

Evaluation of antibacterial activity of Sequential Soxhlet extracts of three types of Sri Lankan tea using the broth microdilution assay

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Tea is a beverage with medicinal properties, produced from the immature leaves of *Camellia sinensis*. Tea is categorized into black and green tea depending on whether it undergoes fermentation or not. Tea waste is produced during the black tea manufacturing process as a waste product. The objective of the present study was to determine antibacterial activity of extracts of black tea, green tea and tea waste of Sri Lanka against multidrug-resistant *Staphylococcus aureus* (MRSA) and *Mycobacterium smegmatis*. From the preliminary antibacterial assays black tea (grade BOP), tea waste and green tea (grade Fannings) were selected for this study. Sequential Soxhlet extracts were prepared using hexane, chloroform, dichloromethane, methanol and ethyl acetate as solvents. Broth microdilution colorimetric assay was used for the determination of minimum inhibitory concentrations (MIC). The range of the concentration of extracts which tested were 0.62 -10 mg/ml. Methanol was the best solvent which gave the best extraction yield in mg/ g 110.88, 146.08 and 68.68 for black, green and tea waste respectively. Extracts in methanol and ethyl acetate had higher antibacterial activities compared to extracts in hexane, chloroform and dichloromethane. The value of 2.5 mg/ml was the best antibacterial activity shown by the methanol extracts of green and black tea against MRSA. Methanolic extracts of the green tea yielded 2.5 mg/ml MIC value against *M. smegmatis* while black and tea waste yielded 5 and 10 mg/ml respectively. With the hexane and chloroform extracts, a few dichloromethane extracts and one ethyl acetate extract, MIC values were not obtained in the tested region (>10 mg/ml) due to low antibacterial activity. From tested samples, green tea was the best followed by black and tea waste for antibacterial activity against MRSA and *M. smegmatis*.

Keywords: Antibacterial activity, black tea, green tea, “factory discarded” tea, broth microdilution assay.

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