



FORMULATION AND DEVELOPMENT OF RICE STARCH SHAMPOO

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ABSTRACT:

The aim of present work was to study formulation and development of rice starch shampoo. Many commercially available herbal shampoos are based on synthetic functional ingredients which may cause various hazards to hair and scalp. As per the literature survey, Rice Starch granules helps in cleansing, conditioning and for making hair smooth, also it is safe to use and free from side effects. Hence shampoo with powdered rice starch was selected as base for the study. The shampoo base was formulated with different trials and the final selection of base was done by evaluating the same on the basis of physical and chemical methods like colour, odour, pH and foam height. The powdered form of rice starch was incorporated in selected base with various concentrations and the formulations were evaluated for the functional parameters. Rice starch shampoo thus prepared was subjected to stability study and evaluation according to BIS guidelines. Subjective evaluation of shampoo was carried out to study the functional parameters like colour, odour, irritancy, cleansing effect, conditioning effect and ease of removal on human volunteers. The study showed that shampoo with 0.5% rice starch had good cleansing effect, leaves the hair soft and easily manageable.

Keywords: - Rice Starch, Shampoo base, Cleansing of hair, Conditioning of hair, Stability Study.

INTRODUCTION :

Shampoo plays important role in hair care routine. In ancient times, shampoos are made up of variety of herbs such as Shikakai, Ritha, Amla and other herbal extracts [1,2]. At present, most of the shampoos available in the market are formulated using strong synthetic surfactants. The surfactants are added for their cleansing property, but it's continuous use may lead to effects such as eye irritation, loss of hair and dryness of hair [3,4]. The alternate solution to this is to substitute the use of synthetic shampoos with the herbal shampoos. Hence, nowadays, consumers' demand for natural ingredients and additives, especially in cosmetic products, as a replacement of synthetic compounds, having possible side-effects on health and the environment, is tremendously increased [5,6].

In the present study, herbal shampoo was formulated by using the ingredients such as

Rice starch, Decyl Glucoside and egg album which make hair smooth and shiny and as well as improves its strength and texture. Rice starch has high absorption capacity for sebum. The amino acids in rice strengthen the hair roots. It also has inositol, which is a carbohydrate that helps to strengthen the hair [7,8]. The particle shape and size makes a great difference in skin feel as well as physicochemical properties. Rice starch has the finest particle size compared to corn and potato starch. This lower particle size not only causes a smoother and silkier feel, but also increases the surface area leading to exceptional adsorption and absorption [9,10].

Mechanism of Hair Cleansing: The Mechanism of hair cleansing involves a number of complex physical phenomena such as wetting, foaming, emulsifying and peptization and several other phenomenon's which are imperfectly understood. In case of shampoo the detergent

solution must be able to wet both the dirt and the keratinized hair fiber, hence it must lower the surface tension. The dirt particles must be kept dispersed in order that they may readily, be washed away. The interfacial tension must be reduced to such an extent that it will allow the dirt or oil particles to be displaced by the detergent solution [11,12].

MATERIAL AND METHODS:

Analysis of Rice Starch [13]: Rice starch was procured for the present study from Swastik Acid and Chemicals from Nagpur. The procured sample was analyzed by performing tests such as Determination of moisture and Determination of foreign matter. The results are summarized in Table no. 3.

Analysis of Decyl Glucoside: Decyl Glucoside was procured for the present study from Yasham Speciality Ingredients Pvt.Ltd., Andheri West Mumbai, along with Certificate of Analysis. The procured sample was validated by performing tests such as pH, Colour and Solubility. The results are summarized in Table no. 4.

Formulation of Shampoo Base [14]: Shampoo base were prepared by taking 3 different trials. (Table no. 1).

Selection of Shampoo Base: Shampoo base were analyzed for parameters such as pH, Appearance, Colour, Consistency, Feel, spreadability and foam height [15]. The results are summarized in Table no. 5.

Formulation of Rice Starch Shampoo: The powdered form of rice starch was incorporated in the shampoo base (Trail 3) in different concentrations such as 0.1%, 0.2%, 0.3%, 0.4% and 0.5% to study the efficacy of rice starch.

Selection of Rice Starch Shampoo: The shampoo base (Trial 3) with different concentrations of rice starch were analyzed on the basis of consistency, colour, odour, appearance and spreadability. The results are summarized in Table no. 6.

Analysis of Final Rice Starch Shampoo:

Determination pH: The pH of shampoo with 0.5% rice starch was determined by using pH meter.

Accelerated Stability Study: The formulated shampoo was assessed for accelerated stability test (i.e. trial 3 base + 0.5% rice starch was observed for colour, odor and pH changes at room temperature, 45°C and at 4°C). The results are summarized in Table no. 7.

Subjective Evaluation: Shampoo containing 0.5% rice starch (i.e. Trial 3) was given to subjects of age group 30-40 years for 4 weeks to carry out the subjective evaluation on the basis of their feedback. The subjects were asked to use the shampoo twice a week for 4 weeks and note the changes they observed on hair and scalp. Subjective evaluation was carried out to check the parameters like Appearance, Odor, Cleansing effect, Irritancy Rinse off and Conditioning effect on hair. The results were noted.

RESULT AND DISCUSSION :

Analysis of Rice Starch: Rice starch was analyzed; results were noted and found within the range as per literature.

Analysis of Decyl Glucoside: Decyl Glucoside was analyzed; results were noted and compared with values mentioned in Certificate of Analysis of Decyl Glucoside. It passed all the test and hence was used for incorporation in shampoo formulation. The results are summarized in table no.4

Selection of Shampoo Base: The result of analysis of shampoo for selection of base summarized in Table no. 5.

Selection of Rice Starch Shampoo: The shampoo base (Trial 3) with different concentrations of rice starch were analyzed on the basis of consistency, colour, odour, appearance and spreadability. The results are summarized in Table no. 6.

Analysis of Final Rice Starch Shampoo: From the above observation, it was found that shampoo with 0.5% rice starch having satisfactory consistency, colour, odour, appearance and spreadability. Hence, it was selected for further analysis.

Determination pH: The pH of shampoo with 0.5% rice starch was found to be 6.8.

Accelerated Stability Study: From the result of accelerated stability study it was observed that the shampoo with 0.5% concentration of rice starch was stable with respect to physical and chemical parameters like colour, odor and pH for 28 days.

Subjective Evaluation: From the subjective evaluation it was observed that shampoo with 0.5% rice starch was well appreciated. It caused no irritation on application. It showed good cleansing effect and improvement in texture of the hair.

CONCLUSION:

After formulating and evaluating the rice starch shampoo it was observed that product can be a useful addition in the portfolio of other mild shampoos available in market. The shampoo can be efficiently used for hair cleansing which leaves the hair soft and easily manageable.

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Table No. 1: Formulation of Shampoo Base

Sr. No.	Ingredient	Uses of ingredients	Quantity in % (w/w)		
			Trial 1	Trial 2	Trial 3
1.	Distilled Water	Vehicle	80.92	81.8	80.7
2.	Xanthan gum	Natural Polymer	0.1	0.2	0.3
3.	Decyl glucoside	Mild non-ionic surfactant	13	14	15
4.	Glycerin	Humectant	0.5	0.5	0.5
5.	Propylene glycol	Humectant	0.5	0.5	0.5
6.	Benzoic acid	Preservative/ Maintains pH	2	2	2
7.	Egg albumin	Conditioning Agent	1	1	1

Table No. 2: Formulation of Rice Starch Shampoo

Trial 3 (Base 99.9%) + 0.1% Rice starch	Trial 3 (Base 99.8%) + 0.2% Rice starch	Trial 3 (Base 99.7%) + 0.3% Rice starch	Trial 3 (Base 99.6%) + 0.4% Rice starch	Trial 3 (Base 99.5%) + 0.5% Rice starch
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Table No. 3 : Result of analysis of Rice Starch

Sr. no.	Test	Observation
1	Determination of moisture content	10.1%
2	Determination of foreign matter	0.5%

Table No.4 : Result of analysis of Decyl Glucoside

Sr. No.	Characteristic	Requirement as per Certificate of Analysis of Decyl Glucoside	Result	Inference
1	pH	3.5-5.5	4.9	Passes the test
2	Colour	Limpid clear	Limpid	Passes the test
3	Solubility	Water Soluble	Water Soluble	Passes the test

Table no. 5 : Result of Selection Shampoo Base

S.N	Formulation	Observed Parameters							Inference
		pH	Appearance	Colour	Consistency	Feel	spreadability	foam height	
1	Trial 1	6.2	good	White	Unsatisfactory	Unsatisfactory	Good	270	Increased Decyl glucoside
2	Trial 2	6.5	Good	White	Unsatisfactory	satisfactory	Good	272	Increased Decyl glucoside
3	Trial 3	6.8	good	White	Good	Good	Good	273	Good

Table no. 6: Results of Selection Rice Starch Shampoo

S. N.	Parameter	Base (Trial 3) + 0.1%Rice Starch	Base (Trial 3) + 0.2%Rice Starch	Base (Trial 3) + 0.3%Rice Starch	Base (Trial 3) + 0.4%Rice Starch	Base (Trial 3) + 0.5%Rice Starch
1	Appearance	good	good	good	good	Good
2	Colour	white	white	white	white	White
3	Consistency	Unsatisfactory	Unsatisfactory	Unsatisfactory	Unsatisfactory	Good
4	Odor	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable
5	Spreadability	Good	Good	good	Good	Good

Table no. 7: Results of Accelerated Stability Study

Sr. No.	Accelerated stability test	Requirement	Observation
1	Colour	To pass the test	Passes the test
2	Odor	To pass the test	Passes the test
3	pH	4-9	6.8

Figure: Graphical Representation of 0.5% Rice starch shampoo

