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Analysis of Groundnut Oil Commercially available in Gujarat

Deepen Gandhi*[1]
*[1]Department of Chemistry, Government Science College, Idar, Gujarat, India
gandhideepen@gmail.com[1]

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ABSTRACT

Samples of groundnut oil from three well-known commercial brands in Gujarat (viz. Ankur, Gulab, Fortune) were tested for various analytical parameters viz. Refractive Index, Acid value, Free fatty acids, Ester value, % Glycerin and Saponification value. Results and inference are presented in this paper.

Keywords : Groundnut oil, Analysis, Saponification value, Acid value

I. INTRODUCTION

Edible oils are commonly used in industrial food manufacturing and home cooking worldwide and are the primary source of unsaturated fats and vitamin E in human diets[1]. Edible oils are an important ingredient in cooking of Indian curries, dal and other dishes.

However, as with all food products, there is the potential for potentially toxic contaminants to occur in oils. Adulteration of commonly consumed edible oils with palm oil or other low price oils is a matter of concern as it may affect human health in various ways. Palm oil used in adulteration is about 49% saturated fat, which can increase LDL cholesterol and the risk of heart disease and chronic health conditions[2]. Mustard oil adulterated with argemone oil and butter yellow has been reported to cause gall bladder cancer. Similarly, argemone oil mixed with edible oils can lead to epidemic dropsy, glaucoma and loss of eyesight[3]. Eating adulterated oil can also lead to health problems like heart problems, liver diseases, and indigestion. Loosely adulterated edible oils can even increase the risk of paralysis, liver damage, and cardiac arrest.

Various events of adulteration of groundnut oil with inferior ingredients have been reported regularly in recent years[4]. Adulteration can change the chemical composition of the groundnut oil, which can reduce or eliminate its beneficial characteristics. For example, pure groundnut oil has anti-inflammatory, anti-cancer, anti-tumor, and anti-diabetic properties[5]. However, the benefits of pure groundnut oil are actually counteracted if the oil being blended contains more saturated than unsaturated fats[6].

Keeping in view the above observations, It is essential to test the oils, so as to ensure that its quality is not tampered and it is consumed without any ill effects to human health. The present report contains analysis of samples of groundnut oil from three well-known commercial brands in Gujarat viz. Ankur double-filtered, Gulab double-filtered, Fortune refined.

Various analytical parameters viz. Refractive Index, Acid value, Free fatty acids, Ester value, % Glycerin and Saponification value for the purchased oil samples of above brands and results are presented in this paper.

II. METHODS AND MATERIAL

One litre packages of Ankur double-filtered, Gulab double-filtered, Fortune refined groundnut oils were purchased from market in Gandhinagar and oils were directly used in analysis without any prior treatment.

Various reagents and solutions used were prepared according to the directives given in the manual of FSSAI published for analysis of oils and fats[7].

Analysis of refractive index, acid value, free fatty acids, ester value, % Glycerin and saponification value was also performed as per the standard procedures given in the FSSAI manual of analysis of oils and fats.

III.RESULTS AND DISCUSSION

Results of various analytical parameters for samples of chosen three brands have been presented below.

A. Determination of Refractive Index

Refractive index of all three samples were measured using abbe refractometer and results are shown in Table 1.

TABLE 1

REFRACTIVE INDEX OF SAMPLES

Sr. No.	Name of sample	Reflective index
1	Ankur double filtered	1.4627
2	Gulab double filtered	1.4632
3	Fortune refined	1.4626

Refractive index of all three samples were found between the standard range of 1.4620 and 1.4640.

B. Determination of Acid Value

Acid values of all three samples were measured using standard procedure and results are shown in Table 2.

TABLE 2

ACID VALUES OF SAMPLES

Sr. No.	Name of sample	Acid value
1	Ankur double filtered	1.66
2	Gulab double filtered	1.67
3	Fortune refined	0.57

Acid values for refined oils and filtered oils should not be more than 0.5 and 6.0 respectively. Accordingly, acids values of all three brands of oils was found to be in range.

C. Determination of Free Fatty Acids (FFA)

FFA values of all three samples were measured using standard procedure and results are shown in Table 3.

TABLE 3

FFA VALUES OF SAMPLES

Sr. No.	Name of sample	FFA value
1	Ankur double filtered	0.8333
2	Gulab double filtered	0.8383
3	Fortune refined	0.7881

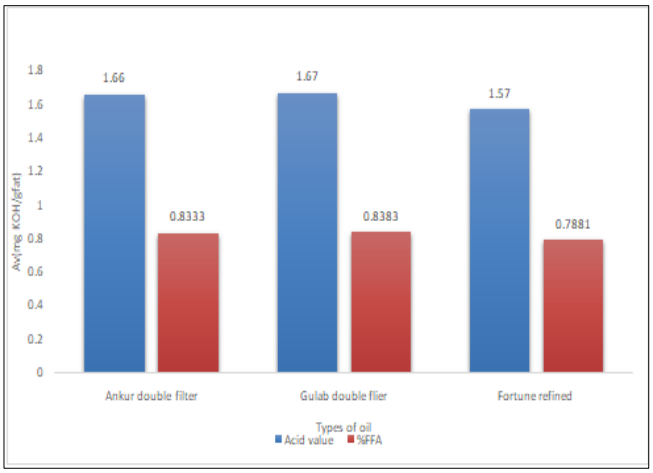

Figure 1. Acid & FFA values of samples

D. Determination of Ester Value

Ester values of all three samples were measured using standard procedure and results are shown in Table 4.

TABLE 4

ESTER VALUES OF SAMPLES

Sr. No.	Name of sample	Ester value
1	Ankur double filtered	187.93
2	Gulab double filtered	186.55
3	Fortune refined	185.59

E. Determination of % Glycerin

% Glycerin values of all three samples were measured using standard procedure and results are shown in Table 5.

TABLE 5

% GLYCERIN VALUES OF SAMPLES

Sr. No.	Name of sample	Ester value
1	Ankur double filtered	10.273
2	Gulab double filtered	10.197
3	Fortune refined	10.140

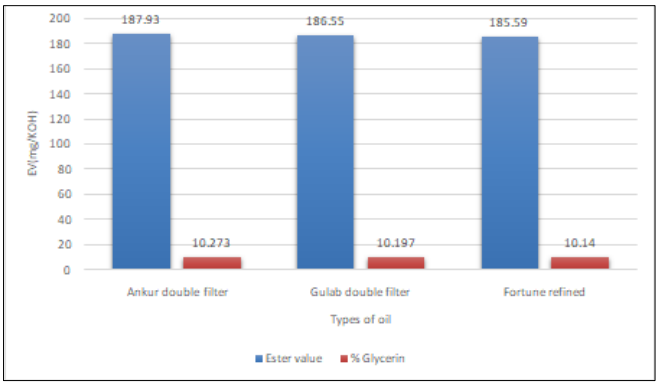

Figure 2. Ester & % Glycerin values of samples

F. Determination of Saponification Value

Saponification values of all three samples were measured using standard procedure and results are shown in Table 6.

TABLE 6

SAPONIFICATION VALUES OF SAMPLES

Sr. No.	Name of sample	Saponification value
1	Ankur double filtered	189.59
2	Gulab double filtered	188.22
3	Fortune refined	187.16

Saponification values of groundnut oil should be between 188 and 196, which were found to be in that range for all three samples.

IV. CONCLUSION

Analysis of various physicochemical parameters of three commercially popular brands of groundnut oil revealed that quality of groundnut oils from all three brands was at par.

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