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LIPID COMPOSITION OF SOME NON-TRADITIONAL OILSEEDS FROM VIDARBHA REGION : PHOSPHOLIPID COMPOSITION OF SUBABHUL, RITHA AND KUSUM SEEDS

Vidharbha region of Maharashtra in India has a very high potential for non-traditional oilseeds such as subabhul, ritha and kusum. Work (Gunstone, 1958; Swern, 1979) has been reported on the phospholipid composition of other oilseeds. This paper reports, for the first time, on the phospholipid composition of these seeds along with the fatty acid composition of individual phospholipids.

Subabhul, ritha and kusum seeds were collected from forest areas. Authentic standards were obtained from Analabs, USA. The total lipids were extracted with chloroform-methanol (2:1, v/v) by Prasad *et al.* (1981) procedure, and separated into neutral lipids, glycolipids and phopholipids by silicic acid column chromatography eluting successively with chloroform, methanol and acetone respectively.

The phospholipids were separated into phosphatidyl choline, phosphatidyl ethanolamine, phosphatidyl inositol and cardiolipin by preparative TLC (Skipski *et al.*, 1962). All the fractions were spotted on the TLC plate (0.25 mm layer of silica gel G) and developed by various solvent systems (Rouser *et al.*, 1970). The spots were visualised (Mangold, 1961) with different spray reagents such as iodine vapours, ammonium molybdate-perchloric acid, ninhydrin and Dragendorff reagent to detect lipids, phosphatidyl ethanolamine or serine containing phospholipids and choline containing phosphalipids. The Rf values were compared with that of authentic standards. Phosphorus was estimated by the method of Harris and Popat (1954). Bases were liberated by acid hydrolysis and identified. Fatty acid methyl esters (FAME) were prepared (Kulkarni *et al.* 1991). GLC of FAME was carried out on a Perkin-Elmer

Table 1. Analysis of fractions of total phospholipids from subabhul oil obtained by preparative TLC

Fraction	Weight %	Phosphorus %	No. of spots	No. of spots on TLC plate			Component phospholipid present in the fraction
				a	b	c	
I	14.5	0.16	1	-	-	-	94% Glycerides
II	16.8	0.20	1	+	-	-	8% Phospholipids
III	19.2	3.40	1	+	-	-	Cardiolipin
IV	14.2	3.20	1	+	+	-	Phosphatidyl ethanolamine
V	20.8	3.10	1	+	.-	+	Phosphatidyl choline
VI	21.6	3.00	1	+	-	-	Phosphatidyl inositol

a Ammonium molybdate-perchloric acid reagent
b Ninhydrin reagent
c Dragendorff reagent

Table 2. Phospholipid composition of seed oils (wt %)

Phospholipid components	Subabhul oil	Ritha oil	Kusum oil
Phosphatidyl choline	24.2	19.2	23.5
Phosphatidyl ethanolamine	20.1	24.2	26.4
Phosphatidylinositol	29.2	32.0	30.2
Cardiolipin	26.0	23.1	18.9
Unidentified	0.5	1.5	1.0

Table 3. Fatty acid composition of the component phospholipids of the seed oils

Component phospholipid	Fatty acids (wt %)								
	16:0	18:0	18:1	18:2	18:3	20:0	22:0	24:0	Unidentified
Subabhul									
Cardiolipin	22.1	2.1	34.0	36.7	1.1	-	1.9		1.3
Phosphatidyl ethanolamine		20.3	2.5	35.5	30.9	1.9		1.5	2.6
Phosphatidyl choline	23.5	3.8	33.4	31.1	1.8	1.9	3.4		1.1
Phosphatidyl inositol	22.7	2.1	33.3	34.2	1.6	-	2.3		3.8
Ritha									
Cardiolipin	20.1	5.7	15.0	48.5	6,5	1.8			2.4
Phosphatidyl ethanolamine	17.3	3.9	19.1	49.6	6.0	4.1	-	-	-
Phosphatidyl choline	17.5	2.8	15.3	56.4	3.9	2.1			2.0
Phosphatidyl inositol	18.7	2.9	16.5	56.6	3.1	1.9			0.3
Kusum									
Cardiolipin	29.8	23.8	13.9	20.6	2.1	9.8	-	-	-
Phosphatidyl ethanolamine	29.7	26.5	14.2	18.3	2.4	8.8			0.1
Phosphatidyl choline	32.5	26.8	11.4	21.2	-	8.1	-	-	-
Phosphatidyl inositol	35.6	26.1	10.6	21.1	0.6	6.0	-	-	-

gas chromatograph equipped with a stainless steel column packed with 2.5% EGSS-X on Chromosorb-W (40-60 mesh) and a flame ionization detector (FID). The conditions of GLC were: chart speed, 60 cm/h, nitrogen flow rate, 20 ml/min, injection port temperature 100°C, column temperature 185°C and

sample injected 1 μl. The fatty acids were indentified by comparison of Rf values of authentic standards and quantified by the area percentages by a computer coupled to the system.

Analysis of total phospholipids of oils obtained by preparative TLC (Table 1) showed the major fractions to be pure glycerides, phospholipids,cardiolipin, phosphatidylethanolamine, phosphatidyl choline and phosphatidyl inositol, being identified with specific spray reagents.

The phospholipid composition (omitting fraction I and fraction II percentages) showed that subabhul, ritha and kusum seeds contained (Table 2) phosphatidyl choline, phosphatidyl ethanolamine, phosphatidyl inositol and cardiolipin. The unidentified substances ranged from 1.0-2.0%.

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