

PHYTOCHEMICAL AND ANTIPLASMODIAL STUDIES OF *NEOBOUTONIA*
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ABSTRACT

A study was done to document medicinal plants used in the treatment of various diseases by the people in the Northern sector of Kibale National Park in western Uganda. It also aimed at establishing the plant parts used and the mode of preparation of remedies.

Different medicinal plants (131 species) distributed over 55 families were observed to be used by the local communities around the Northern sector of Kibale National Park. The people in the study area were found to have a rich heritage of traditional plants that are used in the health care system to treat diseases. These medicinal plants have contributed significantly to several disease therapies. The most common diseases treated were malaria and cough being treated mostly by *Vernonia amygdalina* and *Albizia coriaria* respectively. From the list of medicinal plants established, a plant, *Neoboutonia macrocalyx* which is used for treating malaria was selected for further research.

Phytochemical investigation on the leaves of *Neoboutonia macrocalyx* led to the isolation of nine new cycloartane triterpenes (**1-9**) and one new phenanthrene along with known terpenoids, a steroid and a phthalate ester. The chemical structures of the compounds isolated were established mainly through a combination of spectroscopic techniques which included MS, ¹H and ¹³C NMR spectra along with 2-dimensional COSY, HMQC, HMBC, and NOESY experiments. The new cycloartane triterpenes included; 16-acetoxy-22 α -hydroxy-29-nor-24-methylcycloart-1,24(24a)-dien-3,23-dion-3,4-lactone (**1**), 16,22 α -diacetoxy-29-nor-24-methylcycloart-1,24 (24a)-dien-3,23-dion-3,4-lactone (**2**), 16-acetoxy-6,22 α -dihydroxy-29-nor-24-methylcycloart-1, 24(24a)-

dien-3,23-dion-3,4-lactone (**3**), 16, 16,22 α -diacetoxy-6-hydroxy-29-nor-24-methylcycloart-1, 24(24a)-dien-3,23-dion-3,4-lactone (**4**), 16-acetoxy-22 α -hydroxy-29-nor-24-methyl-6,7-epoxycycloart-1, 24(24a)-dien-3,23-dion-3,4-lactone (**5**), 16,22 α -diacetoxy-29-nor-24-methyl-6,7-epoxycycloart-1,24 (24a)-dien-3,23-dion-3,4-lactone (**6**), 16-acetoxy-22 α -hydroxy-29-nor-24-methylcycloart-1,4, 24(24a)-trien-3,23-dion-3,4-lactone (**7**), 16-acetoxy-22 α -hydroxy-29-nor-3,4-seco-24-methylcycloart-4,24(24a)-dien-23-on-3-oic acid (**8**), cycloartan-24(24a)-ene-1 α ,2 α ,3 β -triol (**9**). The new phenanthrene was established as 7-methoxy-2,8-dimethyl-9,10-dihydrophenanthrene-3,6-diol (**10**) while the known compounds were elucidated as 22-de-*O*-acetyl-26-deoxyneoboutomellerone (**11**), Mellerin B (**12**), 24 (S)-24-ethyl-stigmat-4-en-6 β -ol-3-one (**13**) and di-(2'-ethylhexyl) phthalate (**14**).

Phytochemical investigation on the stem bark led to the isolation and identification of one new diterpenoid, Neoboutomacroin (**15**) in addition to the four known compounds which included; a phenanthrene; 3,6-dihydroxy-1,7-dimethyl-9-methoxyphenanthrene (**16**), a sterol; 3-*O*-Acetyloleurtolic acid (**17**) and two diterpenoids; simplexin (**18**) and Montanin (**19**).

The isolated compounds were evaluated for antiplasmodial activity against the chloroquine-resistant FcB1/Colombia strain of *Plasmodium falciparum* and compounds **1-4**, **7-8** and **11** showed good activity against *Plasmodium falciparum* parasite with IC₅₀ of ≤ 5 μ g/ml. The compounds were also evaluated for their cytotoxicity against KB and MRC5 cells and compounds **3-4** and **11-12** were found to be very cytotoxic. The identification of antiplasmodial compounds from this plant suggests that they may play a role in the medicinal properties of this plant and the new compounds could serve as leads to the development of new drugs for malaria.