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*Phytochemistry*, 1980, Vol. 19, pp. 2462-2463. © Pergamon Press Ltd. Printed in England.

0031-9422/80/1101 2462 \$02.00/0

## LEAF WAX *n*-ALKANE CONSTITUENTS OF THE GENUS *KHAYA*

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(Received 11 January 1980)

**Key Word Index**—*Khaya* species; Meliaceae; *n*-alkanes; leaf waxes; age of leaves; taxonomy.

### INTRODUCTION

The genus *Khaya* (Meliaceae), which is the most important source of mahogany both in Africa and Madagascar, has been found difficult to classify taxonomically, especially in East Africa and the Congo. *Khaya madagascariensis* and *Khaya nyasica* have leaves which are similar both in shape and size. *Khaya anthotheca* and *Khaya ivorensis* are not easily distinguishable in the herbarium [1] and the timber cannot be distinguished microscopically.

In our previous work [2], it was found that the *n*-alkane composition of leaf waxes varied with the age of leaves and that for the *n*-alkane constituents to be useful in taxonomy, variation with leaf age of the *n*-alkane composition of particular aged leaves should be compared. The present work which was carried out on eight species, examined how the variation, with leaf age, in the hydrocarbon constituents of the leaf waxes could be used as a taxonomic character.

### RESULTS AND DISCUSSION

Examination of the variation, with leaf age, in the

composition of *n*-alkanes in the leaf waxes of *K. ivorensis* and *K. grandifoliola* Uganda showed that for *K. ivorensis* the *n*-C<sub>29</sub> alkane was the most abundant between the ages of three and six weeks while from the seventh week the *n*-C<sub>31</sub> alkane took over as the most abundant. In the case of *K. grandifoliola* Uganda, this change took place at the fourteenth week. For convenience, and using the results of the weekly analysis of the leaf waxes of *K. grandifoliola* Uganda and *K. ivorensis* as a guide, the leaf waxes of the other five *Khaya* species involved in this study were analysed at two different ages—six and nineteen weeks.

From the results shown on Table 1, the trees were classified into three groups. *Khaya senegalensis* was the only member of group I as it was either a permanent *n*-C<sub>29</sub> major or had its change over age above nineteen weeks. Both *K. anthotheca* species, which were either permanently C<sub>31</sub> majors or had their change over ages below six weeks, were in group II. All the others: *K. nyasica* Malawi; *K. ivorensis*; *K. nyasica* Amani; *K. grandifoliola* Uganda and *K. madagascariensis* were all in group III, in that they all had their change over ages between six and nineteen weeks. The two *K. anthotheca* sp. differed only in the fact that the plants were initially collected for planting at Ibadan from Ghana and Uganda respectively. This study leads to no distinction between the western and eastern varieties of the plant. The leaf alkane content of leaves of known ages can

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Table 1. Percentage composition of the hydrocarbon mixture of waxes of leaves, aged six and nineteen weeks, from *Khaya* sp.

Carbon No.	L <sub>1</sub>		L <sub>2</sub>		L <sub>3</sub>		L <sub>4</sub>		L <sub>5</sub>		L <sub>6</sub>		L <sub>7</sub>		L <sub>8</sub>	
	6 wk	19 wk	6 wk	19 wk	6 wk	19 wk	6 wk	19 wk	6 wk	19 wk	6 wk	19 wk	6 wk	19 wk	6 wk	19 wk
25	0.6	—	0.6	0.3	—	0.2	—	—	—	—	0.2	—	1.3	0.7	—	—
26	0.5	2.6	0.5	0.3	—	0.1	—	—	—	—	0.2	—	0.7	0.7	—	—
27	5.6	4.7	1.3	0.5	0.7	0.7	0.7	0.6	2.2	1.1	1.1	0.2	10.8	1.6	0.6	0.4
28	2.9	3.8	0.2	0.5	0.6	0.8	0.3	0.6	1.4	1.0	1.4	0.2	4.1	1.5	0.5	0.3
29	47.1	47.9	43.2	38.8	48.0	28.6	38.8	35.7	51.8	32.8	43.6	34.6	52.4	35.0	52.9	16.6
30	4.0	5.5	2.4	2.7	3.1	2.1	1.4	3.4	4.6	5.4	5.3	4.6	3.5	4.1	4.6	2.4
31	31.8	28.3	44.7	47.7	39.4	44.5	45.4	47.8	33.9	43.1	39.3	52.5	23.4	43.7	37.4	65.2
32	3.1	3.5	2.0	2.8	2.2	4.3	3.2	3.2	2.7	5.7	3.2	3.3	1.4	4.6	2.0	5.1
33	5.4	5.2	4.5	6.7	6.1	18.7	10.2	8.6	3.6	10.9	5.8	4.7	1.2	8.2	2.1	9.5

\* wk = week.

L<sub>1</sub> = *K. senegalensis*; L<sub>2</sub> = *K. anthotheca* Uganda; L<sub>3</sub> = *K. nyasica* Amani; L<sub>4</sub> = *K. anthotheca* Ghana; L<sub>5</sub> = *K. madagascariensis*; L<sub>6</sub> = *K. nyasica* Malawi; L<sub>7</sub> = *K. grandifoliola* Uganda; L<sub>8</sub> = *K. voreusis*.

certainly be used from these results to distinguish between *K. ivorensis* and *K. grandifoliola* and our results support the view that these species be maintained as different. A determination of the actual change-over ages for each species as carried out for *K. grandifoliola* Uganda and *K. ivorensis* could, however, further subdivide the grouping of the plants into types. Such an investigation can be conveniently carried out for young plants whose inflorescence are easily accessible. This leaf alkane approach should complement the method suggested by Adesida *et al.* [3] who studied the timber, bark, root and seed limonoid extracts of six *Khaya* species and succeeded

in putting them into three groups of seven types, as well as the conventional botanical methods.

For experimental procedures see ref. [2].

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