

## COLOUR INDEX, F.F.A. AND FATTY ACID COMPOSITION OF FRESH, SHELF STORED AND UNDERGROUND STORED *B. CAMPESTRIS* SEED OIL

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Colour index (Lovibond) free fatty acid (F.F.A.) and fatty acid composition of the fresh and stored, [underground (4 feet deep) and on the shelf for (2 years)] rape-seed oil (*B. campestris*) has been studied. Discernible changes in the colour index and F.F.A. were observed but the fatty acid composition remained essentially the same.

*Key words:* *Brassica campestris*; Folk lore myth.

### INTRODUCTION

The commercial rape-seed oil is generally a mixture obtained from the seeds of the cultivated crucifers Pakistan produces 0.3 million ton rape-seeds yielding 0.1 million ton oil (30 percent) per annum [1]. Traditionally, this oil is the chosen cooking medium for a number of specific eatables. Freshly extracted oil is usually consumed without subjecting to chemical refining. In general, this oil is yellow in colour, clear in appearance and has the peculiar mustard like flavour. In the countryside, people normally the oil from the seeds either by 'Kohlu' or small expellers and store it for the specific use. This oil with low F.F.A. has appreciable shelf-life and, therefore, can be used over a longer period.

In the Folk Lore it is believed that if this oil is stored out of contact with air by deep burying in the earth it becomes lighter in colour and attains the 'ghee' like properties. Apparently there seems no logic in this Folk belief. However, it was of interest to study the properties and chemical composition of a stored oil. Since this storage, as claimed, is to be underground, the freshly expressed oil from rapeseed (*Brassica campestris*) was evaluated for its colour, free fatty acid (FFA) and fatty acid composition and then stored in an amber coloured bottle that was buried four feet deep in the earth. The present communication presents data on the evaluation of this oil as well as on the portion kept on the shelf for the same duration of time (2 years and half month) under ambient conditions.\*\*

### MATERIALS AND METHODS

Rape-seeds (*B. campestris* L.) purchased from the local market were cleaned and expressed by a modified Lahore

expeller [2]. Clear, dark yellow coloured oil was stored in a glass container and then filled into three amber coloured bottles (500 ml). Colour (Lovibond), FFA (as oleic acid) and fatty acid composition of the oil was determined by standard procedures [3] (Table 1). The bottles were stoppered and two of them were buried in four feet deep holes in the earth, while the third one was kept on the shelf in the Laboratories.

The buried bottles were dug out after 745 days (2 years and a half month) and the oil samples were reevaluated for the same characteristics as at the start of the experiment (Table 1).

Table 1. Colour index, F.F.A. and fatty acid composition of the fresh, shelf and underground stored *B. campestris* oil

	Fresh	Shelf stored	Underground stored
Colour	Y = 26.1 R = 2.4	Y = 18.7 R = 0.4	Y = 19.8 R = 0.6
FFA	0.14	8.25	11.24
Acids%			
C <sub>16:0</sub>	3.41	4.33	3.64
C <sub>18:0</sub>	1.74	1.51	1.70
C <sub>18:1</sub>	16.69	17.16	17.60
C <sub>18:2</sub>	14.41	14.07	14.56
C <sub>18:3</sub>	15.17	15.15	16.40
C <sub>22:1</sub>	48.56	47.62	46.10

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\*\*Two oil samples were studied and the experiment was repeated twice.

## RESULTS AND DISCUSSION

Chemical evaluation of the fresh and stored, both underground and on the shelf, *B. campestris* oil for colour, FFA and fatty acid composition was carried out as described under materials and methods. It is observed that the fatty acid profile of the samples remained almost constant while there were discernible changes in the colour index and the F.F.A. values. These changes are expected because they change with the life of a fat or an oil. Generally the acid value increases with storage and it increased in the present case from 0.14 in the fresh to 11.24 and 8.25 in the stored oils, under earth and on the shelf respectively. Temperature and pressure variation in the buried sample and light exposure of the shelf sample could account for the marked difference in the acid values of the two samples. The same argument can perhaps be extended to the changes in the colour index of the oils.

From the results of the experiment it is inferred that the common myth has no scientific base. In the stored oil there occurs partial hydrolysis and hence higher F.F.A. However, It is observed that since there is a visible colour change the common folks, therefore, attribute it to the oil becoming 'ghee'. On the whole, therefore, it is concluded

that there are no advantages in storing the oil either underground or on the shelf.

Similar results were obtained in another study on stored cow butter [4]. Since the storage life longer (5 years), a significant amount of hydrolysis had occurred. In the present study also, as stated above, the trend is similar, though the storage period was short (2 years).

In order to understand better the significance of the results, more studies are in progress.

More oils with varying storage conditions are under examination. The results of these studies will be communicated later .

## REFERENCES

1. S.A. Khan, P. Aziz, K.Y. Khan, J.I. Khan, A.W. Sabir and I.A. Malik, Pakistan J. Sci. Ind. Res., 27, 146 (1984).
2. D. Muhammad, A.W. Omer, S.L. Force and S.A. Khan, Pakistan J. Sci. Ind. Res., 27, 244 (1984).
3. *British Standard Methods of Analysis of Oils & Fats*, B 5684 (1958), pp. 14-15.
4. S. Zaka, B. Asghar, A. Waheed and S.A. Khan, Pakistan J. Sci. Ind. Res., 29, 297 (1986).