

Purity Status of Some Popular Brands of Soybean Oils Available in the Local Market of Dhaka City

Sharmin Rumi Alim*, Amita Podder, Md. Mohiduzzaman, Nazma Shaheen and Quazi Salamatullah

Institute of Nutrition and Food Science, Dhaka University, Dhaka-1000

Abstract

There are several brands of oil available in our local markets but this edible oil of vegetable origin is hardly tested to control their quality. The main purpose of this work is to check the quality of some oil brands usually consumed by the population and also to correlate the price variation of different brands, their popularity and purity status. On the basis of a questionnaire ten most popular brands of oil samples (9 local brands Phoolkapi, Rupchanda, Teer, Rupan, Everyday, Fresh, Shaad, Janata, Starship and one imported brand Chief) were collected randomly from ten different markets of Dhaka city for the experimental work. The physicochemical properties (mainly peroxide value, saponification value, acid value and fatty acid composition) of these oils were analyzed in the laboratory to test their purity status. Ranking of different local brands in terms of consumption, price and peroxide value varies grossly. Slight differences were also found in percent of individual fatty acids among the brands. One of the brand contains higher palmitic acid than the other indicating contamination of palm oil. Publicity appears to be the main reason for high turn over of some specific brands besides considering other factors, like degree of purity. It appears that the brands with high demands are selling at higher prices although their relative quality is not good.

Key Words: Soybean Oil, Physicochemical Property, Purity.

Introduction

People of today are very much cautious about what they are taking as food, which is reflected by several newspaper reports. Daily Ittefaq of 21st October 1999 and daily Janakantha of 17th October 1999 had articles on peoples' awareness on the purity status of edible oil. Some research works on quality of soybean oil quality has been done in past ^{1,2} but the edible oils available in the local markets of Dhaka city are hardly checked to control their quality. In our country any survey regarding the price variation and purity status of the high priced oil has never been done in the past. Since the consumers

Bangladesh Journal of Nutrition, Vol 14, December 2001. Institute of Nutrition and Food Science, University of Dhaka, Dhaka-1000, Bangladesh.

**Author for Correspondence*

have doubt on the quality of different brands of locally available soybean oils, it is necessary to undertake an investigation program to correlate the price variation of different brands and their purity status. Recently imported oils are attracting the attention of consumers because of their expected superior quality. Therefore, it is also necessary to have a comparative data between the biochemical parameters of the local and imported oils.

Physicochemical³ and biochemical⁴ parameters namely, peroxide value and acid value of oil reflect the purity status of that oil. On the other hand fatty acid composition is the most important index of contaminants present in the oil. In the present study a survey was carried out in ten different markets of Dhaka city, from each market ten shops were randomly selected for the study. Nine questions were asked to the sellers of the shops and on the basis of their answer an idea about the best sell brand, price range of different brands, their turn over rate were also obtained. Oil samples from the above mentioned shops were analyzed in the laboratory for their quality status.

Materials and Methods

The survey was carried out in the month of February and March, 1999. Ten selected markets situated at different areas of Dhaka city (New market, Kawran bazaar, Malibagh bazaar, Mohakhali bazaar, Gulshan bazaar, Moulvi bazaar, Chawk bazaar, Shantinagar bazaar, Thatari bazaar and Hatirpool bazaar. From each market 10 retail shops were selected by random sampling. The questionnaire for retail shops consisted of name of the shops, frequency of oil purchased, type of container used for oil sell, name of the oil brands as well as the total amount of oil sold, price range of different oil brands, names of brands purchased mostly.

Collection of oil : Ten most popular brands of oil samples (9 local brands and one imported brand) were collected from randomly selected retail shops for the experimental work. The trade name of the oils were Phoolkapi, Rupchanda, Teer, Rupan, Everyday, Fresh, Shaad, Janata, Starship and Chief(imported).

Physicochemical Properties : Specific gravity and refractive index were determined by the standard methods (Moulah et al. 1990; Worsnop and Flint 1963)^{5,6}.

Biochemical Parameters : Iodine value, Saponification value, Unsaponifiable matter, Acid value, Free fatty acid and Peroxide value were determined by the standard methods (IUPAC, 1979). Fatty acid composition was determined by Gas liquid chromatography (PYE UNICAM)⁷.

Results and Discussion

Nine local brands of soybean oil (Phoolkapi, Rupchanda, Teer, Rupan, Everyday, Fresh, Shaad, Janata and Starship) and one imported brand (Chief) were selected from the local market to conduct a comparative study on their physicochemical properties in order to determine their purity status.

The physicochemical properties such as color, specific gravity and refractive index were very similar among the brands tested (data not shown). The values vary between certain standard limits (colour; light yellow, specific gravity; 0.917-0.920, refractive index; 1.472-1.476) ⁸ and these very small variations are considered to be negligible. Much difference was observed in the biochemical parameters of different brands of soybean oils. The saponification value was between 223 to 237 (highest in Shaad and lowest in Teer, Table 1). The high saponification value for Shaad indicates presence of increased amount of low molecular weight short chain fatty acids. As expected the unsaponifiable matter also differed for different brands (data not shown). Peroxide value which is the indicator of rancidity was rather

Table 1. Saponification value, peroxide value and acid value of different brands of soybean oil

Brands of soybean oils	Saponification value	Peroxide value	Acid value
Phoolkapi	225.05	12.41	0.780
Rupchanda	228.24	7.69	0.560
Teer	222.55	2.54	0.400
Rupan	228.62	14.99	0.632
Everyday	223.37	4.99	0.240
Fresh	235.27	1.22	0.178
Shaad	237.45	11.58	0.182
Janata	230.77	11.95	0.174
Starship	230.91	2.50	0.365
Chief (imported)	224.51	3.82	0.242

For each parameter estimation was done twice and the mean value was tabulated

high in some of the oil samples. Phoolkapi, Rupan, Shaad and Janata had peroxide value above than the accepted level ⁹. Rancidity leads to the formation of both unpalatable and toxic compounds, and is thus nutritionally undesirable. Important thing is that the peroxide value of

imported oil is comparable to some of the values of local brands. On the basis of peroxide value different brands of oil can be classed in the following order :

Fresh < Starship < Teer < Chief < Everyday < Rupchanda < Shaad < Janata < Phoolkapi < Rupan.

The rancidity of oil is also often expressed as percent free fatty acids. As the formation of free fatty acids in natural oil due to hydrolysis by lipase, may be an important factor for rancidity, a high value of free fatty acid is a clear indication of rancidity. From table 1 it is clearly observed that Phoolkapi, Rupchanda, Teer and Rupan have considerable high acid values.

Fatty acid composition of the ten oil samples varied widely Table 2. Four fatty acids were identified and estimated from the chromatogram. Different types of soybean oil contains 10-20% palmitic acid, 4-6% stearic acid 19-30% oleic acid and 52-56% linoleic and linolenic acids. It is to be noted that major difference in fatty acid composition lies in palmitic acid and oleic acid content indicating palmitic acid contamination in some local brands, particularly in Shaad. It is shown in table 1 that Shaad also has the highest saponification value which coincides well with the higher palmitic acid content of Shaad. All the oil brands have more than 80% unsaturated fatty acids except Shaad.

Table 2. Fatty acid composition (%) of different brands of soybean oil determined by gas liquid chromatography

Brands of soybean oil	Palmitate C_{16:0}	Stearate C_{18:0}	Oleate C_{18:1}	Linolate C_{18:2}
Phoolkapi	10.43	6.42	27.43	55.72
Rupchanda	10.78	5.76	30.83	52.63
Teer	11.05	5.29	27.43	56.24
Rupan	11.04	6.10	26.40	56.46
Everyday	12.53	4.01	29.86	53.60
Fresh	11.41	5.29	27.44	55.86
Shaad	20.12	6.26	19.43	54.17
Janata	11.05	5.00	27.33	56.62
Starship	10.45	5.37	28.66	55.52
Chief (imported)	11.30	5.50	30.11	53.09

The survey covered the delivery and sources of supply to different retail shops. On inquiry revealed that 60% of the retail shops get their stock from delivery survice directly provided by the manufacturer as well as from the

nearby whole seller, and 40% retail outlets are solely depend on direct delivery service of the manufacturer. While investigating the frequency of oil purchased by different retail shops it appeared that one or two procurements in a week happens in case of 90% shops. Thus, due to good delivery system of the manufacturers within Dhaka city, the shops do not store the oil for longer period, as a result there is no storage effect on the oil at least in Dhaka city. It is therefore necessary to investigate the reason of quality difference between brands at manufacturer level.

According to the questionnaire ranking of different brands in terms of consumption varies grossly (Table 3). Rupchanda ranks first in terms of brand wise consumption followed by Teer. As well as Rupchanda is getting best price also. But the peroxide value has no bearing to the price rather market perception about the quality and advertisement impact appeared to

Table 3. Sale price and percent distribution of the brands of soybean oil consumed mostly

Brands of soybean oil	Price (Tk/Kg)	Percent distribution
Phoolkapi	50	12.7
Rupchanda	58	49.7
Teer	52	24.9
Rupan	48	0.8
Everyday	56	3.6
Fresh	52	4.1
Shaad	47	1.2
Janata	47	1.0
Starship	49	0.7
Chief (imported)	85	1.3

have strong influence in price and consumption. Therefore it is absolutely clear that publicity appears to be the main reason for high turn over rate of some specific brands, besides considering other factors like, degree of purity. It appeared that the brands with high demand are selling at high prices although their relative quality is not good. Another important finding of this study is that the parameters of imported oil 'Chief' are comparable to those of the other brands of locally refined oils (Table 1 and 2).

Acknowledgement

This work has been supported partially by the financial aid of Science and Technology Ministry of Bangladesh. The acknowledgement is also due to Dr.

Nilufar Nahar, Professor, Department of Chemistry, DU and Mrs. Shamima Choudhury, Professor, department of Physics, DU for their kind cooperation.

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