

**PHYTOCHEMISTRY AND BIOLOGICAL ACTIVITY
OF THE ROOT EXTRACT OF *MILLETTIA OBLATA***

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ABSTRACT

The genus *Millettia* belongs to Leguminosae family, Tephrosiae tribe and is known to elaborate prenylated flavonoids and isoflavonoids. In the search for bioactive principles *Millettia oblata* root was analysed. The dried and ground whole root of *Millettia oblata* was exhaustively extracted using dichloromethane: methanol (1:1) (CH₂Cl₂:MeOH (1:1)) followed by methanol by cold percolation. The CH₂Cl₂:MeOH (1:1) extract was then subjected to chromatographic isolation on normal silica gel and re-crystallisation leading to the isolation of five compounds. The structures of the isolated compounds were determined using spectroscopic methods including ¹H and ¹³C NMR, comparison with literature and comparison with authentic samples. The isolated compounds included three isoflavones [isoerythrin A, 4'-(3-methylbut-2-enyl) ether (**1**), calopogoniumisoflavone B (**2**), 7,2'-dimethoxy-4',5'-methylene dioxyisoflavone (**4**)], a chalcone 4-hydroxyonchocarpin (**3**) and the commonly occurring triterpene lupeol (**5**). This is the first report of these compounds from *Millettia oblata*.

In vitro anti-plasmodial activity of the crude extracts and isolated flavonoids was carried out against chloroquine sensitive D6 (CDC/Sierra Leone) and chloroquine resistant W2 (CDC/Rosewell Indochina III) strains of *Plasmodium falciparum*. The CH₂Cl₂:MeOH (1:1) crude extract showed anti-plasmodial activity against D6 and W2 *P. falciparum* strains with IC₅₀ values of 8.26 ± 1.7 and 11.49 µg/ml, respectively. The methanol extract showed anti-plasmodial activity against the D6 strain only with IC₅₀ value of 14.84 µg/ml. All the isolated and identified flavonoids showed anti-plasmodial activity against D6 and W2 *P.*

falciparum strains with the isoflavone isoerythrin A, 4'-(3-methylbut-2-enyl) ether (**1**) showing the highest potency with IC_{50} values of 6.61 ± 2.8 and 15.10 ± 4.8 μ M against D6 and W2, respectively.

Anti-bacterial activity of the crude extracts and isolated flavonoids was also carried out against gentamycin sensitive *Staphylococcus aureus* (NC 07447), *Bacillus pumilus* (NC 08241), and *Escherichia coli* (ATCC 25922). Anti-fungal activity of the crude extracts and isolated flavonoids was also carried out against nystatin sensitive *Candida albicans*. The crude extracts showed activity against the three bacteria but only the methanol extract showed anti-fungal activity against *Candida albicans*. Amongst the isolated compounds only the chalcone 4-hydroxyonchocarpin (**3**) showed anti-bacterial and anti-fungal activity. The critical inhibitory concentration (CIC) of the CH_2Cl_2 :MeOH (1:1) crude extract and compound **3** were found to be below 6.45 and 1.53 mg/ml, respectively. The MICs (Minimum inhibitory concentration) of CH_2Cl_2 :MeOH (1:1) crude extract and 4-hydroxyonchocarpin (**3**) were found to be 613 and 2.92 μ g/ml, respectively against *Staphylococcus aureus* (NC07447), *Bacillus pumilus* (NC08241) and *Escherichia coli* (ATCC25922). The study has provided some flavonoids of *Millettia oblata* root as possible leads for the discovery, innovation and development of new anti-malarials and anti-bacterial agents. However, further bioassays including acute and chronic toxicity, pharmacokinetic and pharmacodynamic profiles should be carried out to fully establish the potential of *Millettia oblata* crude root extract and phytochemicals as safe and effective therapeutic agents.