

A PHYTOCHEMICAL INVESTIGATION OF FIVE MEDICINAL
PLANTS OF THE COMPOSITEAE FAMILY FROM RWANDA

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BY
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A thesis submitted in part fulfillment for the
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of Nairobi.

JULY 1990

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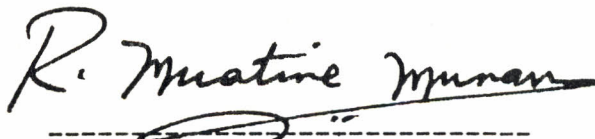
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This thesis is my original work and has not been presented for a degree in any other University.



JOSEPH MUNGARULIRE

This thesis has been submitted for examination with my approval as University Supervisor.



PROFESSOR R.M. MUNAVU

ABSTRACT

The present investigation used phytochemical methods for isolation and structure determination of bioactive principles contained in five medicinal plants of the Compositae family from Rwanda, namely:

Tithonia diversifolia (Hemsley) A. Gray

Gutenbergia cordifolia (Benth. ex Oliver) B. Moore

Vernonia thomsoniana Oliver et Hiern

Vernonia pogoasperma Klatt

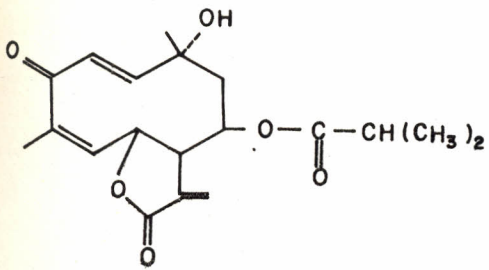
Vernonia karaguensis Oliver et Hiern ex Oliver.

The three *Vernonia* species have not been subjected to any phytochemical studies previously. All substances investigated were obtained from chloroform extracts of the plant leaves. Tagitinin C (94) was isolated from *Tithonia diversifolia* and possessed antibacterial and cytotoxic activity. *Gutenbergia cordifolia* afforded two new sesquiterpene lactones, gutenbergin (108) and idomain (111) which also exhibited the above biological properties. A flavonoid identified as chrysin (113) was also obtained from the *Gutenbergia* species. *Vernonia thomsoniana* and *V. karaguensis* equally afforded sesquiterpene lactones code - named VT 01 (103) and VK 6001 (116) respectively. Both compounds showed antimicrobial activity but only the former was tested for and exhibited cytotoxic activity. A flavonoid identified as cirsilineol (48) was also isolated from *V. thomsoniana*.

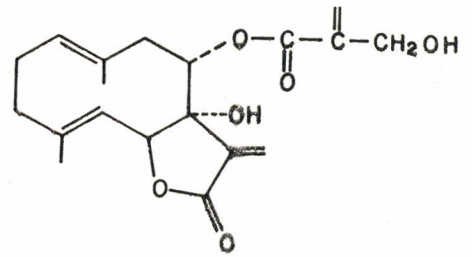
The third *Vernonia* species *V. pogosperma* was devoid of sesquiterpene lactones in the chloroform extract of the leaves but it was found to contain a cytotoxic steroid code-named VP 5001 (114).

The present study largely supports the various biological activities claimed by local herbalists about the plants investigated.

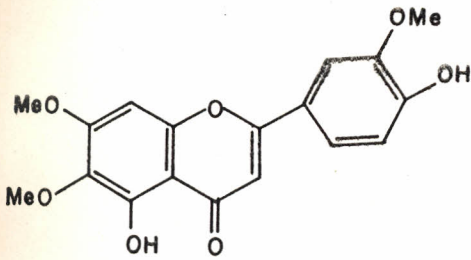
The physico-chemical methods used in the study, especially the two-dimensional NMR experiments, made it possible to establish the structures of the isolated natural products unambiguously. The ^1H and ^{13}C NMR data of all the compounds described are tabulated in the thesis and compared, where applicable, with data of similar compounds reported in the literature. The results obtained bring a relatively modest but significant contribution to the study of biologically active ingredients of the large family of the Compositae from Rwanda.



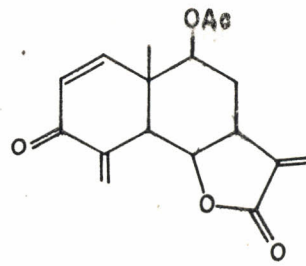
94 Tagitinin C (TD 2001)



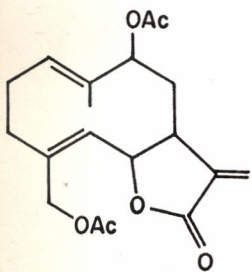
103 VT 01



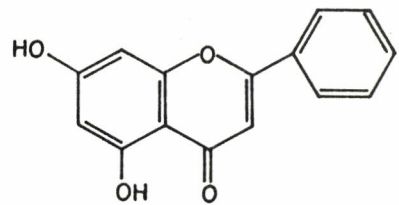
48 Cirsilineol (P1)



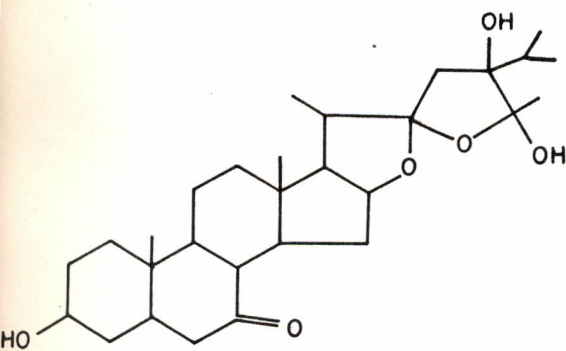
108 Gutenbergin



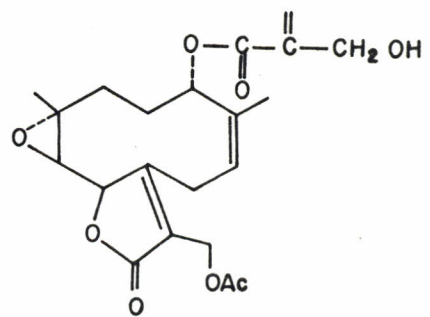
111 Idomain



113 Chrysin (GC 4001)



114 VP 5001



116 VK 6001