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Biochemical Analysis of Oil from Seeds of *Abutilon Muticum*

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Abstract: The oil seeds of *Abutilon muticum* (Akri) have been studied for their chemical composition and nutritive value. Moisture and ash content are not very significant but their oil contents is important. The oil seed cakes contain a reasonable amount of protein, starch, free sugar, reducing sugar, crude fiber, inorganic material and vitamin C. physical properties such as saponification value, acid value iodine value and peroxide value for seed oil were determined. It was found that oil was non edible because acid value was high. Qualitatively analysis of amino acid was studied by paper chromatography.

Key words: *Abutilon muticum*, saponification value, iodine value, refractive index, paper chromatography

INTRODUCTION

Vegetable oils are very important for human beings because oil have a nutritive value. A good percentage yield of oil crops are international demand because oil is a important component of our meals. It was found that *abutilon muticum* occurs in plains through out Pakistan specially more common in Sindh and abundantly in desert of Cholistan Bahawalpur. *Abutilon muticum* is of cotton family, perennial herb and shrub, 0.5-2 m tall, small leaves 2-16 cmm across, seeds usually 2 mm. The oil seeds contain significant amounts of both saturated and unsaturated fatty acid. (Lander and Morrison 1962). Besides these they also contain significant amount of proteins, carbohydrates, vitamins and minerals. The oil cakes are used for diary cattle. The cakes are also used as fertilizer. They can also be used in the manufacture of soaps and pharmaceutical products. The oil seeds have some importance in the treatment of colds, cough and bronchial infections. Inflammation of urinary tract, gonozzhea diarrhea are also used in the relief of local inflammation and ulcers (Gutkin, 1950).

The present study has been undertaken to explore the physical, chemical properties and minerals contents of oil. It was further found that recent studies on essential oil give maximum information about the utility of these essential oils. (Demiriei; 2000, Demetzos, 2000, Hadiak *et al.*, 2002).

MATERIALS AND METHODS

Seeds were collected from Cholistan desert adjoining to department of chemistry, Islamia University Bahawalpur. Petroleum ether, hydrochloric acid, sulfuric

acid, glucose, anthrone were obtained from BDH Co Ltd. Sodium hydroxide, dinitro salicylic acid, phenol, diethyl ether and chloroform were purchased from E. Merck. The entire reagents were of analytical grade and was used with out further purification.

Estimation of different contents: After having the knowledge of moisture content of oil seed by conventional methods, the seeds were subjected to following estimations.

- Protein content of different varieties of seed cakes were determined by the micro Jeldahl method (Jayaraman, 1985).
- Crude fiber was estimated by the following method. The fat free cake (2-3 g) was mixed with 0.2N H₂SO₄ and boiled for 30 min. the mixture was filtered and residue was washed with hot water, until free from acid. The residue was boiled with 1.25% NaOH for 30 min and filtered and again washed with hot water until free from alkali, followed by washing with ethanol and ether. Finally it was dried at 110°C over night in a crucible cooled and content was then heated at 600°C for 3 h, cooled and weighed. The difference in weight represents the amount of crude fiber (AOAC, 1980).
- Free sugar and starch contents of oil seeds were determined colorimetrically followed by enthrone method (Morse, 1947) and reducing sugar content was estimated by D N S method (Miller, 1959) using glucose as a standard.
- Phosphorous and Iron contents were estimated spectrophotometrically (Vogel, 1953) while Calcium content was determined by titration (Oser, 1965).

- The amount of vitamin C was estimated titrimetrically following the Bessey's method (Bessey, 1944).

Identification of free amino acids: Free amino acids present in seed cake was identified by two dimensional paper. Chromatography method (Jayaraman, 1985) using n-butanol, acetic acid and water in 3:1:1: ratio and phenol with water (4:1) solvent systems.

Extraction and purification of the oil: The oil was obtained from the oil seeds by the solvent extraction process, using petroleum ether as a solvent. (40-60°C) by soxhlet apparatus (Southcombe, 1962). For purification, the oil was taken in a separating funnel along with water (100 ml), ether (200 ml) and saturated sodium chloride, the content was shaken well and allowed to stand. The aqueous layer was discarded and the process was repeated two times with organic layer. Finally the ethereal extract was taken in a conical flask and dried over anhydrous sodium sulfate (20 g) and was evaporated at 40°C to get the purified oil.

Physical properties of the oil: Specific and refractive index of the oil were determined using standard methods (Hilditch, 1949).

Chemical properties of the oil: The saponification value (Hilditch, 1949), the quantity of unsaponification matter, iodine value (Williams, 1966) and peroxide value (Jacobs, 1958) were determined by standard methods. The saponification equivalent (Hilditch, 1949) of the oil was calculated from its saponification value. Acid value of the oil (william, 1966) was determined as the percentage of free fatty acid (as oleic acid) present in the oil.

RESULTS AND DISCUSSION

The moisture, ash, oil and cake contents of seeds are shown in Table 1. The moisture contents in fresh oil seeds was 7.6%

The moisture content of oil seeds are quite close to the brassica and linseed as reported by (krishnamurthy *et al.*, 1960). The Ash contents are 5.3% this indicates that seed contains higher percentage of mineral, matter. It was found that four amino acids were detected. The essential amino acids are Alaninie, Arginine, Glutamic acid and Leucine were present as shown in Table 2

The Table 3 indicates the fiber, protein, carbohydrate, vitamin c and mineral elements.

It was found that these values are in close agreement with the values as reported indian sesame oil (Lander and

Table 1: Moisture, ash, oil and cake content in oil seeds*

Moisture (g %)	Ash (g %)	Cake (g %)	Seeds (g %)
7.6	5.3	37.4	50.3

*Estimation was done twice and the mean value was tabulated

Table 2: The free amino acid content of oil seeds

Amino acid	Absence / presence
Alanine	+
Arginine	+
Aspartic acid	-
Glutamic acid	+
Leucine	+
Proline	-

*+ Indicates presence – Indicates absence

Table 3: Composition of oil seed cake*

Properties	(mg %)
Crude fiber	7.40
Protein	6.01
Carbohydrate reducing sugar	2.30
Non reducing sugar	0.90
Vitamin C	0.16
Phosphorous	310.00
Iron	6.4
Calcium	570.0

* Estimation was done twice and the mean value was tabulated

Table 4: Chemical and physical analysis of oil

Properties	%age
Saponification value	182.0
Iodine value	6.4
Peroxide value	80.1
Acid value	13.4
Free fatty acid	0.3
Unsaponification matter	1.0
Specific gravity at 25°C	0.893
Refractive index at 25°C	1.437

morrison (1962). The result indicates that oil seed cake may be considered as a good source of calcium and phosphorus so we can used as fertilizer.

Analysis of oil: The physical and chemical analysis of oil gives information about the suitability of oil or fat for specific purpose.

REFERENCES

- AOAC., 1980, Method of analysis, 13th Ed., Washington D.C.
- Bessey, O.A., 1944. Determination of Ascorbic acid in citrus fruits and Tomatoes; J. Assoc. Office Agric Chemists, 27: 537.
- Demetzos, C., D.M. Perdetzoglou, K. Ten and C. Economakis, 2000. Chemical Analysis and anti microbial studies on three species of Ferrolago from Greece, *Planto Medica*, 66: 560-563.

- Demiriei, F., G. Iscan, K. Guven, N. Kirima and K. Basu, 2000. Antimicrobial activities of Ferulago essential oils, *Zeitschrift-fur-Nalurtorschung Section c, Bioscience*, 55: 886-889.
- Gutkin, S.S., 1950. Properties and uses of high iodine number, Falkidine drying oils, *J. Amer. oil chem. Soc.*, 27: 542.
- Hadiak, H.A., N. Aghel and R. Etemadi, 2002. Chemical and Biological study of essential oils of Ferulago macrocorpa ; *Hamdard Medicines*, 45: 35.
- Hilditch, T.P., 1949. *The Industrial Chemistry of Fats and Waxes*. 3rd Edn., Balliere Tindall and Cox Ltd., London, pp: 80-159.
- Jacobs, M.B., 1958. *The Chemical Analysis of Foods and Food Products*. 3rd Edn., Von Nostrand Co. Ltd., London.
- Jayaraman, J., 1985. *Laboratory Manual In Biochemistry* 1st Ed. Wiley Eastern Ltd. New Dehli, India.
- Krishnamurthy, K., T.N. Ramakrishnon, R. Rajagopalan, M. Swaminathan and V. Subrahmanyam, 1960. Composition and nutritive value of sesame seed. *Ann. Biochem.*, 20: 73.
- Lander and Morrison, 1962. *The wealth of india*. CSIR, India A-Dictionary of Indian Raw Materials and Industrial Products, 6: 120.
- Miller, G.L., 1959. Use of dinitrosalicylic acid reagent for determination of reducing sugar. *Anal. Chem.*, 31: 426-428.
- Morse, E.E., 1947. Anthrone in estimating low concentrations of sucrose. *Anal. Chem.*, 19: 1012-1013.
- Oser, B.L., 1965. *Hawks Physiological Chemistry*. 14th Edn., McGraw Hill Book Co., New York.
- Southcombe, J.E., 1926. *Chemistry of the oil industries*, constable and Co. Ltd. London, pp: 144.
- Vogel, A.L., 1953. *A Text-Book Of Quantitative Inorganic Analysis: Theory and Practice*. Longans, Green and Co., London.
- Williams, K.A., 1976. *Oils, Fats and fatty foods*, 4th Ed. J. and A. Churchill Ltd. London, pp: 124 .