

“To Study the *Patrasanskar* on the basis of Physico-chemical Analysis of *Goghrita* (Cow’s *Ghee*).”

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Abstract:

The above study explains the effect of different *Patras* (containers) on *goghrita* (cow’s *Ghee*). Materials used were cow’s *Ghee* (prepared with lab scale method) and different types of containers (copper, iron, bronze, silver, brass, earthen clay, steel, plastic and glass). The *Ghee* was stored in the containers for a period of 10 days under controlled conditions (on shakers at 75 RPM and at 27°C). Physico-chemical and sensory analysis of the sample was carried out and the results exhibited better nutritional and satisfactory sensory properties when stored in glass container while negative and unsatisfactory results were observed in bronze and plastic containers. The research may prove promising to the food industry sector to ensure public health.

Key words: *Goghrita* (Cow’s *Ghee*), *Patras* (Containers), Sensory analysis.

I] Introduction

Cow’s *ghee* is of special medicinal interest in India (Dhurvey Y. T. et al, March 2012). *Ghee*/ clarified butter is a complex lipid of glycerides, free fatty acids, phospholipids, sterols, sterol esters, fat soluble vitamins, carbonyls, hydrocarbons and carotenoids (cow’s *ghee*). *Ghee* also contains traces of iron and calcium. The major constituent of *ghee* is glyceride which constitutes 98% of total material in *ghee* and rest 2% consists of sterols most commonly cholesterol, occurring to the extent of about 0.5%. *Ghee* is unique among natural fats in that it contains a large proportion of fatty acids and as a consequence many of its characteristics are quite distinctive (Dhurvey Y. T. et al, March 2012).

The quality of *ghee* prepared depends upon the quality of milk, cream, *dahi*(Curd), butter, method of preparation, temperature, conditions of storage and type of animal feed. These factors in turn will help in determining physicochemical properties of *ghee*. The quality of *ghee* is determined by three parameters: Peroxide value, flavor and acidity. The quality of *Ghee* on storage has been measured by acid and peroxide value. The temperature of clarification is most important factor that controls the intensity of the flavor of *ghee* (Jariwala, K. N., June 2014).

Traditionally clarified butter/ *ghee* is prepared at domestic scale by traditional methods and now commercially as well. *Ghee* may be produced through heat clarification of cream or via conversion into

butter followed by heat desiccation (Dhurvey Y. T. et al, March 2012).

The quality of prepared *ghee* depends upon the storage conditions and storage containers as well. Hence to retain the original properties of *ghee* and to improve the shelf life, storage in appropriate containers is essential.

Hence, the following study focuses on understanding the effects of different materials of containers on the physico-chemical and sensory properties of *ghee*. The study might prove helpful for dairy sector which aims to improve human nutritional status.

II] Materials and Methods

1. Collection of requirements

The sample and containers used were of analytical grade. The sample was prepared in laboratory using standardized procedure and containers were procured from local market.

2. Preparation of the sample

The sample was prepared in the lab by standardized traditional method. When sufficient cream was collected, it was mixed with equal quantity of cold water and churned. Butter formed during churning was skimmed off and collected in a suitable container. The butter was processed into the *ghee* using industrial creamery butter method. Butter was melted at 60°C and transferred into a boiling pan at 90°C

to drive off moisture. It was finally clarified at 115°C, allowed to sediment, decanted, filtered and used for analysis.

3. Storage of the sample

The sample (cow's *ghee*) of 100gm was stored in various containers (glass, earthen clay, plastic, metal containers (silver, copper, iron, brass, bronze, stainless steel containers)) for the further study. The storage duration was 10 days (240 hours). The sample was placed on shakers at 75 rpm at 27°C.

4. Analytical methods

a. Physico-chemical analysis

All the apparatus used were calibrated for the purpose of accuracy. Tests were carried out on zero day and 10th day.

- 1. Refractive Index:** The refractive index (η) of a substance with reference to air is the ratio of the sine of the angle of incidence (i) to the sine of the angle of refraction (r) of a beam of light passing from air into the substance.

$$\eta = \sin i / \sin r$$

- 2. Weight:** Weight (gm) of the sample was assessed using pycnometer.
- 3. Saponification Value:** The Saponification value is the number of milligrams of potassium

hydroxide required to saponify 1 g of *ghee*. The Saponification value is the index of mean molecular weight of fatty acids of glycerides comprising of fat. Lower is the Saponification value, large the molecular weight of fatty acids and triglycerides and vice-versa.

4. **Iodine Value:** The iodine value is used to determine the degree of instauration of constituent fatty acids thus relative measure of unsaturated bond present in sample. It is the measure of number of grams of iodine consumed by 100 g of sample. The method is *ghee* is adulterated with oils or animal fat.
5. **Acid Value:** Free fatty acids present in *ghee* are readily soluble in rectified spirits. The acid value is the number of milligrams of KOH required to neutralize free fatty acids in 1 g of *ghee* sample. The value is determined by titrating the with standard potassium hydroxide using phenolphthalein indicator, the mixture may be warmed to about 70°C and is swirled vigorously. It is measure of fatty acids which have been liberated by hydrolysis of triglycerides due to action of moisture, temperature or enzymes.
6. **Sensory Analysis:** Samples were evaluated for organoleptic characteristics (colour, appearance, taste, flavor, texture and overall

acceptability) on the zero day and 10th day.

5. **Statistical Evaluation:** The original data and other results were statistically analyzed using analysis of variance (ANOVA) and least significance difference at a significance of probability 5%.

III] Results and Discussion

A. Changes in the physico-chemical parameters:

- I. **The Refractive Index:** The value of the sample was found to be greater in bronze and iron containers and least in earthen clay and glass containers.
- II. **Saponification Value:** Results showed that the Sap value was greater for the *ghee* stored in bronze and plastic containers and that of the sample from glass which had the least Sap value.
- III. **Iodine Value:** Results indicate no significant difference in the iodine value of the samples stored in all the containers.
- IV. **Acid Value:** Results indicate no significant difference in the acid value of the samples stored in all the containers.

B. Changes in the sensory parameters

- I. Color: Glass and earthen clay containers retained original color of the sample as against bronze and silver containers which showed significant difference and color fading.
- II. Texture: No significant difference observed in the samples from all the containers.

- III. Odor: Glass, earthen clay and silver containers retained original pleasant odor of the sample as against bronze, plastic and iron containers which showed significant difference.
- IV. Characteristic appearance: The overall appearance of the samples from glass and silver containers was better as compared to all other containers.

Table 1

Sample (100 gm)	Refractive Index	Saponification Value	Iodine Value	Acid Value
Initial	1.4	182.2	9.7	2.00
I (Copper container)	1.44	230.6	11.3	1.1
II (Iron container)	1.47	222.4	19.6	1.3
III (Bronze container)	1.47	236.5	11.7	1.4
IV (Earthen clay container)	1.38	228.3	11.5	1.1
V (Plastic container)	1.40	230.3	9.9	1.3
VI (SS container)	1.40	234.8	8.7	1.2
VII (Brass container)	1.40	208.1	9.3	2.00
VIII (Glass container)	1.40	197.5	8.9	1.6
IX (Silver container)	1.40	211.4	10.2	2.2

*Mean of triplicate analysis of the samples.

IV] Conclusion

From the results, it was concluded that the *ghee* (*goghrita*) stored in glass container retains beneficial and satisfactory nutritional and sensory properties under appropriate conditions. On the end of the spectrum, the *ghee* stored in bronze container develops negative and unsatisfactory traits which may prove harmful for its usage.

V] Scope for the study

Advanced analytical tests and additional parameters can be evaluated for the same sample for detailed research growth. The same study on curd and home-made butter is another good discipline for the future study. Detailed study will prove beneficial for food industry for advancement in the sector from public health point in sight.

References

- Dhurvey Y. R. (2012), Evaluation of physico-chemical properties of cow's *Ghee* before and after hydrogenation. International Journal of Chem-tech Research (IJCRGG), vol.4, No.1, pp 185-189.
- Jariwala K. N. (2014), Analytical techniques for the assessment of physico-chemical properties of *Ghee*. Indian Journal of Applied Research, Vol: 4, Issue.6, pp.216-217.
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