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Antimycobacterial and cytotoxic activity of selected medicinal plant extracts

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Abstract

Ethnopharmacological relevance

Tuberculosis (TB) caused by *Mycobacterium tuberculosis* remains an ongoing threat to human health. Several medicinal plants are used traditionally to treat tuberculosis in Ghana. The current study was designed to investigate the antimycobacterial activity and cytotoxicity of crude extracts from five selected medicinal plants.

Material and methods

The microplate alamar blue assay (MABA) was used for antimycobacterial studies while the CellTiter 96® AQueous Assay, which is composed of solutions of a novel tetrazolium compound [3-(4,5-dimethylthiazol-2-yl)-5-(3-carboxymethoxyphenyl)-2-(4-sulfophenyl)-2H-tetrazolium, inner salt; MTS] and an electron coupling reagent (phenazine methosulfate) PMS, was used for cytotoxic studies. Correlation coefficients were used to compare the activity of crude extracts against nonpathogenic strains and the pathogenic *Mycobacterium tuberculosis subsp.tuberculosis*.

Results

Results of the MIC determinations indicated that all the crude extracts were active on all the three tested mycobacterial strains. Minimum inhibitory concentration values as low as 156.3 µg/mL against *M. tuberculosis*; Strain H37Ra (ATCC® 25177™) were recorded from the leaves of *Solanum torvum* Sw. (Solanaceae). Cytotoxicity of the extracts varied, and the leaves from *Solanum torvum* had the most promising selectivity index. Activity against *M. tuberculosis*; Strain H37Ra was the best predictor of activity against pathogenic *Mycobacterium tuberculosis subsp.tuberculosis* (correlation coefficient= 0.8).

Conclusion

The overall results of the present study provide supportive data on the use of some medicinal plants for tuberculosis treatment. The leaves of *Solanum torvum* are a potential source of anti-TB natural products and deserve further investigations to develop novel anti-TB agents against sensitive and drug resistant strains of *M. tuberculosis*.

Keywords: Tuberculosis; Antimycobacterial; Cytotoxicity; Selectivity; Medicinal plants; Crude extracts

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