INVESTIGATION OF THE MAJOR CHEMICAL COMPONENTS IN THE ROOTS OF *VERNONIA GALAMENSIS* SSP. *NAIROBENSIS*

BY

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A thesis submitted in partial fulfillment for the degree of Masters of Science of the University of Nairobi.

1997.

DECLARATION

This thesis is my original work and has not been presented for a degree in any University.

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Jeremiah Kamau Mwaura

This thesis has been submitted for examination with our approval as the research supervisors.

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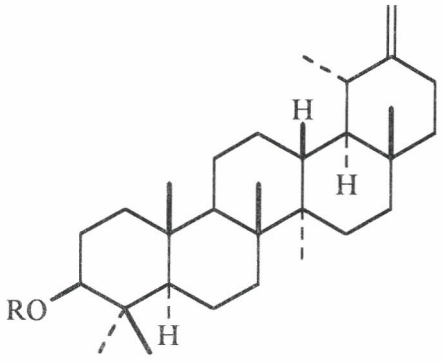
ABSTRACT

The genus *Vernonia* is the dominant member of the tribe *Vernonieae* (family, Compositae) *Vernonia galamensis* ssp. *nairobensis* grows as a common weed in some parts of Kenya and Tanzania. Previous screening of this plant has established that the aerial parts contain predominantly sesquiterpene lactones while the seeds are rich in a naturally epoxidized vernonia oil.

The root part of this plant was screened for the presence of metabolites including triterpenes, sterols, flavonoids and alkaloids. The most abundant metabolites were found to be triterpenes and sterols. The roots were then sequentially extracted with n-hexane, chloroform and methanol. The crude extracts were then subjected to chromatographic separation and the isolated pure compounds subjected to spectroscopic (^{1}H and ^{13}C NMR, IR and MS) analysis in order to elucidate and establish their structures.

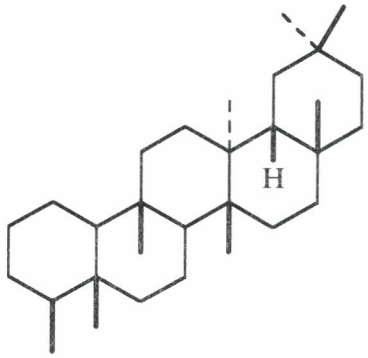
Seven compounds were isolated of which five were fully characterised. The compounds characterised, all of which were contained in the hexane crude extract, included taraxasteryl acetate (**38**), friedelane (**40**), friedelan-3β-ol (**41**), stigmast-5,22-dien-3-ol (**42**) and β-sitosterol (**43**). The former three are triterpenes while the latter two are sterols. Taraxasteryl acetate (**38**) was hydrolysed to its alcohol derivative which was confirmed to be taraxasterol (**39**).

The crude extracts were found to exhibit no anti-microbial activity against the fungal micro-organisms: *Trichophyton mentagrophyte, Microsporum gypsum* and *Candida albicans* plus the bacteria : *Escherichia coli* and *Bacillus subtilis*. The extracts also showed no larvicidal activity against the 2nd inster larvae of the *Aedes aegypti*.



38 **R = $COCH_3$**

39 **R = H**



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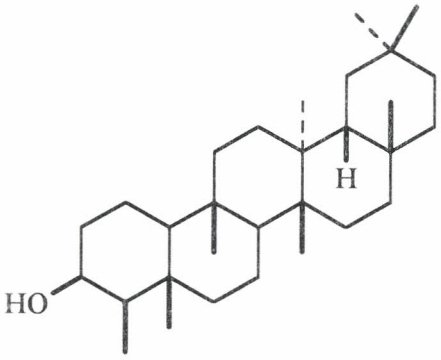

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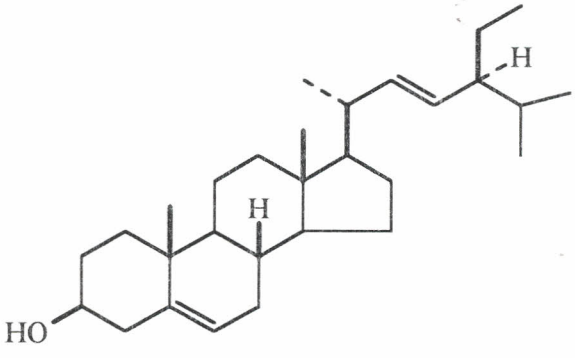

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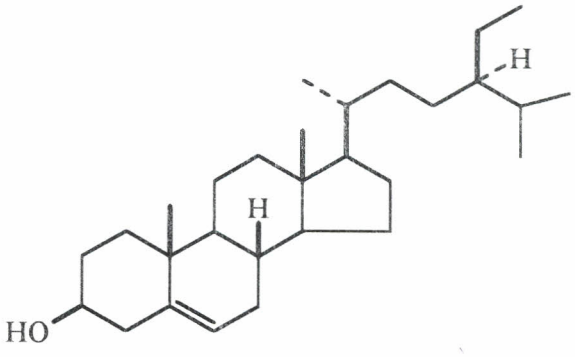

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