

High Content of Cholesterol in the Lipid of *Acacia farnesiana* Leaves**

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The lipidic composition of the leaves of *Acacia farnesiana* has been determined using gas liquid chromatographic techniques. The light petroleum extract has been found to contain *n*-alkanes (C_{21} – C_{33}) with maximum occurrence of *n*-nonacosane (60%), triacontanol and phytosterols: cholesterol (8.7%), campesterol (21.6%), stigmasterol (37.2%) and sitosterol (32.4%). Occurrence of this relatively large amount of cholesterol (8.7%) in plants is an unique finding.

ACACIA farnesiana commonly called 'Vilayati kikar' in Hindi belongs to family "Mimosaceae". The plant is cosmopolitan in tropics. According to *Sushruta's* "Kaharagoda", the plant is one of the ingredients in a preparation for the treatment of snake bite¹. The tender leaves, bruised in a little water, are swallowed for treatment of gonorrhoea. Only β -diketones and flavones have been isolated from some *Acacia* species². The oil of *Acacia farnesiana* has been analysed by Demole³. Considering its medicinal importance and the fact that no systematic work on the leaves of this species has been done so far, a chemical analysis of the leaves was undertaken.

Experimental

The leaves of *Acacia farnesiana* were collected locally. Air dried leaves (600 g) were extracted thrice with light petroleum (60–80°) at boiling temperature for 36 hr. A dark green solid (4%) was obtained. It was found to be neutral and gave positive Libermann-Burchard test. After usual work-up, the extract was chromatographed over a column of neutral activated alumina (~20 fold excess) and gave different fractions on elution with increasing polarity of the solvent.

Fraction A: Elution with hexane and crystallisation from acetone gave a waxy product (22 mg), m.p. 59–61°. It gave a single spot on tlc (silica gel plate impregnated with 2% $AgNO_3$). IR spectrum indicated it to be a long chain aliphatic hydrocarbon. GLC analysis represented the homologous series of *n*-alkanes (C_{21} – C_{33}) with maximum occurrence of *n*-nonacosane (C_{29} ; 60.0%) and *n*-heptacosane (C_{27} ; 18.0%). Odd numbered homologues predominated only in the higher members (Table 1). Some branched hydrocarbons were also present in traces. The distribution pattern of *n*-alkanes has been found to be of unimodal type⁴.

TABLE 1—COMPOSITION OF *n*-ALKANES

Sl. No.	<i>n</i> -Alkanes		Composition + %
1.	<i>n</i> -heneicosane	$C_{21}H_{44}$	0.2
2.	<i>n</i> -docosane	$C_{22}H_{46}$	0.6
3.	<i>n</i> -tricosane	$C_{23}H_{48}$	0.6
4.	<i>n</i> -tetracosane	$C_{24}H_{50}$	0.7
5.	<i>n</i> -pentacosane	$C_{25}H_{52}$	2.5
6.	<i>n</i> -hexacosane	$C_{26}H_{54}$	2.7
7.	<i>n</i> -heptacosane	$C_{27}H_{56}$	18.0
8.	<i>n</i> -octacosane	$C_{28}H_{58}$	11.6
9.	<i>n</i> -nonacosane	$C_{29}H_{60}$	60.0
10.	<i>n</i> -triacontane	$C_{30}H_{62}$	1.9
11.	<i>n</i> -hentriacontane	$C_{31}H_{64}$	1.2
12.	<i>n</i> -dotriacontane	$C_{32}H_{66}$	0.5
13.	<i>n</i> -tritriacontane	$C_{33}H_{68}$	traces

* According to glc analysis.

Fraction B: Further elution of the column with petroleum ether: benzene (1 : 4 v/v) gave another waxy product, homogeneous on tlc. It was crystallised from methanol (1.754 g), m.p. 85–86°. Its ir spectrum indicated it to be a long chain primary aliphatic alcohol showing prominent peaks at 1060, 3360 cm^{-1} . It was characterised as *n*-triacontanol on the above basis and on comparison with authentic specimen (co-tlc and m.m.p.). Its acetyl derivative⁵ had m.p. 68–69° and was identical with the authentic derivative (co-tlc and m.m.p.).

Fraction C: The next fraction of sterol was obtained on elution with benzene: chloroform (3 : 1). It gave positive Libermann-Burchard test and yellow colour with tetranitromethane. This fraction, on crystallisation from methanol, gave shining crystals (130 mg), m.p. 138–40°. This fraction was then acetylated (m.p. 131–32°) in Ac_2O -pyridine and the identification of each sterol was carried out as the acetates by argentation tlc followed by glc on both OV-1 and OV-17 SCOT glass capillary column. The acetylated sterol mixture was separated into three different zones by argentation tlc having R_f value of the least polar

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zone 0.87 (zone 1) and the medium polar zone 0.80 (zone 2) while the most polar zone (zone 3) was not evident.

The fraction from zone 1 was a mixture of cholesterol, campesterol and sitosterol. The next fraction from zone 2 consisted mainly of the acetate of stigmasterol. The fraction from zone 3 was shown to contain the acetates of cholesterol, campesterol, sitosterol and stigmasterol which might have resulted from the "tailing" of the components on the argentation tlc. The approximate content of each of the four sterols in the acetylated total sterol fraction as determined by glc on OV-1 column, has been given in Table 2.

TABLE 2—COMPOSITION OF STEROIDS

Sterol acetate	OV-1(%)	RRT*	
		OV-1	OV-17
Cholesterol	8.7	1.00	1.00
Campesterol	21.6	1.29	1.32
Stigmasterol	37.2	1.41	1.44
Sitosterol	32.4	1.61	1.64

* Retention times of cholesterol acetate 7.93 has been taken to be 1.00.

It is worth mentioning here that the occurrence of relatively larger amount of cholesterol (8.7%) in this plant is an unique finding. Cholesterol is

generally of animal origin, but is widely distributed in higher plants in trace amount⁶.

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