International Journal of Science and Research (IJSR)
ISSN: 2319-7064
SJIF (2022): 7.942

Comparative Study of Marketed Bathing Bars as Per Bureau of Indian Standards

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Abstract: ***Skin cleansers are the products that clean and refresh the skin by removing soil or dirty materials to keep skin's psychological condition normal. Among various skin concerns, the common concern highlights on maintaining and repairing the skin barrier function, the disruption of which leads to dryness and disturbs the natural skin health. The basic mechanism of bathing bar is to cleanse the skin, however added benefits serves the purpose of desired effect on the skin. The quality of soaps is directly related to their physicochemical properties. Generally, the quality and actual properties of a product remains indistinct to the consumer, which necessitates the scientific evaluation of products. The study highlights the comparative study of laboratory formulated sample with the marketed products of Bathing Bars based upon their physicochemical properties.***

Keywords: Bathing Bars, Physicochemical properties, Skin, Moisturizing agents, Consumers awareness.

1. Introduction

The skin performs many vital functions, including protection against external physical, chemical, and biological assailants, prevention of excess water loss from body and a role in thermoregulation. It is composed of two distinct regions- the epidermis and the dermis. The epidermis, composed of epithelial cells is the outermost protective shield of body. The underlying dermis forming the bulk of the skin is tough leathery layer composed of fibrous connective tissue. The hypodermis just deep and below the dermis shares some of the skin's protective functions. [1]

Soaps are sodium or potassium salts of fatty acids. Any compound that results from reaction of an insoluble fatty material with a metal radical or even an organic base is described as soap. The basic reaction in soap making between a neutral fat and an alkali is to produce a soap and glycerol. [2]

Dry skin is characterized by decreased lipid content and delayed reconstitution of epidermal barrier after skin irritation. Moisturizing agents are considered as cosmetics as well as therapeutic agents to overcome diseases associated with skin dryness, thereby replenishing and maintaining overall skin health. [3]

The common ingredients in Bathing Bar include; Fatty acids (stearic acid, myristic acid, sodium palmate), Humectants (glycerin, propylene glycol), Surfactants (sodium lauryl sulphate, sodium laureth sulphate), Saponifying agents (sodium hydroxide/potassium hydroxide), Chelating agents (Disodium EDTA, citric acid), Antioxidants (butylated hydroxyanisole, butylated hydroxutoluene), perfume.

2. Materials and Methods

Collection of Marketed Bathing Bar Samples

The Bathing Bar samples used for the study were purchased from the local market. The batch numbers, expiry dates, quantity and presence or absence of manufacturing details were noted during the purchase. 5 Bathing Bar samples purchased were coded respectively.

Formulation of a Laboratory Sample

A laboratory sample of the Bathing Bar with similar composition to that of the other marketed samples selected for evaluation and comparison study was evaluated for its physicochemical parameters in comparison to marketed samples of bathing bars.

Selection of Raw Materials

The ingredients similar to those observed on the labels of marketed samples of Bathing Bar were selected for formulation of laboratory sample. 50 grams of Bathing Bar sample was formulated using those ingredients for convenience of study.

Table 1: Formulation of Bathing Bar.

Sr. No.	Ingredients	Quantity Required (100%)
1	Coconut oil	20 to 40
2	Stearic acid	3 to 15
3	Sodium palmitate	Up to 50
4	Sodium laureth sulphate	Upto 47
5	Propylene glycol	Upto 50
6	Glycerol	Upto 50
7	Ethylenediamine Tetraacetic Acid (EDTA)	Less than 2
8	Butylated Hydroxyl Toluene	0.0002 to 0.8
9	Titanium dioxide	0.2 to 0.4

10	Sodium hydroxide	less than 5
12	Fragrance (Almowood)	0.5 to 1.0

Physicochemical Parameters

The samples were analyzed for the following mentioned parameters and observed as per Bureau of Indian Standards. [4] The parameters considered for the evaluation included; pH, Moisture Content, Total Fatty Matter, Synthetic surface active agent, Freedom from grittiness, Free caustic alkali, Determination of Cleansing Efficiency, Saponification value, Microbiological Testing, Stability Testing.

pH [5]

Each sample was tested for pH respectively using electrode pH meter and observations were noted.

Moisture Content [6]

5g of each sample were weighed and transferred to tarred petri-plates respectively. The weight of each plate with sample taken was noted. The plates were placed in an oven at 105°C. The readings for the weight of each sample were noted after 15minutes consecutively till the constant reading was not observed. The procedure was repeated until the constant weight was reached.

$$\% \text{ Moisture content} = \frac{\text{Loss in weight}}{\text{Weight of sample}} \times 100$$

Determination of Total Fatty Matter [7]

10g of sample was weighed in 250ml beaker. 125ml absolute alcohol was added, heated for 5mins and filtered in 500ml conical flask. The operation was repeated twice. All the absolute alcohol extract portions were collected and diluted to 250ml with distilled water. The alcohol was evaporated by distillation. The residue was dried at 105°C for 3h and weighed as M_1. Remaining extract was evaporated to about 25ml. 50ml of 2N sulphuric acid [8] was added and refluxed for 2h, transferred to separating funnel. To this 75ml of petroleum ether was added. The lower alcoholic layer was drawn off and transferred to another separating funnel. 75ml of petroleum ether was added and alcoholic layer was drawn off in 250ml beaker and petroleum ether extract was transferred to first separating funnel. The alcoholic layer was transferred to second separating funnel and the extraction was repeated. The petroleum ether was evaporated from extract by distillation. The content was dried in an oven at 105°C for 2h and was weighed as M_2.

1) $$\% \text{ Total Actives} = \frac{M_1 \times 250}{M} = T_1$$

Where, M= mass in g of sample taken, and M_1 = mass of g in residue

2) $$\% \text{ TFM} = \frac{M_2 \times 250}{M} = T_2$$

Where, M= mass in g of sample taken, and M_2 = mass of g in residue.

3) % Synthetic surfactants = $T_1 - T_2$

Determination of Grittiness [9]

The bathing bars were held under running water at a temperature of 40°C and rubbed gently on two sides of the bars on palms for 3 minutes. It was examined for any grittiness observed while rubbing. The bars were set for drying for 24h at room temperature and the surface was examined.

Determination of Alkali Content [10]

10g sample was dissolved in 15 ml distilled ethanol and heated in water bath until the sample had completely dissolved. 5 ml of 20% $BaCl_2$ and 5 drops of phenolphthalein indicator was added. The resultant solution was titrated against 0.05 M H_2SO_4 [8], to the disappearance of pink colour.

Determination of Cleansing Efficiency [11]

All the panellists cleaned their hands with an ordinary soap and dried. The refined groundnut oil was applied on their hands and asked to rub the inner sides of palms against each other for uniform distribution of oil. The pre-wetted tablet was rubbed on inner sides of the palms for 15 seconds. They were then asked to rinse their hands with 24°C water to remove all the soap and observations were noted for the presence or absence of oiliness on their hands.

Saponification Value [12]

Alcoholic potash solution was prepared by boiling 1500ml of ethyl alcohol with 10g of potassium hydroxide in 500ml of distilled alcohol. 9g of potassium hydroxide was dissolved in 500ml of distilled alcohol. The solution was clear. 5 grams of sample was weighed and 50 ml of alcoholic potash was added to flask. The contents were boiled and titrated with 0.5N HCl [13] acid using phenolphthalein as an indicator. A blank titration was carried out simultaneously and saponification number was calculated.

Microbiological Testing

The samples were evaluated microbiologically against *Escherichia coli* organism. The standard anti-biotic selected forthe experiment against *E.Coli* was Tetracycline. [14]

The Zone of Inhibition was done using Disc Diffusion Method. [15]

Stability Testing [16]

The stability tests were carried out for all the bathing bars and examined for any change in colour, odour and appearance for 0^{th}, 7^{th}, 14^{th} and 28^{th} day, at temperatures of 4°C±2, 27°C±2 and 45°C±2.

3. Results

Based upon all the observations after the performance of tests as per Bureau of Indian Standards, results for the evaluation parameters of all bathing bar samples were as follows. (Table No.2)

Table 2: Results of physiochemical characteristics of bathing bars [17]

Sr. No.	PhysiochemicalParameters	Requirements	Samples					
			S-1	S-2	S-3	S-4	S-5	S-6
1	pH (10% solution)	8 to 10	8.64	8.99	9.01	9.15	8.94	8.62
2	Moisture Content	0.0% to 30%	16%	6%	12%	8%	15%	6%
3	Total Fatty Matter (%)	40% by mass, minimum	72.5%	77.5%	80%	72.5%	75%	72.5%
4	Synthetic Surface Active Agent (%)	4% by mass, minimum	12.5%	15%	12.5%	17.5%	10.0%	7.5%
5	Free Alkali (asNaOH)	0.05% by mass, maximum	0.04%	0.05%	0.04%	0.06%	0.05%	0.06%
6	Saponification Value	1, minimum	82.4	70.1	89.7	85.2	95.3	92.5

4. Discussion and Conclusion

The laboratory experiments were done to evaluate and compare the properties of selected Bathing Bars. The samples were analyzed for their properties and effects on the skin, as well as for claims made by the manufacturers. Regardless of the claims they make, the fundamental cleansing activity of bathing bars was carefully observed.

The perception of consumers toward natural products which are well-known for having no side effects and being safe for use on the skin was taken into account. Although the actives incorporated into the product are from natural sources, the effect of other base ingredients on the skin has to be taken into consideration.

Issues with stability and compatibility arise more when using natural active ingredients in formulations. The stability studies were done and noted for specific time intervals of a storage period under controlled conditions. The subjective evaluation was carried out on a group of 6 panelists in the age group of 20-35years. It was concluded that all the panelists experienced desired effect without any irritation.

In recent times, the focus of consumers has turned more towards safer cosmetics. Consumers are readily attracted towards advertisements and buy the products that are suitable for their skin. However, dissatisfaction with the claimed products ultimately leads to consumer disappointments.

The climatic conditions, surroundings, and lifestyle affect an individual's skin and the skin requires care and nourishment accordingly. The prior analysis of products and skin structure consideration is necessary for the use of suitable products and to make a clear way for confused consumers in buying appropriate products.

All the samples selected for evaluation have good quality in terms of all the properties; however S-4 and S-6 have slightly higher alkali content than required. The study was thus conducted to assess the quality characteristics of different Bathing Bar samples, which influence the quality of products and ultimately becomes necessary for appropriate selection of products by the consumers depending on their overall quality.

Acknowledgements
Authors are thankful to the Principal, Dr.Pooja Pathak, and Teaching faculties of the Department, LAD and Smt. R.P College for Women, Nagpur, for providing facilities and sharing their knowledge while drafting this research paper.

References

[1] Mitsui T. (1997), New Cosmetic Science, 1st edition, Amsterdam, Elsevier Science B.V., pp. 13-15.
[2] Poucher, W.A. (2012), Perfumes, cosmetics and soaps, 9th edition, London, Chapman and Hall, pp. 453-454.
[3] Purnamawati, S., Indrastuti, N., Danarti, R., and Saefudin, T. (2017). The Role of Moisturizers in Addressing Various Kinds of Dermatitis: A Review. Clinical medicine & research, 15(4):75–87.
[4] Indian Standard, Bathing Bars Specification IS 13498 : 1997, Bureau of Indian Standards, New Delhi, pp. 1-9.
[5] Christopher M, Kadango Z. (2020). Comparative Evaluation of Some Physicochemical Properties on Selected Commercially Available Soaps on the Zambian Market. Scientific Research, 7(3):1-13.
[6] Chattopadhyay P. (2016). Modern Technology of Soaps, Detergents & Toiletries, 2nd edition, India, National Instituteof Industrial Research, pp. 296-298.
[7] Indian Standard, Bathing Bars Specification IS 13498 : 1997, Bureau of Indian Standards, New Delhi, pp. 7-10.
[8] Government of India Ministry of Health & Family Welfare. (1996) Volume 2, The Indian Pharmacopoeia Commission, Indian Pharmacopoeia. S-616.
[9] Indian Standard, Bathing Bars Specification IS 13498 : 1997, Bureau of Indian Standards, New Delhi, pp. 6.
[10] Betsy K, Jilu M, Fathima R and Varkey J. (2013). Determination of Alkali Content & Total Fatty Matter in Cleansing Agents. Asian Journal of Science and Applied Technology, 2(1):8-12.
[11] Indian Standard, Bathing Bars Specification IS 13498: 1997, Bureau of Indian Standards, New Delhi, pp. 6-7.
[12] Indian Standard Methods Of Sampling And Test For Soaps, Second Revision, IS 286 – 1978; Bureau of IndianStandards, New Delhi, pp. 26-28.
[13] Government of India Ministry of Health & Family Welfare. (1996) Volume 2, The Indian Pharmacopoeia Commission, Indian Pharmacopoeia. H-632
[14] Karami, N, Nowrouzian, F, Adlerberth I, and Wold A. (2006), Tetracycline resistance in Escherichia coli and persistence in the infantile colonic microbiota. Antimicrobial agents and chemotherapy, 50(1):156–161.
[15] Mwambete K and Lyombe, F. (2011). Antimicrobial Activity of Medicated Soaps Commonly Used By Dar esSalaam Residents in Tanzania. Indian journal of pharmaceutical sciences, 73(1):92–98.
[16] The European Cosmetic and Toiletry Association. (2004), Guidelines on stability testing of cosmetic products, pp. 1-6.
[17] Indian Standard, Bathing Bars Specification IS 13498: 1997, Bureau of Indian Standards, New Delhi, pp.