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# PHYSICO–CHEMICAL CHARACTERISTICS AND FATTY ACID COMPOSITION OF GROUNDNUT OIL

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## INTRODUCTION

The groundnut *(Arachis hypogaea)* is cultivated in large quantities in the United States of America, Brazil, China, Senegal, India, Burma and Sudan. Its oil, being superior in quality, is comparatively costlier than most of other edible oils. It is used in cooking [1] and in the preparation of shortenings, margarines and may–onnaise.

Present communication reports the physico–chemical characteristics and fatty acid composition of the oil of the Pakistani groundnut variety 'Banki' which contains 49.4% oil on dry weight basis.

## EXPERIMENTAL

*(i) Extraction and Examination of Oil.* The groundnuts (100 g) were crushed, dried and extracted with distilled hexane in a soxhlet apparatus. The solvent was removed from the dried extracts to yield light yellow coloured oil. The percentage of oil in the sample and its physico–chemical characteristics were determined by the methods of Cocks and Van Rede [2].

*(ii) Analysis of Component Fatty Acids of Oil.* The oil (5 g) was saponified with 0.5 *N* ethanolic potassium hydroxide solution (75 ml). The soap solution was extracted with ether for unsaponifiable matter and then treated with 2 *N* sulphuric acid to liberate fatty acids. The fatty acids (800 mg) were converted into methyl esters by refluxing with dry methanol (12 ml) and 1% w/w sulphuric acid for 2 hr, and were subsequently analysed by a Pye Unicam 204 series gas liquid chromatograph using a column of polyethylene glycol succinate (PEGS 10%) coated on diatomite (80–100 mesh) at 200°. Nitrogen was used as a carrier gas at a flow rate of 40 ml/min.

## RESULTS AND DISCUSSION

The importance of groundnut is due to the quality of its oil as is seen from its physico–chemical characterstics and fatty acid composition (Table 1). The oil is characterised by the presence of unsaturated essential fatty acids. Further, the production of oil/hectare of groundnut has been worked out as 408.4 kg which is much higher than the per hectare oil production of rapeseed/mustard seed (234.9 kg), cotton seed (128.1 kg), and soyabean (84.6 kg). Thus the cultivation of groundnuts must be increased to overcome the shortage of edible oils in Pakistan.

Table 1. The fatty acid composition and physico–chemical characteristics of groundnut oil.

| No. | Fatty acid | Area (%) |
|---|---|---|
| 1. | Myristic | 0.1 |
| 2. | Palmitic | 12.9 |
| 3. | Stearic | 1.9 |
| 4. | Oleic | 47.1 |
| 5. | Linoleic | 31.2 |
| 6. | Arachidic | 1.4 |
| 7. | Eicosenoic | 2.9 |
| 8. | Behenic | 1.5 |
| 9. | Lignoceric | 1.0 |
| *Characteristics* | | |
| 1. | Moisture (%) | 24.0 |
| 2. | Yield (%) | 49.4 |
| 3. | Acid value | 3.1 |
| 4. | iodine value | 97.0 |
| 5. | Saponification vlaue | 194.0 |
| 6. | Unsaponifiable matter (%) | 0.87 |
| 7. | Refractive Index at 40° | 1.464 |

## REFERENCES

1. Oil Seeds Situation in the Punjab by Shamshad Akhtar Khan, First National Oil Seeds Seminar, Punjab Agricultural Research Institute, Faisalabad, 16–17 May, 1975.
2. L.V. Cocks and C.V. Rede, *Oil and Fat Analysis* (Academic Press, London and New York, 1966).