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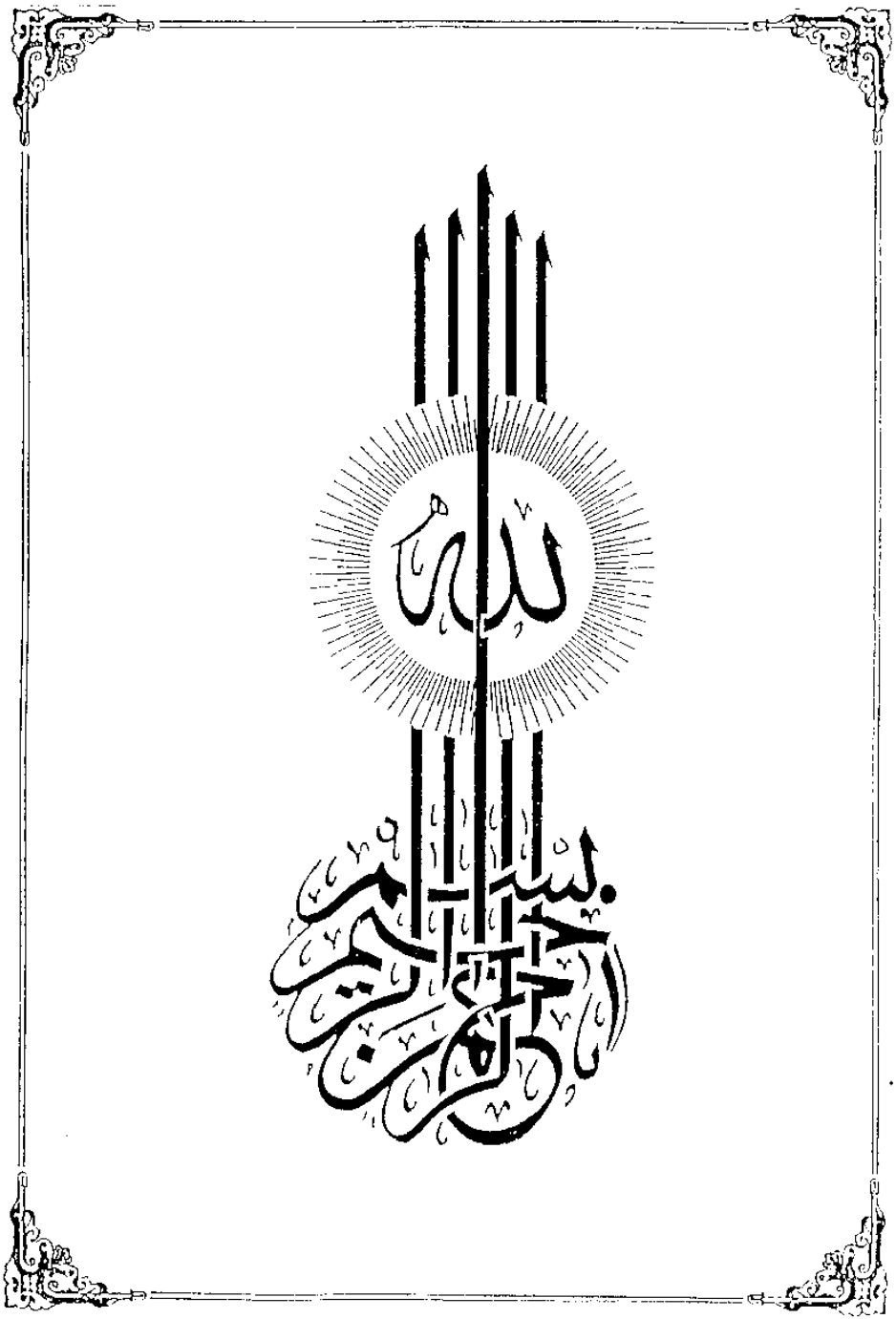

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I- INTRODUCTION

Fats and oils constitutes an important source of energy in comparison with carbohydrates and proteins. Crude vegetable oils contained small amounts of non-glycerides components being less than 5 % and the refined oils contained less than 2 %. In many instances less than 0.2% was found. Some of these are completely or substantially removed from the crude fats during refining or bleaching and hence do not appear in the mamufactured products. The substances commonly removed in refining are generally phosphatides, carbohydrates, ... etc. Phospholipids, which are associated with fats and oils in many plant and animal tissues, consist of a polyhydric alcohol which is esterified with fatty acids and also with phosphoric acid. The phosphoric acid is, in turn, combined with a basic nitrogen - containing compound such as choline, and ethanolamine.

Phospholipid are major constituents of plant cell membranes. A limited number of molecular types : Phosphatidylcholine , phosphatidylethanolamine and phosphatidylinositol are predominant in all cell membrane, exeept for chloroplast thylakoids and envelope where phospholipids are largely replaced by galactolipids and where phosphatidylglycerol is the predominant,(Mazliak 1977).

These phospholipids present in crude oil can be easily removed during a process called degumming. Therefore, degumming or water degumming has two main purposes, first, remove almost completely phosphatides or gums from the oil in order to produce a fully refined oil and the other point, gums may be valuable by-product. Several methods degumming process can be used; water degumming with or without adding various chemical agents.

The phospholipids during soybean seed oil processing consisted mainly of lecithin. This by product can be used in miscellanous edible industerial purposes. In food uses, it can be used in babing, candy, chocolate, ice cream, margarine and shortening. While the industerial uses, it can be used in dyes, insecticides, inks, leather, points, plastics and textile. Moreover, nowadays it is advisable to add these oil phospholipids, perhaps in combination with other low - cost material antioxidants to improve the oxidation stability of lipid products. Since it showed an inhibitory effect in autoxidation of oils.

Therefore, this work aim to study the following :

- Some physical and chemical properties of refined cotton-seed oil, bleached soybean seed oil and crude sunflower seed oil.

- Isolation of phospholipids portions.
- The fatty acids composition of oils as well as the fatty acids present in their phospholipid portions using GLC technique.
- Fractionation and identification of phospholipids from crude cottonseed oil, crude soybean seed oil, crude sunflower seed oil and commercial lecithin using TLC.
- Evaluation of the role of phospholipids, separated from crude cottonseed oil, crude soybean seed oil, and crude sunflowers seed oil and commercial lecithin, in autoxidation process.

II- REVIEW OF LITERATURE

Physical and chemical properties of vegetable oils :

The physical and chemical properties of oils play an important role for identification, which are quite important from both the economical and industerial points of view.

Collins and Sedgwick (1958) reported that, the saponification number and iodine value for soybean seed oil were 185- 195 and 133.5- 134.2, respectively. Meanwhile, Itoh (1972) found that, these constants for soybean seed oil were 190.7 and 134.6, respectively.

El- Sharkawy (1974), studied the physical and chemical properties of cottonseed oil. They were, refractive index 1.4725, acidity as oleic acid 0.5- 3 %, saponification number 195, iodine value 108, peroxide value 0.0, and unsaponifiable matter 0.7 %.

Hallabo (1977) reported that, soybean seed oil "variety clark" contained 1.3 % of unsaponifiable matter. While Bastic et al. (1978) reported that, sunflower seed oil and soybean seed oil contained 0.79 and 1.3 % of unsaponifiable matter , respectively.

El- Hadidy et al. (1977) stated that, the refractive, index at 25°C, acid value, saponification value , iodine value and peroxide value mill.-equ./ kg of soybean oil were 1.3966; 1.17, 186.07, 157.66 and 4.173, respectively.

Robertson and Morrison (1977) found that, the iodine value of oils obtained from American sunflower seeds ranged from 121 to 134.9. However, locally Kulta (1972) and El-Easa (1973) reported that, the iodine value of Egyptian sunflower seed oil was 111- 112 for the white sunflower variety and 124 for the striped variety.

Morrison and Robertson (1978) revealed that, the iodine value of sunflower seed oil varied greatly according to the variation in daily temperature of the maturity period.

Chu and Shedon (1979) analyzed the crude oils of seven soybean genotipes grown at various location in USA. They found that, planting sit and environmental factors affected greatly the iodine value which ranged from 123.5 to 138.2.

El- Nikeety (1981) studies the physical and chemical properties of crude soybean seed oil and sunflower seed oil,

they were, refractive index 1.4731, 1.4713; acidity as oleic acid 0.53 %, 0.74 %; iodine value 133.3, 121.5; saponification number 192.3, 191.8; unsaponifiable matter 0.49 % , 0.905 % and peroxide value 3.93, 8.03 for the above mentioned oils, respectively.

El- Hinnawy et al. (1983) studied the physical and chemical properties of crude soybean seed, sunflower seed, cottonseed oils. They stated that, the refractive index at 25°C, acid value, iodine value, saponification value , and unsaponifiable matter (ether extract %) were 1.4723, 1.19, 130, 195.4, and 0.92 for crude soybean seed oil,while it were 1.4732, 2.4, 117.4, 208.2, and 1.35 for crude sunflower seed oil, in addition it were 1.4725, 2.7, 101.4 , 189.7, and 0.93 for crude cottonseed oil, respectively.

Abd El- Aziz (1985) determined the characteristics of crude soybean seed oil, they were, refractive index at 25°C 1.4739, acidity as oleic acid 0.48 %, peroxide value 3.72 milliequivalent/ kg oil, iodine value 134.5, and unsaponifiable matter 0.73 %.

2- Fatty acids composition of vegetable oils :

Bertoni et al. (1966) reported that, Argentine grown sunflower seed oil consisted of 0.02- 0.1 % myristic acid, 5.8- 8.5 % palmitic acid, 0.3- 0.6 % palmitoleic acid, 1.8-

4.8 % stearic acid, 16.6 - 48.3 % oleic acid and 40.2 - 72.9 % linoleic acid.

Cummins et al. (1967) stated that, fatty acids composition of sunflower seed oil were, 8.6 % palmitic and stearic, 44 % oleic acid, 45.9 % linoleic acid and 0.3 % linolenic acid, but in soybean seed oil about 15 % palmitic and stearic, 26.0 oleic acid, 50 % linoleic acid, and 7.0 % linolenic acid.

Robertson (1972) and Robertson and Morrison (1977) reported that, Alabama and Minnesota sunflower seed oils consisted of 6.5 %, 6.5 % palmitic acid, 5.0 %, 4.3 % stearic acid, 37.2 %, 22.5 % oleic acid and 50.5 %, 66.4% linoleic acid, respectively. While Kulta (1972) found that, the fatty acids composition of Egyptian white and striped varieties of sunflower were 39.1 %, 55.6 % linoleic acid , 52.5 %, 34.2 % oleic acid and 8.4, 10.2 % saturated fatty acids, respectively.

Carpenter et al. (1976) and Spencer et al. (1976) summerized the fatty acids composition of soybean seed oil as 0.5 % myristic acid ($C_{14:0}$), 7.0-12 % palmitic acid ($C_{16:0}$), 0.5 % palmitoleic acid ($C_{16:1}$), 2.0-5 % stearic acid ($C_{18:0}$), 19- 30 % oleic acid ($C_{18:1}$), 48- 58 % linoleic acid ($C_{18:2}$), 4-10 % linolenic aicd ($C_{18:3}$), 1.0%

arachidic acid ($C_{20:0}$), 1.0 % gadoleic acid ($C_{20:1}$) and 0.5 % behenic acid ($C_{22:0}$).

The saturated fatty acids in crude soybean seed oil represented 11.2 to 19 %, according to the result reported by Evans et al. (1973), Cowan et al. (1973), Imai et al. (1974), Spencer et al. (1976) and Carpenter et al. (1976).

Spencer et al. (1976) analyzed cottonseed oil using GLC. They identified myristic, palmitic, palmitoleic, stearic , oleic, and linoleic acids, the average percentage values were 0.9, 19.8, 0.4, 2.17, 16.1 and 60.7 %, respectively.

Robertson and Morrison (1977) reported that, sunflower seed oil from sothern grown seeds was more stable than that from northern seeds, as would be expected from their fatty acid composition, since the southern sunflower seed oils contained 37.1 % oleic and 52.2 % linoleic acids, while northern sunflower seed oils contained 19.1 % oleic and 69.5 % linoleic acids. Similar data was also obtained by Morrison and Robertson (1978).

FAO /WHO (1977) outlined gas chromatography studies on the fatty acids composition of different oils as shown in the following table (1) :

Carbon number *	Cottonseed oil	Sunflower seed oil	Soybean seed oil
$C < 14$	< 0.1	< 0.1	< 0.1
$C_{14:0}$	0.5- 2.0	< 0.5	< 0.5
$C_{16:0}$	17 - 29	3.0- 10	7.0- 12
$C_{18:0}$	1.0- 4.0	1.0- 10	2.0- 5.5
$C_{18:1}$	13 - 44	14 - 65	19 - 30
$C_{18:2}$	33 - 58	20 - 75	48 - 58
$C_{18:3}$	0.1- 2.1	< 0.7	4 - 10
$C_{20:0}$	< 0.5	< 0.1	< 0.1
$C_{22:0}$	< 0.5	< 0.1	< 0.5
$C_{24:0}$	< 0.5	-	< 0.5

* F.A.O./ W.H.O. Codex (1977).

Pokorny et al. (1982) mentioned that, the fatty acids composition of sunflower seed oil were, 6.0 % plamitic acid, 1.7 % stearic acid, 18.6 % oleic acid and 72.7 % linoleic acid.

Erickson (1983) reported that, fatty acids composition of soybean seed oil were < 0.2 % myristic, 10.7% palmitic, 3.9 % stearic, 0.2 % arachidic, 0.3 % Palmitoleic, 22.8 % oleic acid, 50.8 % linoleic and 6.8 % linolenic.

Cherry (1983) stated that, the fatty acids composition of oil from Glanded cottonseed kernneles were, 0.9 % myristic, 25.24 % palmitic, 0.8 % palmitoleic, 2.69 % stearic, 17.53 % oleic and 52.55 % linoleic.

Abd El-Aziz (1985) identified the fatty acids in crude soybean seed oil. They consisted of 0.45 % $C_{13:0}$; 13.20 % palmitic acid ($C_{16:0}$), 2.70 % stearic ($C_{18:0}$), 16.13 % oleic acids ($C_{18:1}$), 63.02 % linoleic acid ($C_{18:2}$) and 4.5 % linolenic acid ($C_{18:3}$).

3- Fatty acids composition of vegetable oils phospholipids:

Babaev et al. (1975) stated that, lipid of cottonseed oil were hydrogenated and the fatty acid composition of phospholipids was studied. Phosphatidylinositol, phosphatidylethanolamine, lecithin and total phospholipids and triglycerides all showed a higher percentage of $C_{16:0}$ and $C_{18:0}$ fatty acids.