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Safety evaluation and bioassay-guided isolation of antimycobacterial compounds from *Morella salicifolia* root ethanolic extract

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Abstract

Ethnopharmacological relevance

Although the available medicines can cure almost all tuberculosis drug-susceptible patients some problems including the emergence of multi-drug resistant and extensively drug-resistant strains press for the need of new anti-TB medicines. Morella *salicifolia* is a common plant that is widely used in traditional medicine for managing HIV and AIDS-related conditions including tuberculosis but no studies have been done to evaluate its safety and efficacy.

Aim of the study

This study was designed to investigate the antimycobacterial activity and safety of *M. salicifolia* extract and its constituents.

Material and methods

Antimycobacterial activity of the crude extract was tested against non-pathogenic mycobacteria including Mycobacterium aurum (MA), *Mycobacterium indicus pranii* (MIP) and *Mycobacterium madagascariense* (MM) using the broth microdilution method. Bioassay-guided fractionation was employed to isolate the active compounds. Some of the isolated active compounds were tested for antimycobacterial activity against the standard and selected clinical isolates of *M. tuberculosis*. Safety of the crude extract was assessed using cytotoxicity assay and oral acute toxicity testing.

Results

The crude extract exhibited antimycobacterial activity against all the species used. The study led to isolation of six compounds; four pentacyclic triterpenoids; (3β)-3-Hydroxyolean-12-en-28-oic acid (Oleanolic acid) (1), (2α,3β)-2,3-Dihydroxyolean-12-en-28-oic acid (maslinic acid) (2), D-Friedoolean-14-ene-3β,28-diol (taraxerol) (3), and D-Friedoolean-14-en-3β-ol (myricadiol) (4), and two diarylheptanoids; (±)-myricanol (5) and myricanone (6). The six compounds exhibited activity against three nonpathogenic mycobacteria species. Compound 2, was the most active, with MICs of 17, 28 and 56 μg/ml against MM, standard a *M. tuberculosis* strain H_{37}RV and rifampicin resistant *M. tuberculosis* clinical isolates, respectively. The crude extract did not show toxicity on peripheral blood mononuclear cells and it was safe in mice following acute oral toxicity test.

Conclusion

The results from this study indicate that some isolated compounds in *Morella salicifolia* could form potential scaffolds for drug development efforts targeting *M. tuberculosis*. More studies are needed to further explore the potential of the plant extract and its secondary metabolites in the management of HIV and AIDS-related conditions using *in-vivo* models.