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Evaluation Studies on Various Reputed Brands of Shampoo

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ABSTRACT

The Indian market is flooded with a range of shampoos offering protection against various infections providing better cleansing, moisturizing, reducing hair fall and even spa like treatment. Here we have compared various shampoo formulations to judge their safety and efficacy. In this work five marketed preparations were compared based on physio-chemical characteristics. The results give us insight that popular believe of higher the foaming-higher the cleansing is a false notion and consumer awareness is the need of hour. The cleansing action of shampoo having highest foaming index was found to be lowest defying the popular belief. The surface tension that is attributed to presence of detergents was found to be more or less similar in all the samples. The percentage of solid content and wetting time were found to be considerably varying in different samples.

Keywords: Physiochemical, Foaming index, Surface tension, Solid content and Wetting time.

1. INTRODUCTION

There is a plethora of brands of shampoos available in India for hair protection, nourishment, reduction of hair fall, etc. The shampoos are a combination of surfactants, cleansing agents, foaming agents, viscosity controllers, sequestering agents, opacifiers, conditioners, fragrances, preservatives and an active ingredient or a combination of it. Each hair type is different so the suitability of shampoo needs to be judged before use. This study involves the comparison of five marketed preparations based on their physio-chemical characteristics like pH, acid value, dirt dispersion ability, cleansing action, foaming index, surface tension, solid content, wetting time and physical appearance and the results were tabulated. Higher detergency leads to scaly skin and irritation due to drying of the scalp. Cleansing ability is governed by surface tension parameter. Foaming reduces the friction and thus reduces hair damage during washing so stability of foam is of certain value but not related to cleansing property.

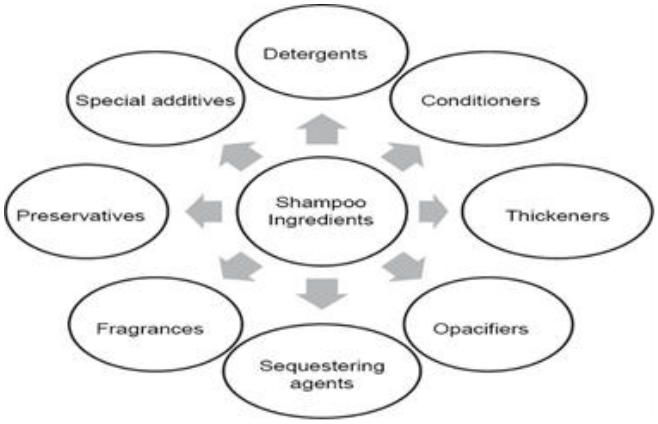

Figure 1: Ingredients of Shampoo Formulation

In the dirt dispersion test a shampoo is considered poor quality if it concentrates ink in the foam as the dirt in the foam is difficult to rinse and will redeposit on the hair. The pH influences the compatibility of product to scalp skin but may also result in eye irritation. All the shampoos were found to have a pH in between the range of 5 to 5.5 which is near to skin pH. The viscosity is related to ease of use as well as spreading ability on the wet hair. The results obtained gives us the insight that popular belief of higher the foaming, higher the cleansing action is a false notion and consumer awareness is the need of the hour. The names of the marketed shampoos are kept confidential so as not to tarnish their image and they will be referred as sample A, B, C, D and E.

2. MATERAILS AND METHODS

1. Physical Appearance/ Visual Inspection: The sample marketed preparations were evaluated in terms of color, foaming index and acid value.

2. Determination of pH: The pH of 10%V/V shampoo solution in distilled water was determined at room temperature (25^0c) by using a pH meter.

3. Dispersion of dirt: A test tube containing specified amount of water (10 ml) and 2 drops of shampoo were added followed by addition of 1 drop of ink into it. The visual estimation of ink in the foam is carried out to estimate the amount of ink as nil, light, moderate or heavy.

4. Determination of solid content: A clean, dry evaporating dish was weighed and 4 grams of shampoo was added to it. The dish and shampoo was placed on hot plate. The weight of shampoo (only solids) was calculated after complete drying.

5. Cleansing action: 5 grams of sample consisting of human hair was placed in grease and was added to 200 ml water containing 1 g of shampoo in a flask. The flask was shaken for 4 minutes. The solution was removed and a sample was taken out, dried and weighed. The amount of grease removed was calculated by using the following equation:

$$DP=100(1-T/C)$$

6. Surface Tension measurement: The surface tension of 10% W/V shampoo in distilled water is measured by measuring the flow property of sample by drop count method.

S=s.[P/p]. [n/N]

7. Foaming ability: Cylinder shake method was used for determining the foaming ability. 50 ml of 1% shampoo solution was placed in 250 ml graduated cylinder and was shaken foe 10 times. The total volume of foam content after 1 min was recorded.

8. Wetting time: A canvas paper was cut into 1 inch diameter disc carrying an average weight of 0.44gram and was placed on 100ml water containing shampoo. The time required for disc to begin to sink was noted down as wetting time.

3. DISCUSSION AND RESULT

An appropriate concentration of active as well as other ingredients is essential for optimal performance of a shampoo along with the individual characteristic of a person in terms of quality of hair. So, developing a shampoo as a cosmetic product needs to fulfill certain characteristics like application site, sensory and optical characteristics, stability and storage of finished product in an appropriate packaging.

Table 1: Physical Appearance, Foam height, pH & Percentage of Solid content

S.No.	Sample	Physical App	Foam Ht	pH	Solid (%)
1	A	Black	2.2	5	74.23
2	B	White	2.1	5.3	55.71
3	C	Pale blue	2.3	5.1	65.93
4	D	White	2.4	5	57.30
5	E	Sky blue	3.1	5.5	66.66

Table 2: Evaluation of formulation for Detergency power, Surface tension & Wetting time

S. No.	Sample	Detergency Power (%)	Surface Tension (dynes/cm)	Wetting Time (min)
1	A	8.7	33.12	2.31
2	B	10.7	34.35	1.37
3	C	8.8	31.12	3.14
4	D	9.6	32.55	2.53
5	E	7.2	33.65	1.59

All the samples were acid balanced and were ranged from 5 - 5.5. The contents of solid were found in between 20-29% as they are easy to washout. The dirt dispersion test showed absence of ink in the foam thus all shampoos were found to be satisfactory in this regard as higher the ink in the foam higher will be the dirt in the foam which is difficult to rinse out and redeposit on the scalp leading to seborrheic dermatitis. The detergency power was found to be same in all samples that were tested. Since cleaning action was tested on wool yarn in grease as it is the primary aim of the shampoo. The surface tension reduction is one of the mechanisms implicated in detergency for easy application and spreading. There is no eye irritation by various formulations of the shampoo. The formulators have the responsibility to disclose the ingredients and the harmful effects associated with them.

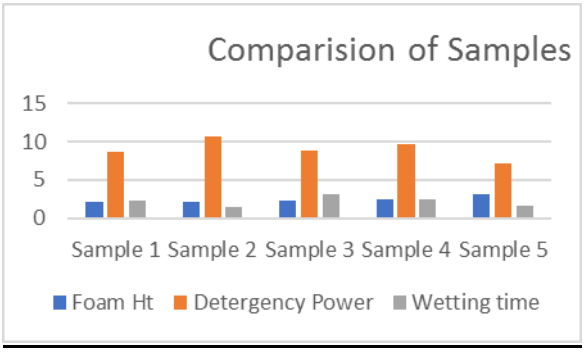

Figure 2: Graphical representation of Foam height, detergency power and wetting time

4. CONCLUSION

Although the foaming ability was found to be very much similar, the cleansing action did vary by a significant margin. Thus, the false notion among the customers that the shampoo that foams well, works well, was debunked. Formulators must play an active role in educating the customers about the cleaning action of the shampoos irrespective of other factors. There is strong need to change the consumer perception of a good shampoo and onus lies with the formulators.

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