

# Antiplasmodial, Cytotoxicity and Phytochemical Constituents of Four Maytenus Species Used in Traditional Medicine in Kenya

## Abstract

**Background:** In Kenya, several species of the genus *Maytenus* are used in traditional medicine to treat many diseases including malaria. In this study, phytochemical constituents and extracts of *Maytenus undata*, *M. putterlickioides*, *M. senegalensis* and *M. heterophylla* were evaluated to determine compound/s responsible for antimalarial activity.

**Objective:** To isolate antiplasmodial compounds from these plant species which could be used marker compounds in the standardization of their extracts as a phytomedicine for malaria.

**Methods:** Constituents were isolated through activity-guided fractionation of the MeOH/CHCl<sub>3</sub> (1:1) extracts and in vitro inhibition of *Plasmodium falciparum*. Cytotoxicity was evaluated using Vero cells and the compounds were elucidated on the basis of NMR spectroscopy.

**Results:** Fractionation of the extracts resulted in the isolation of ten known compounds. Compound 1 showed promising antiplasmodial activity with IC<sub>50</sub>, 3.63 and 3.95 ng/ml against chloroquine sensitive (D6) and resistant (W2) *P. falciparum*, respectively and moderate cytotoxicity (CC<sub>50</sub>, 37.5 ng/ml) against Vero E6 cells. The other compounds showed weak antiplasmodial (IC<sub>50</sub> >1.93 µg/ml) and cytotoxic (CC<sub>50</sub> > 39.52 µg/ml) activities against *P. falciparum* and Vero E6 cells, respectively.

**Conclusion:** (20 $\alpha$ )-3-hydroxy-2-oxo-24-nor-friedela-1(10),3,5,7-tetraen-carboxylic acid-(29)-methyl ester (pristimerin) (1) was the most active marker and lead compound that warrants further investigation as a template for the development of new antimalarial drugs. Pristimerin is reported for the first time in *M. putterlickioides*. 3-Hydroxyolean-12-en-28-oic acid (oleanolic acid) (5), stigmast-5-en-3-ol ( $\beta$ -sitosterol) (6), 3-oxo-28-friedelanoic acid (7), olean-12-en-3-ol ( $\beta$ -amyrin) (8), lup-20(29)-en-3-ol (lupeol) (9) and lup-20(29)-en-3-one (lupenone) (10) are reported for the first time in *M. undata*.

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