(corrigés). Les spectres de masse ont été effectués avec l'appareil type MS-9. Les pouvoirs rotatoires ont été mesurés dans HCl sur polarimètre Jobin–Yvon, type Bourgogne II.

Extractions et séparations. 1,25 kg de tiges feuillées sont broyées et infusées dans 7,5 l. d'H_2O bouillante. Après essorage et rinçage la phase aqueuse est passée sur colonne d'Amberlite XAD_2 (6×90 cm). On lave la colonne par 7 l. d'H_2O distillée. La désorption des produits fixés se fait par de l'EtOH à 80% (3 l.) La soln hydroalcoolique est évaporée à sec et le résidu 30 g repris dans 300 ml d'H_2O est passé sur résine Amberlite IR 120 H^+ (2,5×60 cm). Après lavage par 3 l. de MeOH à 50%, on élue par 3 l. de NH_4OH (N). Cette soln ammoniacale donne 4,3 g d'extrait sec. Les reprises à reflux successives par EtOH (5×250 ml) puis MeOH (5×200 ml) à reflux montrent dans les fractions 1–3 (EtOH) la présence de tryptophane (R_f 0,46), tyramine (R_f 0,47), tyrosine (R_f 0,33) ainsi que d'un spot de R_f 0,26 rouge vif lors de la révélation par la ninhydrine [2] après chauffage à 140°. La CCM est effectuée sur gel de Si avec le mélange éluant EtOAc–MeCOEt–HCO_2H–H_2O (5:3:1:1). Les fractions 4 et 5 (EtOH) et 1–5 (MeOH) très riches en produit se révélant rouge sont réunies et concentrées à sec (750 mg). La reprise à 80° par le mélange PrOH–H_2O (10:90) laisse cristalliser 600 mg d'un produit qui donne une tache en CCM (R_f 0,26), F. 218–219°. (Analyse: Trouvé: C, 58,63; H, 6,97; N, 10,61. Résultat calculé pour $C_{13}H_{18}N_2O_4$: C, 58,63; H, 6,81; N, 10,52%). $[\alpha]_D^{20}$ + 18° (HCl N, *c* 1); Spectre UV: $\lambda_{max}^{HCl\ N}$ nm (log ε): 230 (3,8), 280 (3,23). Spectre IR: NHCO à 1640 cm^{-1}.

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Phytochemistry, 1980, Vol. 19, pp. 1226–1227. 0031-9422/80/0601-1226 $02.00/0

DEPENDENCE OF THE HYDROCARBON CONSTITUENTS OF THE LEAF WAXES OF *KHAYA* SPECIES ON LEAF AGE

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(*Revised received* 28 *August* 1979)

Key Word Index—*Khaya*; leaf waxes; GLC; alkanes.

Abstract—The hydrocarbon constituents of the leaf waxes of eight species of *Khaya* were analysed for taxonomic purposes using GLC. The leaf waxes contained neither isoalkanes nor alkenes and the bulk of the *n*-alkanes were in the range of C_{25} to C_{33}, odd-carbon number compounds predominating. It was found that the percentage composition of the *n*-alkane constituents of the leaf waxes varied with the age of leaves, young leaves having *n*-C_{29} as the most abundant alkane, whereas older leaves had *n*-C_{31}.

INTRODUCTION

Trees of the Meliaceae have received much attention from chemists [1] and a large number of compounds have been isolated [2–4]. The distribution of these compounds form a pattern common to the family [1].

The object of the present work was to examine the chemotaxonomic importance of alkanes in the leaf waxes of eight species of *Khaya*. We also wished to examine whether there was any variation in the alkane composition of the waxes and the age of the leaves.

RESULTS AND DISCUSSION

Eight species of *Khaya* growing on the campus of the University of Ibadan were chosen for the investigation . These were *Khaya senegalensis*, *K. anthotheca* (Uganda), *K. anthotheca* (Ghana), *K. ivorensis*, *K. grandifoliola* (Uganda), *K. nyasica* (amani), *K. grandifoliola* (Ife) and *K. madagascariensis*.

During a preliminary investigation it was found that the hydrocarbon composition of the leaf waxes varied with the age of the leaves (Table 1). In both cases,

Table 1. Percentage composition of the hydrocarbon mixture of waxes from young and old leaves picked from three *Khaya* species

Alkane carbon No.	*K. nyasica*		*K. anthotheca*		*K. ivorensis*	
	Young	Old	Young	Old	Young	Old
25	—	—	0.2	—	1.2	—
26	—	—	0.1	—	—	—
27	4.8	0.6	16.1	0.7	5.8	0.1
28	1.8	0.4	1.3	0.2	1.2	0.1
29	68.3	30.8	41.9	34.8	45.9	29.5
30	2.4	2.1	2.0	2.2	3.2	1.4
31	20.3	49.4	33.2	53.2	34.7	63.8
32	0.8	3.4	1.6	2.3	2.2	1.4
33	1.7	13.2	3.0	6.0	5.4	3.6

odd-carbon number alkanes were predominant, the n-C_{29} and the n-C_{31} alkanes being the major components. However, for the young leaves, the n-C_{29} alkanes were the most abundant whereas n-C_{31} was predominant in all old leaves.

A closer examination of the variation with age in the composition of alkanes in the leaf wax of *K. worensis* showed that, at 3 weeks, both n-C_{25} and n-C_{26} alkanes were detected but by 6 weeks these were reduced to trace levels. The n-C_{27}, n-C_{29} (13.8, 43.1%) and n-C_{31} (30.2%) alkanes were the three major components in the 3-week-old leaves, but in six-week-old leaves the n-C_{27} alkane was reduced to (0.6%) while the n-C_{29} (52.0%) and n-C_{31} (36.2%) had increased. At the age of 7 weeks, however, the n-C_{31} (49.6%) was more abundant than n-C_{29} (38.0%). There was not much further variation in the hydrocarbon composition up to 27 weeks. Similar results were obtained with *Khaya grandifoliola*.

These results show that if the n-alkane constituents of leaf waxes are to be useful in taxonomy then particularly aged leaves should be compared and that the variation of the n-alkane composition with the age of leaves should always be checked.

EXPERIMENTAL

Extraction of crude wax. Crude wax was extracted from leaves by dipping each leaf or bunch of leaves into $CHCl_3$ for *ca* 15 sec with gentle agitation. The soln was filtered and solvent removed. The cyclohexane-soluble portion was separated on a dry column of activated Al_2O_3 and eluted with cyclohexane. The first 5 ml of eluate was collected and evapd to dryness leaving the crystalline hydrocarbon mixture.

Gas chromatographic analysis of the hydrocarbon mixture. A Becker gas chromatograph (FID) was used with a column of Kieselguhr (60–100 mesh) coated with 0.5% Apiezon L. Separation was carried out at 235° and identification was done by comparison of retention times with that of n-C_{28} alkane sample injected under the same conditions. All the other peaks were assigned to the other members of the homologous series. This was checked with a plot of their $\log_{10}$ (retention time) against the carbon number.

Acknowledgements—We thank Mr. S. O. Fadeyi, Agricultural Officer in charge of the Agodi Gardens, Ibadan, for granting us permission to work on the *Khaya* plantations in the gardens.

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