Palmitoleic Acid in *Roureopsis obliquifoliata* (Connaraceae) Seed Oil

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ABSTRACT

Roureopsis obliquifoliata Schellenberg seeds contain an oil (45% by weight) comprised primarily of 16-carbon fatty acids. Palmitic acid constitutes 50% of the fatty acids, palmitoleic acid 32%, and small amounts of the usual C_{18} acids make up the remainder. Identifications were based on chromatographic properties of the acids and their ozonolysis products.

INTRODUCTION

Ongoing investigations of the seeds from the world's uncultivated plants have disclosed a new source of palmitoleic (*cis*-9-hexadecenoic) acid in *Roureopsis obliquifoliata* Schellenberg, a member of the Connaraceae collected in Ghana. The relative rareness of this acid in plants (1), its unusual abundance in this one, and the paucity of literature on Connaraceae seed oils prompt this report.

EXPERIMENTAL PROCEDURES

Sample preparation, oil extraction, and preliminary analyses of the oil were done in the usual manner (2-4). Methyl esters, prepared by BF_3-catalyzed methanolysis (5), were analyzed by gas liquid chromatography (GLC) (6). Separation of the esters by high pressure liquid chromatography (HPLC) was done on a 30 x 0.78 cm μ-Bondapak C_{18} column in a Waters ALC 201 instrument (Waters Assoc. Framingham, MA) with a solvent system of 20% H_2O in acetonitrile. Detection was by differential refractometry. Separation by thin layer chromatography (TLC) on $AgNO_3$-impregnated plates and recovery of esters have been described (4). Double bonds were located by ozonolysis-GLC (7).

TABLE I

Fatty Acid Composition of *Roureopsis obliquifoliata* (Area % by GLC)

14:0	0.1	$18:1^9$	9.8
16:0	50	$18:1^{11}$	2.2
$16:1^9$	32	$18:2^{9,12}$	4.2
18:0	1.0	18:3	0.1
		20:1	trace

RESULTS AND DISCUSSION

Members of the Connaraceae are usually tropical, twining shrubs, closely allied to the Leguminosae (8). *R. obliquifoliata* produces seeds weighing ca. 0.1 g each containing an oil (45% dry basis) that is a semisolid at room temperature and appears to be almost completely made up of triglycerides when analyzed by GLC and TLC. Methyl esters prepared from it had the composition given in Table I. HPLC of the esters afforded two major fractions. The earlier eluting fraction contained only 16:1 and 18:2, while the later eluting one contained 16:0 and 18:1. TLC on $AgNO_3$-impregnated plates gave pure samples of 16:1 and 18:2 from the first fraction. The other minor constituents in the esters were not collected. No indications of *trans* unsaturation were found by infrared analysis or by $AgNO_3$-TLC.

The fragments from ozonolysis of the 16:1 were a seven-carbon aldehyde (7A) and a nine-carbon aldehyde-ester (9AE). The 18:1 gave a 9A and a 9AE (90%) and a 7A and an 11AE (10%), and the 18:2 gave a 6A and a 9AE. These fragments show that the parent acids were palmitoleic, oleic, *cis*-vaccenic, and linoleic, respectively.

R. obliquifoliata joins the ranks of the few seed oils, such as some Proteaceae (9) and *Doxantha (Bignonia)* (10), that contain large amounts of palmitoleic acid. Investigation of *Roureopsis* and other Connaraceae may provide a lead for commercial exploitation in tropical countries.

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