

Validating the usage of medicinal plants in cosmetics

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ABSTRACT: Now a days, herbal cosmetics is a worldwide interest. Irrespective of commercially available cosmetics or homemade ones, the adaptive to skin surface pH is so crucial. Cosmetic products of pH 6-7 will be more adaptive to all, due to its closeness to neutrality. In this work two cosmetic products, soap and shampoo are, prepared in which the ratio of the combination of herbals determine the product pH. A beneficial result of their application on skin and hair is found. It is also found that it is having irritation less nature and long shelf life. The restoration period 1-2 hours is observed after the first usage itself.

KEYWORDS: Cosmetics, Medicinal Plants, pH, Extract, Herbal Soap, Herbal Shampoo.

I. INTRODUCTION

In cosmetic industry, there are two different types of cosmetics, one is herbal and the other is synthetic. Because of their less side effect, the cosmetics consumers are moving towards the herbal cosmetics instead of synthetic ones. Since the prehistoric times herbal products are in use globally. Generally, herbal products are rich sources of vital trace elements, i.e., aluminium, calcium, zinc, copper and magnesium and other useful minerals, which play an important role for skin nutritional requirements as well as effective anti-poisonal materials[1,2]. Sometimes the chemical-based cosmetics are irritative than the herbal cosmetics as per literatures [3,4].

It is a very important factor to be addressed whenever cosmetic products are considered, ie, the pH value of skin surface. It is commonly accepted that cosmetic products, especially soaps and other skin cleansing products, can induce significant changes in skin surface pH (ss-pH). Ss-pH increases after a single washing procedure or after rinsing the skin with water alone. According to Blaak and Staib [5], the skin pH recovery needs time up to several hours before it can reach the physiological level and in this regard, skin care products with a pH level of

4.0–5.0 may be helpful. In addition, it is stated by Blaak and Staib [5], that is by combining the acidic product pH level with the ideal mix of surfactants, it can enhance the product compatibility and minimize the skin irritation and intolerance, which becomes a major challenge for the future.

The general aspects on skin cleansing is to remove unwanted materials from the skin surface which includes dust, sebum, sweat, residues of cosmetics and pollutants carried by air. Skin cleansing procedure has been followed even in the vedic period by Sushruta as a procedure before surgery, which is still followed in operation theatres. Vegetable oils and potash were used to produce soap even by the Sumerians. Since 2500 B.C., the process of skin cleansing has changed enormously. Skin cleansing became a part of modern medicinal washing in the 19th century and was later integrated into the daily body care routine. Since then, the impact of skin cleansing products on skin and ss-pH has been clinically studied by many authors and the research is still going on. Today, the advantage of acidic synthetic detergents compared to alkaline rinse-off products are commonly accepted [6]. The skin cleansing process became a part of our daily skin care routine which should be skin compatible. The acidic nature of the skin surface was discovered before 120 years. In 1928 it was established as “acid mantle” by Schade and Marchionini. 15 years ago the physiological ss-pH is defined as just below 5 [7,8]. Many studies reveal the physiological acidic ss -pH and its role in regulating the antimicrobial barrier [7,9,10].

The role of pH in skin cleansing

It is known that the cosmetic products such as soaps and skin cleansing products influence ss-pH [6]. A literature survey conducted by “pores and skin cleansing” group of the German Society for scientific and applied cosmetics demonstrated in 2013 that the effect of skin cleaning on ss-pH [11]. Regarding the impact of pores and skin cleaning on ss-pH, it seems to be vital to differentiate between

“pH shift” (ss-pH change in units after washing procedure) and “pH restoration” (time required to reach baseline ss-pH). It is proven that even washing the pores and skin with tap water can increase ss-pH to $\approx +1.0$ unit [11, 12].

Gfatter et. al [12] evaluated the product pH effect in ss- pH and reported the highest pH shift for the alkaline cleansing soap (pH 9.5). But the recovery time was not assessed. Tamburic [13] has shown that a single soap usage had increased the pH shift to a high level and 5 soap (pH 10.2-10.5) usage increased to more than +2.0 units and for 3 acidic products (pH 6.9-7.5) in which the shift was +0.5 . But Tamburic [13] was not able to observe a recovery of ss-pH time to the latest measurement i.e., 60 minutes after usage. Barel et al. [14] have evaluated the ss-pH shift on the upper arm, neck and legs after a prolonged usage (10 weeks) of soap at normal home use condition through biophysical measurement methods. Gunathilake et al.[15] compared the effect of soap and syndet after a single standardized hand washing procedure and found that there was a pH shift of +1.7 units by soap (pH 9.1) and +0.8 units by syndet (pH 5.5). Also, the interrelation between the product pH and ss-pH in the context of skin irritation is not yet clarified[16]. Ananthapadmanabhan et al. [17] provided a first step to evaluate the direct pH effect. They have demonstrated that the pH of a buffered solution can induce itself induces skin irritation and therefore stratum corneum (SC) damage may be a function of pH. Assmus et al, [11] reported that the skin cleansing using soaps and pH neutral to alkaline syndets leads to ss-pH shift of up to +3.0 pH units after single washing procedure and the recovery time consumed many hours [11]. Furthermore, reported that the recovery of the baseline ss-pH was reached 1 h after the washing procedure for the syndet area, but ss-pH was still enhanced 1 h after using the alkaline soap (+0.4 units). Similarly Moldovan and Nanu [18] compared 6 commercially available cleansers to identify their impact on different skin parameters and reported that after 90min, ss-pH was decreased to the normality interval, but baseline level was still not restored.

Based on the literature survey from Assmus et al. [11], pH recovery time varies from 45 min [19] to 8 h [20] and 12h, pH shift of range between (\pm) 0.0 [19] and (\pm) 3.0[21] units respectively, in a repetitive cleansing procedure [22]. It is very important that pH shift and pH recovery of the ss-pH are closely linked to the product pH value. Furthermore, it is shown that the impact of the product pH on ss-pH is also influenced by the product ingredients. Hence it is understood that the most of the literature available are dealt with commercially available skin cleansing products. In this context, this work is aimed to manufacture the skin cleansing products ‘soap’ and ‘shampoo’ by herbal ingredients with a neutral pH which should not affect the natural pH of skin.

II. METHODOLOGY

In this work it is proposed to prepare cosmetic products compatible to all types of skin. So we focused on the acceptable pH value, i.e., not alkaline but little acidic, i.e., 5-6pH , which is very approximate to the suggested skin care products [5].

In this context we have prepared three soaps and a shampoo solely from herbal base. Accordingly 3 different combinations of herbal soaps have been prepared, They are (1) Neem based, (2) Orange based and (3) Neem and Aloe vera based.

The Ingredients used for preparing the soap are soap base, neem extract, Aloe vera gel, Vitamin E oil and Orange peel juice. Even though the ingredients are quite common in any soap manufacturing process the ratio of herbal ingredients with the base is able to achieve a pH of 6-7. Product of this pH has the following advantages.

1. A good cleansing effect
2. No irritation to skin
3. Optimal restoration time

The ingredients are mixed in different ratios and are subjected to analysis after preparing it as the concerned product.

The preparation process are photographed and given in fig (1-3).

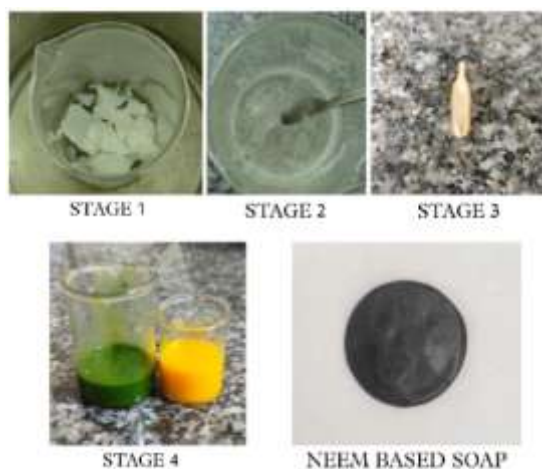


Fig.1: Stagewise process of preparation of herbal neem based soap

Table-1 shows the ratio of combination, types of products prepared and their pH.

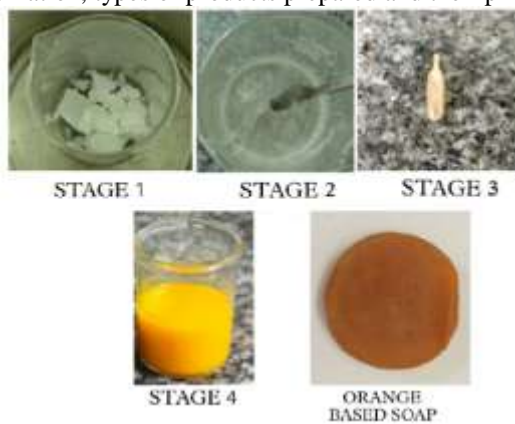


Fig.2: Stagewise process of preparation of herbal orange based soap

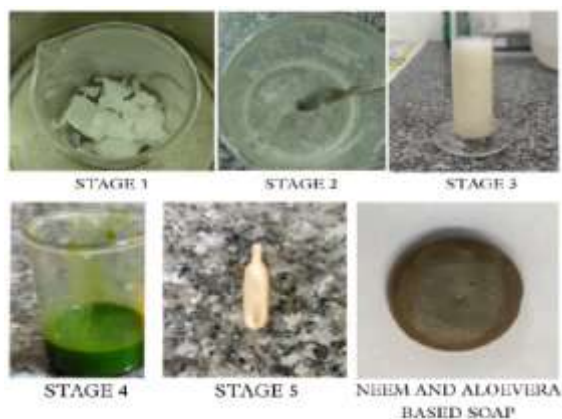


Fig.3: Stagewise process of preparation of herbal neem – alovera soap

Table-1: Products and their ratio of combination

Sl. No	Name of the product	Soap Base (g)	Aloevera gel (g)	Neem extract (g)	Vitamin oil (g)	Orange peel juice (g)	PH
1	Neem based	15 (Aloevera mixed)	-	5	0.4	5	7-8
2	Orange based	20	-	-	0.4	12	6-7
3	Neem and Aloevera based	30	5	3	0.4	-	6-7

Table-2: Effect of products and its restoration time:

Sl. No	Product Name	Part of application	Cleansing effect	Irritation	Restoration Time
1	Neem based	Face, palm and Back of the hand	Better	Nil	1hrs
2	Orange based	Face, palm and Back of the hand	Good	Nil	1-2hrs
3	Neem and Aloevera based	Face, palm and Back of the hand	Better	Nil	1-2hrs

Biophysical Application

The products are applied on hand and face (10 samples) and the effect of the product on ss-pH is studied by its cleansing property though notifying the colour change in the surface of application. The restoration time is also noticed and tabulated in table-2.

Herbal shampoo

A complete herbal shampoo with the ingredients, Sapindus mukorossi (soapnuts), Acacia concinna (leaf), Hibiscus rosasinensis (flower),

Azadirachta indica (leaf) and Psidium guajava (leaf) is prepared by boiling 3g, 8g, 1g, 4g and 4g each respectively with 250 ml of water and which is reduced to 100ml. This prepared shampoo is applied on hair and found it has a fine dust removal capacity with pH 5-6. Hence this herbal Product is an alternate to commercially available products and which in due course will replace the existing shampoo since the world population is starting to prefer the organic herbal based products. The stagewise preparation is given in fig.(4).



Fig.4: Stagewise process of preparation of herbal shampoo

III. SUMMARY

Modern commercial market is overflowing with cosmetics of both synthetic and herbal products. It is understood that most of the herbal products are either the combination of chemical and herbs or synthetic, alternate to herbals. Due to the adverse side effects of any synthetic products, the modern population shows more interest on pure herbal products. In this context, two cosmetic products are prepared for this work namely soap and shampoo. Three different types of combination of herbals are used in the production of soap and all are within the acceptable pH of 6-7, except the neem based product which shows a pH of 7-8 and these products are not creating any irritation as most of

the commercially available soaps are giving irritation to skin due to their pH unsuitability. These are having the restoration time 1-2 hours at the first usage itself, which is a highly interesting result. At the same time the shelf life of the products is more than two months in the open air condition and hence it may be more than six months in package. As a pure herbal product this period of shelf life is very high. The pH of shampoo with pH 5-6 is also a good result, but it cannot be in a colloidal or gel form for long. Hence the mixture of ingredients in powder form can be used whenever & wherever necessary. A systematic planning of the production of these herbal products may produce small scale entrepreneurs.

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