mg/ml. There were significant differences among the extracts at each concentration where $P<0.05$ except at 50 mg/ml for the DPPH test.

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TABLE OF CONTENTS