SUMMARY

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The study was conducted on soybean, sunflower and corn oil by-products which produced from different stages of refining oils (degumming by-product, Bleaching by-product, deodorizer distillate). Composition of those soybean, sunflower and corn oil by-products were determined. Phospholipids, were separated from degumming by-product, and commercial lecithin were identified by thin- layer chromatography. Fatty acid of phosphoilipids of soybean sunflower and corn oil were identified by Gas liquid chromatography also, hydrocarbons and sterols which were separated from unsaponifiable matter were determined. Phospholipids was evaluated as antioxidant in frying process. Unsaponifiable matter of bleaching by-product was determined and identified.

Unsaponifiable matter of deodorizer distillate, produced from soybean, sunflower and corn oil were determined. The fatty acid of soybean, sunflower, corn oil deodorizer distillate were determined. Total tocopherol was also determined in corn, soybean and sunflower deodorizer distillate.

The obtained results could be summerized as follows :

1- Chemical analysis of degumming by-product of corn, soybean, and sunflower oil show that, it contained 1.20, 1.22 and 0.82% unsoponifiable matter, respectively. Its free fatty acids was 18.20, 21.00 and 20.50%, respectively. Total phospholipids was 37.70, 65.00 and 46.66%, respectively

and Neutral lipids was 42.00, 11.44 and 30.80%, respectively.

- Phospholipids were separated from degumming by-product of corn, soybean, and sunflower oil and it was identified. Soybean phospholipids contain, phosphatidylcholine (20.24%), phosphatidly ethanolamine (33.99%), phosphatidylinositol (17.16%) and phosphatidylserine (28.27%) while sunflower phospholipids contain, phosphatidylcholine (15.54%), phosphatidylethanol amine (29.41%), phosphalidylinositol (22.56%), and phosphatidylserine (32.35%). Corn phospholipids have phosphatidylcholine, (42.21%), phosphatidylethanolamine (28.83%), phosphatidyl-inositol (13.59%) and phosphatidyleserine (15.37%).

- Gas liquid chromatography (GLC) technique was used for determining fatty acids of corn, soybean, and sunflower phospholipids.

- Hydrocarbons and sterols were determined in unsaponifiable matter of degumming by-product of corn, soybean and sunflower, total hydrocarbons percentages were 35.15%, 29.43% and 46.08%, respectively. While, sterols percentages in unsaponifiable matter were 64.82, 70.57% and 53.92%, respectively.

- Lecithin native powder extraxted from corn, soybean and sunflower gums were used as antioxidant in heated sunflower oil at 180°C ± 10°C.

- Acid value increased from 0.14 to 2.48 after 48 hr of heating in control sunflower oil, while it increase from 2.54, 2.62 and 2.42 in sunflower oil treated with soybean, sunflower, corn phospholipid respectively. It was 2.42 in sunflower oil treated with BHT after 48 hr of frying.

- Iodine value, decreased from 134.43 to 51.72 after 48 hr of heating control sunflower oil. In sunflower oil with corn, soybean and sunflower phospholipid it decreased to 62.22 and 52.17 47.56, respectively. While in BHT iodine value decreased to 65.47.

- Peroxide value of sunflower oil treated with corn, soybean, sunflower phospholipids and BHT increased from 0.49 to 48.49, 42.13, 33.88 and 50.66 respcetively after 24 hr of heating, while in sunflower oil it was increased to 58.93 after 24 hr of frying.

- Benzidine number, increased from 92.24 to 649.41 after 48 hrs of heating control sunflower oil. In treated sunflower oil with corn, soybean, sunflower phospholipid and BHT it increased from 92.42 to 529.15, 5.59.12, 60.72 and 481.79 respectively.

- Effect of addition of lecithin powder on fatty acids composition of heated sunflower oil.

The obtained results showed that the total saturated fatty acid were increased by heating from 9.13% to 29.62%, 22.53%, 20.93%, 23.02% and 20.44% in sunflower oil, sunflower oil plus

corn, soybean, sunflower lecithin powder and BHT respectively. In the same time the unsaturated fatty acids decreased from 90.36% to 70.33%, 77.89%, 79.07%, 76.96% and 79.50% to sunflower oil, sunflower oil plus corn, soybean, sunflower lecithin powder and BHT.

2- Chemical analysis of bleaching by-product extract was determined, it indicated that moisture of corn, soybean, and sunflower oil bleaching by-product extract were 1.45, 1.05 and 0.92 respectively. The unsaponifiable matter were 4.61, 2.97 and 2.32 respectively. The free fatty acid were 24.50, 21.12 and 35.22 respectively and neutral lipids were 69.50, 75.12 and 61.54% respectively.

- Hydrocarbons and sterols were determined in unsaponifiable matter of corn, soybean and sunflower bleaching by-product. Hydrocarbons were 64.11%, 69.75% and 45.30%, respectively, while sterols were 35.92%, 30.23% and 54.79%, respectively.

3- Chemical composition of corn, soybean, and sunflower oil deodorizer distillate was carried out, results showed that moisture was 1.79, 2.14 and 2.21% unsaponifiable matter represent as 22.08, 16.86 and 20.07% respectively, the free fatty acid (as oleic acid) was 29.91, 29.00 and 26.72% respectively, and neutral lipids were 46.22, 52.00 and 51.00%, respectively.

- The major fatty acids in corn, soybean, sunflower deodorizer distillate were oleic 29.39, 33.55 and 35.10% and linoleic 36.36, 37.23 and 46.23%, respectively.

- Unsaponifiable matter of deodorizer distillate were determined, total hydrocarbons were 49.49, 56.15 and 34.59% for corn, soybean and sunflower deodorizer distillate. While, total sterols were 49.9, 53.86 and 65.45%, respectively.

- Total tocopherol was determined, it was 10.41, 10.70 and 4.19% in corn, soybean and sunflower deodorizer distillate.