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RieeF$_g$-An Organic Shampoo

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ABSTRACT

Hair Shampoos are cleaning formulations utilized for removal of dirt as well as for conferring gleam to hair and maintaining the sensibility and sleekness of hair. They are primarily composed of chemicals called surfactants that have the ability to surround oily materials on surfaces and allow them to be rinsed away by water. The main problem of using chemical based shampoo is the increase in hair fall instead of dropping it. In this perspective, the present study focused on the formulation and development of harmless organic shampoo from natural ingredients. An approach in reducing the chemical ingredients is by incorporating natural herbal extracts whose functionality can be studied by comparing with chemical ingredients. The shampoo contained aqueous extracts of Fenugreek (seeds), Reetha seeds and Rice water. Small amounts of black pepper and honey was added to nourish the scalp, glycerine to adjust the pH, lecithin powder and essential oils to use as preservatives. The physicochemical parameters the prepared shampoo such as color, clarity, pH, dirt dispersion and, the percentage of solid content and foaming ability were carried out. It was found that the prepared organic shampoo was clear and dark to light brown in colour. The pH of the shampoo ranges from 5.20-5.50. It has good foaming ability and cleaning capacity. The percentage of solid content of prepared shampoo was found to be 22%.

KEY WORDS: Hair Shampoos, Organic Formulations, Hair Care, Fenugreek, Reetha Seeds

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1. INTRODUCTION

Hair, protective appendages on the body and structures of integumentary system are considered an important part of the body, derived from the skin ectoderm originates from the epidermis during embryological development *(Kancharla K et al., 2018).* Hair is an integral part of human magnificence and vitalelement of human excellence. Shampoo, a hair care substance made of natural and synthetic materials, is used to get rid of dirt and contaminant particles that accumulate in hair. But use of synthetic preservatives and detergents in shampoo cause adverse effects such as loss of hair, skin irritation, eye irritation and permanent hair root damage. A fundamental approach in reducing the synthetic or chemical ingredients is by integrating natural extract whose functionality can be compared with synthetic ingredients. Many of the hair care products that people use nowadays disrupt the natural pH of the hair. When a substance is too alkaline it cause hair cuticles to open, while a substance with acidic nature cause the hair cuticle to contract. Hair products can control the pH of hair *(Dias MFRG et al., 2014).* Organic hair care products have developed growing interest in the world market as it is free from any adverse reactions. Organic shampoo helps the hair to improve the quality of moisture, shine, growth, thickness and strength of hair roots. Several medicinal plants such as *Hibiscus rosa-sinensis, Emblica officinalis, Acacia concinna* (Shikakaiin), *Sapindus indica, Eclipta prostrata, Aloe barbadensis*, *Cassia auriculata, Phyllanthus emblica* are being used in different proportions in formulating the hair based products which are reported to have beneficial effects on hair and are commonly used in formulation of shampoo (*Potluri A et al., 2013; Al Badi K, & Khan SA, 2014).*

The objective of the current study is to prepare the healthy organic shampoo from the herbal extracts of fenugreek, reetha seeds and rice water with long shelf life. The prepared shampoo was estimated to contain the sugar and protein that helps in the nourishment and improves the quality of the hair. The quality of the shampoo was determined by testing the physical appearance (clarity, color, odor and texture), pH, dirt dispersion, percentage of solid content.

2. MATERIALS AND METHODS:

2.1 Preparation of extracts

2.1.1 Rice water

Ponni no.1 rice used for the preparation of shampoo was collected from the local market of Thrissur, Kerala. 500 g of rice were taken and washed thoroughly to remove the dirt. To the cleaned rice, 500 ml of water was added and boiled at 90°C for 35 min. The extract was concentrated to 100 ml.

2.1.2 Fenugreek seeds

Fenugreek seeds and pepper were purchased from the local market of Thrissur, Kerala. About 10 g of fenugreek seeds were taken and washed thoroughly. The seeds were soaked in water for about 8-10 h. Then, the soaked fenugreek seeds were pulverized into fine paste and the extract was filtered and taken separately.

2.1.3 Reetha seeds

Sapindus mukorossi (Reetha) seeds were purchased from the local market of Thrissur, Kerala. Seeds were dried at 80°C for 3 days. Dried seeds were pulverized into fine powder. Solvent extraction using ethanol was carried out at room temperature. For extraction, fine powder was mixed with different ratios of ethanol 1:10 and 1:20, respectively and kept in magnetic stirrer for 6 h.

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2.2 Preparation and Processing of *RieeFg* Shampoo

RieeFg shampoo was prepared by formulating the processed extracts. At first, the boiled and concentrated Ponni No.1 rice water extract were mixed with 200 ml of fenugreek extract. This solution was concentrated to 100 ml by boiling. To this concentrated solution, 100 ml of Reetha seed extract was added. The solution was allowed to cool. The extracts were mixed thoroughly in appropriate proportion. Around 2 ml of honey and 1 ml of essential oil (neem oil) were added along with 2 ml of PEG solution. Hence, the *RieeFg* shampoo obtained was stored in air tight bottle/container at room temperature *(Firthouse PU, 2009; Al Badi K & Khan SA, 2014).*

2.3 Estimation of Sugar and protein content

The amount of sugar and protein content in the prepared sample were estimated using DNS and Lowry's reagent respectively. The optical density was measured calorimetrically at 540 and 660 nm.

2.4 Determination of percentage of solid content

The percentage of solid content was determined by weighing about 10 g of shampoo in a clean and evaporating dish. The liquid portion of the shampoo was vaporized in evaporating dish by placing it on hot plate. The percentage and the weight of the solid content present in the shampoo were calculated after drying completely *(Gaud RS & Gupta GD, 2001; Vijayalakshmi A et al., 2018)*.

2.5 Dirt dispersion analysis

To the 5 ml of formulated shampoo, two drops of Indian ink was added and shaken for 10 min with a stopper. The volume of ink in the foam was measured and the result was categorised as none, slight, medium, or heavy foam *(Saad AH et al., 2011; Vijayalakshmi A et al., 2018)*.

2.6 Statistical analysis

The measurements were performed in triplicate and mean values and standard deviation (SD) were used for analysis.

3. RESULTS AND DISCUSSION

3.1 Preparation of *RieeFg* shampoo

Formulation of *RieeFg* shampoo was prepared by using different proportions of the ingredients such as extracts of Rice water, Fenugreek seed, Reetha seed, Neem oil, Pepper, Honey and PEG (Figure 1). The ingredient in the *RieeFg* shampoo plays a significant role in protecting the hair from damaging when compared with artificial shampoos. The chemical such as inositol present in the rice water extract prevents and repairs the hair damage. It makes the hair smoother, shiny and flexible. The presence of Vitamins B, C and E in the rice water plays a vital role in growth of the hair. The amino acids present in the rice water help in the regeneration and faster growth of the hair. *RieeFg* protects the hair by maintaining the moisture and natural oils. The Reetha extract in the shampoo has an anti-bacterial or anti-fungal property making the scalp free from dandruff and skin irritation. It also makes the hair shiner and softer, prevents the hair loss. The Fenugreek seeds extracts induces hair growth and it has anti-inflammatory and antifungal effects. The presence of black pepper in the shampoo promotes hair growth by facilitating blood flow to the hair roots and strengthens hair follicles which prevent hair fall *(Gholamreza DN et al., 2011; Kancharla K et al., 2018)*. The conditioning effect of the *RieeFg* shampoo ensures that the hair is smooth for combing. The *RieeFg* is completely non-toxic shampoo. The amount of sugar and protein content in the prepared shampoo are estimated to be 25 µg and 15 µg respectively that helps in the nourishment and improves the quality of the hair.

3.2 Physical Appearance and pH

The physicochemical tests were carried out for RieeFg shampoo. The formulated shampoo was analysed based on commercially used evaluation tests to determination and evaluation the quality of organic shampoo *(Arora P et al., 2011; Gholamreza, DN et al., 2011)*. The prepared shampoo solution had a purple brown colour and looked slightly turbid at the time of preparation, but within a few days, the turbidity settled and appeared more clear and light brownish in colour (Figure 2). The colour of the shampoo remained stable. The pH of the shampoo was assessed and found to be 5.2-5.5 which is near to pH of the skin at room temperature 28°C (Table 1).

3.3 Dirt dispersion and solid content

The dirt determination was carried out based on Saad, AH et al., 2011*(Saad AH et al., 2011)*. The results showed that the RieeFg shampoo has good quality as the ink was found more in the water portion rather than in the foam portion. The solid

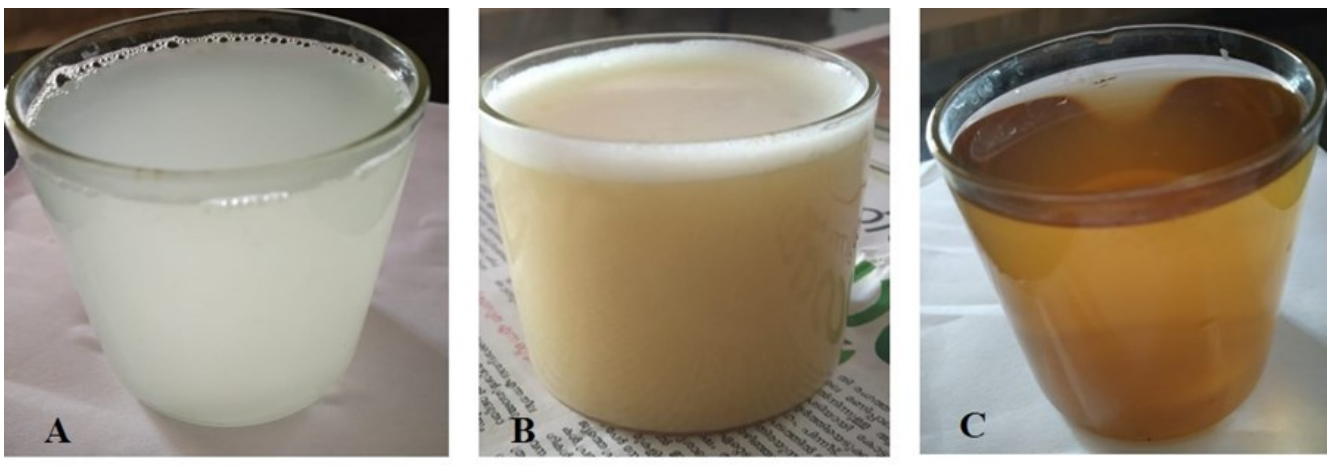

Figure1: Extracts of (A) Rice water, (B) Fenugreek seed, and (C) Reetha seed

content of the shampoo was found to be 22% (Figure 3). The result indicated the good quality of the prepared shampoo. It is reported that shampoo with high solid content will be very hard to rinse and work with the hair (*Vijayalakshmi, A et al., 2018).* The 22% solid content is considered as less solid content as it can be easily washed out during preparation of shampoos.

Based on the results and observations, *RieeFg* showed good cleansing and conditioning, low surface tension, small bubble size and good foam stability. The results indicated that *RieeFg* having excellent performance, than the commercially available shampoo. Further research is required to improve the quality and safety of the *RieeFg* Shampoo.

Table 1: Physical properties of *RieeFg* shampoo

Parameters	Nature
Color	Light brown, clear
pH	5.2-5.5
Odor	Good
Solid content	22%
Foam type	Small

4. CONCLUSION

The purpose of the study was to formulate a completely organic shampoo which is similar or in fact safer than the synthetic shampoo available in the market. The present study also aimed to prepare a stable, self-preserved shampoo formulation contains low detergents to reduce the risk of chemicals. The organic shampoo was formulated by using raw rice extract which are commonly and easily available and lauded for their hair cleansing actions across several Asian countries. All the ingredients used to formulate shampoo are safer than silicones and polyquaterniums synthetic conditioning agents and can greatly reduce the hair or protein loss during combing. Instead of using cationic conditioners we have used honey to provide the conditioning effects. Tests were performed to evaluate the physicochemical properties of the prepared shampoo. The prepared shampoo named as Ri*eeF*$_g$ showed consistent and stable properties of cleansing action. Pepper and neem oil have been used to increase the shelf life of the prepared shampoo and it has shown good results. Further standardization needs to be carried out to improve upon the shelf life of the shampoo prepared. Further studies need to be carried out to determine the antifungal and anti-dandruff properties which are also a very crucial aspect of designing a product.

Figure 3: Dirt dispensing ability and percentage of solid content of *RieeFg* Shampoo

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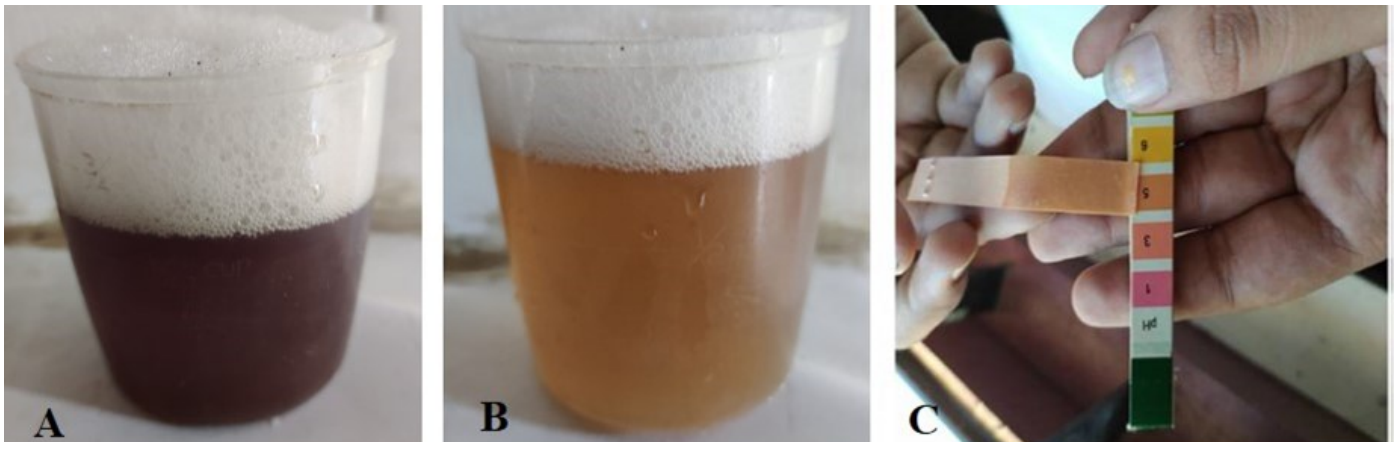

Figure 2: Physical nature of *RieeFg* shampoo (A) appeared purple brown, at week 1 and week 2 (B) to light brown, clear at week 3 (C) pH determination

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