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# SPROUTED WHEAT MICRO PARTICLES USING MELT DISPERSION TECHNIQUE IN COSMETICS

Sonal Sanjay Dhabekar [1] | Dr. Jayashree Hajare [1] | Amar Deshpande [1]

[1] Department of Cosmetic Technology, L.A.D and Smt R.P.College for Women , Seminary Hills ,Nagpur

## ABSTRACT

Consumers demand more and more performance from their personal care products. As these expectations rise, personal care formulations become more complicated. .In response to this trends formulators look for innovative ways to enhance delivery system have aesthetic value with herbal ingredient in it One such approach to solving these formulations challenge is through the encapsulation of active ingredients. Now-a-days microencapsulation is a promising aid that has an excellent capability to protect bioactive material against temperature , humidity, and acidic conditions .Herbal cosmetics have growing demand in the world market and is an invaluable gift of nature. Herbal formulations always have attracted considerable attention because of their good activity .Sprouted wheat is one such natural active which provide moistursing effect and also provides smoothness to the hair surface. But Sprouted wheat is prone to degradation if incorporated directly in product thus make the product unstable thus the objective of study is to prepare stable product by using encapsulation technique of wax melt dispersion technique using rice bran wax which is derived from rice bran oil, which is byproduct of rice milling.

**KEYWORDS:** Sprouted wheat, herbal cosmetics, Encapsulation, Rice bran wax, melt dispersion technique.

**1.Introduction**

Hair is a protective covering and attractive feature for both men and women .It forms an important part of person's personality .So a product is needed to be developed which will provide some sort of softness to hairs and also serves to improve texture of hair. Sprouted wheat is one such active which provides softness and smoothness to the hair surface. Sprouted wheat is prone to degradation if incorporated directly in product thus making the product unstable therefore the objective of study is to prepare stable product by using encapsulation technique of wax melt dispersion technique. In melt dispersion technique, the drug wax melt was emulsified into heated aqueous phase followed by cooling to form the microparticles .The microsphere system is newly developed for parenteral or topical drug delivery of bioactive compounds .[1]

Micro-encapsulation is a process in which tiny particles or droplets are surrounded by a coating to give small capsules of many useful properties. Microencapsulation can also be used to enclose solids, liquids, or gases inside a micrometric wall made of hard or soft soluble film, in order to reduce dosing frequency and prevent the degradation of pharmaceuticals .In a relatively simple form, a microcapsule is a small sphere with a uniform wall around it. The material inside the microcapsule is referred to as the core, internal phase, or fill, whereas the wall is sometimes called a shell, coating, or membrane. Some materials like lipids and polymers, such as alginate, may be used as a mixture to trap the material of interest inside. Most microcapsules have pores with diameters between a few micrometers and a few millimeters.[9]

**2.Material and Method**

**(2.1)Material**

**( a) Active : Sprouted wheat**

**Botanical name:** Triticum aesitivum

**Family:** Graminaeae[8]

**Fig No 1 Sprouted Wheat**

**(b)Uses of sprouted wheat :**

- It provides moisturizing effect
- It minimizes roughness and chapping of skin by preventing moisture loss.
- It provides smoothness to the hair surface.
- It can be used in skin creams , gels , shampoos, body washes , lotions etc.[3,6,4,5]

**(c)Chemical Constituents**

Vitamin A, Vitamin K and Vitamin E, Vitamin B1,B2, B3,B5 ,folic acid ,Essential amino acid content of the proteins (Arginine 3.8%,Lysine 2.8% ,Threonine 2.78%, valine 4%, leucine 8.27%, Methionine 1.32%, Phenylalanine 3.68%, Tryptophan 1.03%) ,Fatty acid component (Palmitic acid 17.7%,Stearic acid 1.3%,Oleic acid 15.7%, Linoleic acid 58.2%, linolenic acid 5.9%,others 1.3%) .[8,1]

**(d) Preparation of Sprouted wheat**

Wheat was properly washed and then soaked in water for eight hours. After eight hours water was drained and then it was kept for sufficient sprouting.

**(e)Preparation of Sprouted wheat powder:**

After sprouting, the sprouted wheat was properly dried and then finely powdered.

**2.2 Rice Bran Wax :**

Food grade purified rice bran wax was obtained from Gurunanak College of Pharmacy , Nagpur

Botanical name : *Oryza sativa*

Family :Graminaeae

Rice bran wax is cheap and obtained from natural source and is abundantly available. It is an important byproduct of rice bran oil industry. [7]

Rice bran wax is edible and can serve as a substitute for carnauba wax in most applications due to its relatively high melting point. It is used in paper coatings, textiles, , fruit & vegetable coatings, confectionery,pharmaceuticals, candles, moulded novelties, waterproofing, lubricants, crayons, adhesives, chewing gum and cosmetics.

In cosmetics, rice bran wax is used as an emollient, and is the basis material for some exfoliation particles. [10]

Rice bran wax is a major wax resource in East asia , where rice is the main food. The main potential applications of Rice bran wax in the cosmetic , pharmaceutical ,food, polymer industries are as cost efficient as those of other plant waxes , such as carnauba and Candelilla wax [2]

**2.3 Method :**

**Encapsulation**

**Preparation of Microparticles**

Food grade rice bran wax was melted in10% (w/w) of Isopropyl alcohol at temp at 95°C in thermostat water bath then sprouted wheat powder was dispersed in melted wax (1:1 and 1:2). To this mixture Tween 80 and Span 80 was added and stirred thoroughly and this dispersion was added to distill water at 80°C to 85°C.The mixture was stirred (Remi stirrer India at 500rpm for 4 min) with three blade impeller. Then this mixture was cooled to 2°C to 8°C with stirring for 15 min then microparticles were collected by filtration under reduced pressure, washed with water and dried at room temperature for 48 hrs. In 1:1 ratio microparticles were irregular in shape and in 1:2 ratio microparticles were quite spherical . So further study was carried out using 1:2 ratio.

**3. Characterization of Microspheres**

The size of microparticle was determined by using Motic Microscope

The particle size was found to be in range of : 75µm to 150µm .

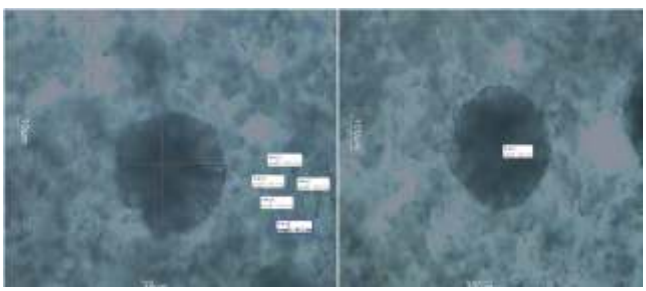

**Figure 2: Sprouted wheat powder microparticles**

**4.Formulation of suitable Base**

Success of any Cosmetic depends upon suitable base formulation. Now-a-days more people are adopting aqueous gel products as they are easy to apply, spread well without tacky feel and provide uniform external appearance .

**5.Incorporation of Active :**

Simple hair Softening gel formulation was selected and microparticles were incorporated in it in three conc. 1%, 3%, 5%.

All the three formulations with different concentrations of sprouted wheat powder microparticles were subjected to accelerated stability testing conditions test for 30 days .

There was no significant change observed in color, odor, pH and viscosity of the product.

- After formation of gel, Sprouted wheat microparticles were added with slow mixing.
- In the above formulations , active was incorporated in the conc. of 1%,3%,5%. If active added more than 3% , it made the gel less transparent and product was not appealing .So the final formulation with 3% active was decided to maintain the aesthetic appeal of the product .
- Mixing should be slow or otherwise the gel may become aerated.

**Table No1 Formulation of Hair softening Gel with sprouted wheat microparticles**

| Ingredients | Quantity (gms) |
|---|---|
| Carbopol | 0.5 |
| Glycerin | 2 |
| Methyl paraben | 0.1 |
| Sodium benzoate | 0.1 |
| Triethanaloamine | 0.5 |
| Dimethicone | 1 |
| Water | Up to 100ml |
| Active | 3% |
| Perfume | Quantity sufficient |

**6. Result :**

Thus an stable hair softening gel was developed with sprouted wheat rice bran wax microparticles in it. An unique controlled release mechanism guarantees the maximum release on the hair surface because of minute particle size, active can easily release by pressing, rubbing and massaging action and thus providing softness and smoothness to the hair surface after the application of gel.

**7.Discussion and Conclusion :**

Wax based microparticles drug delivery system has received considerable attention in recent years .Microparticles provide constant and therapeutic effect .Rice bran wax is edible and can serve as a good substitute of Carnauba wax .Therefore it was used in formulation of hair softening gel with sprouted wheat powder microparticles by using melt dispersion technique .Gel formed from this method was stable and have good aesthetic appeal .

Thus it can be concluded from the present study that formulation of hair softening gel with sprouted wheat microparticles prepared from rice bran wax shows good homogeneity, spreadability and viscosity with good aesthetic value.

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