

Antidiabetic, anti-oxidant and antimicrobial activities of *Fadogia ancyllantha* extracts from Malawi

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ABSTRACT

Ethnopharmacological relevance: Communities in Chilumba, Malawi use herbal tea prepared from *Fadogia ancyllantha* Schweinf (Rubiaceae) leaves for the management of diabetes, hypertension and alleviation of symptoms of gastrointestinal disorders and pneumonia. The objective of the study was to evaluate the in vitro antidiabetic, anti-oxidant and antimicrobial activities of the crude extracts of the leaves prepared by using three different extraction methods. Materials and methods: Each of the organic, cold and hot aqueous extracts of the herbal tea was evaluated for its effect on glucose uptake in C2C12 muscle and Chang cell lines.

Metformin and insulin were used as positive controls. The anti-oxidant activity, based on neutralisation of DPPH free radicals, was determined spectrophotometrically. The Agar serial dilution method was utilised to determine the minimum inhibitory concentration (MIC) of the extracts for the selected fungal and bacterial strains. Results and discussion: The organic extract (12.5 µg/ml) exhibited the highest in vitro glucose uptake increases in Chang cells (181.24±0.29%) and C2C12 muscle cells (172.29±0.32%) while the hot and cold aqueous extracts gave lower uptakes, 145.94±0.37% and 138.70±0.52% in Chang cells respectively. At 100 µg/ml, aqueous extracts gave significantly higher ($p < 0.01$) anti-oxidant activity (range 85.78–86.29%) than their organic counterpart (68.16%). The minimum inhibitory concentration (156 µg/ml) was obtained in the organic extract against the fungus *Aspergillus fumigatus* and moderate growth inhibition was observed with other test micro-organisms. The hot aqueous extract inhibited the growth of all test organisms except *Pseudomonas aeruginosa*. The cold aqueous extract was inactive against *Pseudomonas aeruginosa* and *Candida albicans*. The differences in the MIC values between the aqueous extracts seem to suggest that raised temperatures, as traditionally practised, facilitate the extraction of secondary bioactive metabolites.

Conclusion: These results show that *Fadogia ancyllantha* extracts have high antidiabetic and anti-oxidant properties.