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MODIFICATION AND UTILIZATION OF RICE BRAN FATTY ACID IN COSMETICS

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ABSTRACT:
The field of cosmetics is gaining huge importance in the present days. The conventional methods of preparations need some modification in order to fulfill the requirements of the society. Waxes have always been a primary ingredient of the cosmetic preparations. Natural and synthetic waxes are used since a long period of time. This study aims to investigate the modification of rice bran fatty acid and its usage in cosmetics preparations. Rice bran gel is a by-product generated during the refining of rice bran fatty acid. In this work Rice bran gel was purified processed and was analyzed for its physico-chemical properties further based on these properties it was utilized in preparing various skin care products. Natural and synthetic waxes are used since long period of time. But studies reveals that's natural waxes provide a latter emollient effect as contrasted to synthetic waxes. One such natural product is rice bran gel.

KEYWORDS: Rice Bran fatty Acid, Rice Bran Gel, Emulsion, Natural Cosmetics

INTRODUCTION:

Rice bran oil is an unique vegetable oil produced from the outer brown layer of rice which is commonly known as rice bran are removed during the processing and polishing of rice in milling industry. Besides having an about ideally balanced fatty acid profile, it is splendid in actual anti-oxidants. A numeral of controlled systematic studies conducted in India & abroad compromise considerably acknowledged the improved on cholesterol lowering properties of rice bran oil as contrasted to other conventional vegetable oils. White rice is polished to remove the excess bran layers and achieve desired degree of whiteness. The hull of rice and the rice bran are generated as the by-product of the rice milling industry.[1,2]

Rice bran wax is obtained from natural source. That natural sources Oryza-Sativa- family Gramine. And it is abundantly available. It is significant result of the rice bran oil industry. The wax is reported to be chiefly Melissly cerotate.

Rice bran wax has been historically old in a large strain of cosmetics. The rice bran wax is moderately despicable in priced as compared to imported materials. It is an ordinary hard, crystalline vegetable expand obtained from rice husk. It is having peak melting point of 77-86 degree Celsius. It consists of exceedingly prolonged chain saturated C46-C62 esters additionally recognized as policosanols, from C20-C36 fatty acids. Rice bran wax expand in nature contains phospholipids. There phytosterols (healthy arrange steroids) and squalane which moisturizing and has antioxidant properties.

According to the prescriptions of FDA, rice-bran wax is a refined wax from rice-bran meetings the following specifications: m.p. 75 - 80°C, max. Free fatty acids content 10 per cent, max. Iodine number 20, saponification number 75~12t. Based on the data published in literature and on the results of my own investigations the proposed quality prescriptions for rice-bran wax may be summarized in the following: color yellowish-white, iodine number 4-20, acid number 5-20, saponification value 80-120, non-saponifiable matter 52 - 58 per cent, m.p. 78-82.

The purified rice-bran wax has similar properties of carnauba wax. This means, that the potential field of use of the rice-bran wax is very wide. As a potential replacement for carnauba wax, rice-bran wax may moreover be a “melting point booster" for other waxes. It may be utilize in different polishing emulsions, as a constituent of shoe creams and as components or coating for candy, chewing gum and fruits and in various cosmetics. To estimate the marketability of a new outcome result is very difficult.

The world production of the vegetable waxes is evaluated at about 20,000 tons per year. About half of this quantity is carnauba wax. The production of the other plan* waxes is relatively smaller. The most essential consumer, the USA, imports practically all the hard vegetable waxes. The countries of Western Europe also import relatively high quantities of plant waxes. The prices vary from US$ 1,100 to US$ 1,800 for each metric ton of wax. Prospectively the marketing of 3,000 - 5,000 tons rice wax seems to be possible.

The literature studies reveal that a lot portion of the work has been done in the topic cosmetics. During the very first attempts, waxes like carnauba waxes were blended to yield skin care products. Later, utilization of petroleum fractions used for the production of cosmetic products had become the trend. But now technologists are again trying to switch towards the natural raw materials. With the same objective, this paper highlights the utilization of Rice Bran Wax as a basic raw material for cosmetic preparations. Distinct formulations were prepared and were tested for their pH value, moisture content, percent solids, surface tension, and viscosity.

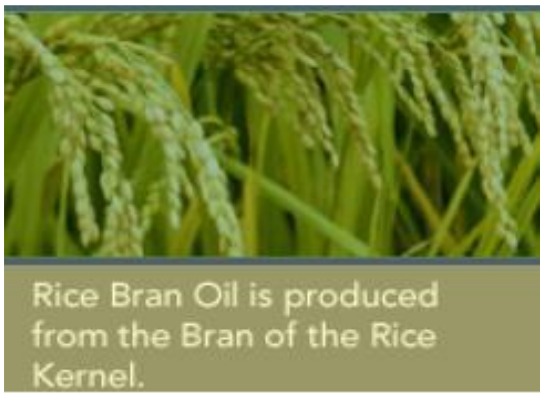

Fig1: RICE CROP

Fig.2: RICE BRAN GEL

Table 1 – Components of Rice Bran

COMPONENTS	%
Protein	15
Oil	18
Ash	7
Carbohydrates Fiber	50
Crude	7
Total Dietary	28
Soluble Fiber	2.4
Insoluble fiber	25.6

Table 2 - Physico-Chemical Characteristics of Rice Bran Oil

Characteristics	Value Range
Refractive Index at 25°C	1.470-1.473
Specific Gravity at 30°C	0.916-0.91
Saponification Value	180-190
Iodine Value	99-108
Acid Value (Max)	1.2
Smoke Point	213°C
Fire Point	352°C
Cloud Point	17°C

Table 3 - Fatty acid composition of Rice Bran Oil

Fatty Acid	% Composition
C14:0 Myristic acid	0.6
C16:0 Palmitic acid	21.5
sC18:0 Stearic acid	2.9
C18:1 Oleic acid (an Omega 9 fatty acid)	38.4
C18:2 Linoleic acid (LA, an Omega 6 fatty acid)	34.4
C18:3 αLinolenic acid(ALA, an Omega 3 fatty acid)	2.2

The literature studies reveal that since the 18th century a wide range of work has been done on the topic of cosmetics. During the very first attempts, natural oils like almond oil were blended with waxes to yield skin care products. Later, utilization of mineral oil for the production of cosmetic products had become the trend. But now technologists are again trying to switch towards the natural raw materials.
With the same objective, this paper highlights the utilization of Rice Bran Gel as a basic raw material for cosmetic preparations. Distinct formulations were prepared and were tested for their pH value, moisture content, percent solids, surface tension, and viscosity[3,4,5].

EXPERIMENTAL PROCEDURE

The procedure for the modification of Rice Bran Fatty Acid

Reaction

Rice Bran Fatty Acid + Saturated KOH + Emulsifier + Water

(Constant temp and stirring)

↓

Gel Formation

Table 4 - Composition Of Rice Bran Gel

Chemicals	Composition
Rice bran fatty acid	40gm
Saturated KOH	15ml
Tween 20	5ml
Water	80ml
Temperature	120 °C
Stirring time	40min

As a part of this study, cosmetic products such as - moisturizing lotion, shaving cream and hair conditioner were formulated using conventional ingredients and Rice Bran Gel formed from modification of Rice Bran Fatty Acid.

Moisturising lotion – Initially, the specified amount of Stearic acid, Kusum oil, and Rice Bran Gel were melted together in a glass beaker. This mixture was at that moment neutralized using TEA. The accurate

amount of GMS and soft jelly were weighed, melted and mixed with the neutralized mass to form the oil phase. These contents were heated to about 70°C.

Further, in another beaker, all the water phase ingredients were assorted at once and heated to 70°C. Now, the oil phase was bit by bit added into the water phase with constant agitation. After the complete addition, the mixture was cooled to about 50°C. Other additives such as preserving agents and perfumes were added to this to yield the final product[6,7].

Table 5 – Composition of Moisturizing Lotion

Chemicals	Composition
Oil Phase :-	(in g)
Stearic Acid	4
Glycerol Monostearate`	2
Kusum Oil	2
Soft Jelly	1
Rice Bran Gel	3
Water Phase:-	
TEA	4
Glycerol	3
Isopropanol	1
Tween 20	2
Distilled Water	27
Preservative	0.15%
Perfume	0.30%

Shaving Cream – Initially, specified quantity of Stearic acid an Blend oil (a blend of Kusum oil and coconut oil) and Rice Bran Gel were melted together in a glass beaker and a mere quantity of GMS was added to the same. In another beaker distilled water, glycerol, borax, 80% KOH solution were assorted in concert and heated to materialize a homogenous mixture. Further, the water phase was little by little mixed to the oil phase, which was assisted with strong stirring and continuous heating. During this time of mixing the two phases, SLS was crushed into the fine powder form and added to the reaction mass. After the complete addition, the resultant was cooled to yield shaving cream[8].

Table 6 – Composition of Shaving Cream

Chemicals	Composition (in g)
Stearic acid	10
Rice Bran Gel	1.2
Blend Oil	5
GMS	1.5
KOH solution (80%)	5
Glycerol	5
Borax	1
SLS	2
Distilled Water	45

Hair Conditioner – The oil phase was prepared in a glass beaker by taking an appropriate amount of Kusum oil, bee's wax, Rice Bran Gel, soft jelly and GMS and melting them together at to establish a

homogenous phase. In a separate beaker, water was heated to about 65°C and specified quantity of borax and tween 20 were added to it. This was then slowly added into the oil phase with constant heating and constant mixing. The resultant product was cooled down to 40°C and the additives were followed by new to the same[9].

Table 7 – Composition Of Hair Conditioner

Chemicals	Composition
Oil Phase :-	(in g)
Soft Jelly	25%
Kusum Oil	2
Rice Bran Gel	3
Bee's wax	11
Glycerol Monostearate	6
Water Phase :-	
Tween 20	6
Borax	1
Distilled Water	35
Preservative	0.15%
Perfume	0.30%

Characterization[10] –

1. Moisture contented – hose is beauty formulation helps to shelve the skin glib and soft, as anyhow as shining and hale and hearty by retaining dampness in the outmost skin layer. Fill up is a main ingredient in moisturizer for the reason that it helps in combination the ingredients and retains its homogeneity.
2. Gritty Matter – The examination is done to check the presence of solid particles in the formulations.
3. pH – It is the degree of sharpness or alkalinity of a product. The pH collection of person skin is about 5-6. The pH of the skin harvest requirement be near this go hence that they are unhesitatingly acknowledged by the skin.
4. Consistency – Cosmetic preparations are definite by their gooeyness or thickness. Formulating such preparations, therefore, mostly depends upon the requisite end-product consistency, influencing the span of important to use. One needed feature (viscosity) in merchandise change is having a item for consumption that by far squeezes out of a tube and breaks off cleanly after application.
5. Surface tension – Different formulations are definite by their stickiness or thickness. The subordinate the viscosity, the inferior will be the surface tension and more will be its Spreadability.
6. Absorption Rate – while the foam is essence sprayed on a piece of filter paper, the time required by the moisture to reach the bottom of the filter paper gives the absorption rate.
7. Foam height – foam height is the height of the column of foam that is generated after spraying it in a foam cylinder and shaking it upside down for 40 times.
8. % Yield – It is the percent ratio of real yield to the academic yield. It is calculated to be the experimental yield divided by academic yield multiplied by 100%. It's likely for percent yield to be over 100%, which way extra sample was healthier from a result than predicted.
9. Viscosity – The viscosity of substance is evaluated of its resistance to gradual bend by cut/shear stress.
10. Solubility Test – The solubility experiment is a route for seminal solubility of the compound. The reason of the test is to influence how much of a solvent that can be dissolved in a solute, in other words, the premier concentration of a solute in a solvent.

RESULTS AND DISCUSSIONS –

Results of Rice Bran Gel –

Table 8 – Results Of Rice Bran Gel

Test	Prepared Sample	Std. Reference
• **Acid value**	185	180 – 205
• **Sap value**	200	190 – 210
• **Iodine value**	101	98 – 108
• **Titration (clear pt.)**	29 min	28 min
• **Colour**	6 max	7 max

Results of Moisturising lotion –

Table 9 – Results Of Moisturizing Lotion

Tests	Prepared Sample	Std. Reference
• **MIV (%)**	34.43	26.97
• **Gritty Matter (%)**	65.57	73.03
• **pH**	5.79	5.45
• **Consistency**	Good	Excellent
• **Surface Tension(dyne/cm)**	14.13	13.69

Results of Shaving Cream –

Table 10 – Results Of Shaving Cream

Tests	Prepared Sample	Std. Reference
• **Absorption Rate (s)**	31	20
• **pH**	6.25	5.8
• **Surface Tension(dyne/cm)**	13.67	12.84
• **Foam content**	900ml	1000ml

Results of Hair Conditioner –

Table 11 – Results Of Hair Conditioner

Tests	Prepared Sample	Std. Reference
• **Viscosity**	1.96	3
• **pH**	1.78	2
• **Spreadability**	1	1
• **Moisture**	4.67	5

The objective of the work was successfully achieved. All the prepared samples were consistent and homogenous, off-white in colour and had a pleasant fragrance. The quality analysis reveals that their properties were close to that of a commercial product. When applied on the skin, the moisturising lotion had an emollient effect without much oiliness. pH is one of the as a critical assets for any skin care product was successfully improved and brought to the permissible limits. The product had good flow and was easily spreadable on the skin, without much drag.

CONCLUSIONS

The significance of these discoveries, together with the numerous reports on the bio-activity indicate that Rice Bran Gel is indeed a very promising active component for new functional eco-friendly cosmetic products. It has a proven immediate moisturization and skin barrier enhancing the effect, manufacture it a model emollient for a sort of applications in innovative skin care. The easy consistency, pooled with a eminent melting point, offers the formulator loads of conduct to optimize in cooperation skin deem and peak fever stability without compromising extensive ridge living and fascinating appearance. Moreover it doesn't basic any impair to the environment during disposing. The good quality stability and the inherently pleasant formulating properties linked with RBW, in general, sweeping up amount of possibilities, complete by the sort of resultant crop that preserve be obtained from this perfectly researched untreated material.

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