



# ENCAPSULATION OF SPROUTED WHEAT AND ITS INCORPORATION IN COSMETICS

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## ABSTRACT

India having rich resources of medicinal plants with rich knowledge of its medicinal values since ancient times with that tradition use of botanical extracts ,juices and other potentially unstable cosmetic actives continues to rise. With more and more consumers entering into conscious use personal care products are evolving to meet the changing market needs. Cosmetic Technology is the technology which is concerned with the improvement of skin or to prevent the damage and thus makes the great place in innovatory world Using natural herbs in cosmetics provide an added advantage as this naturals contributes some attributes as they are rich in phytochemical which exhibit many properties to mention few like moisturizing ,antioxidant ,anti-inflammatory ,antimicrobial . Sprouted wheat is one such natural active which has good moisturizing effect .It minimizes roughness and chapping of skin by preventing moisture loss. But if incorporated directly it shows degradation and product is not stable. Ingredient instability drives the need for encapsulation. In response to this formulators look for innovative ways to enhance the appearance of the skin and encourage more youthful healthy appearance and at the same time competition in market favors product with novel and unique delivery system that combines both performance and novelty. The aim of study is to develop a stable product with sprouted wheat in encapsulated form or pellets prepared by extrusion, spheronization and coating pan technique with pressure triggered release mechanism .

**KEYWORDS :** Sprouted wheat , Naturals ,Encapsulation, Extrusion ,Spheronization, Coating pan .

## 1. INTRODUCTION

Cosmetic Technology is the technology which is concerned with the improvement of skin or to prevent the damage and thus makes the great place in innovatory world.Moisturizers available in market contains synthetic chemicals but now a day's trend is shifting towards natural active ingredient as naturals are rich in phytochemicals which exhibit moisturizing effect.

Now-a-day's consumers are very conscious personal care products are evolving to meet the changing market needs .In response to this needs formulators look for some innovative solution. Ingredient instability drives the need for the delivery system that combines both performance and novelty.<sup>(6)</sup>

Encapsulation is such an innovation which provides various formulation and performance benefits both like :

- Protection from incompatible ingredients
- Protection from oxidation
- Targeted delivery to certain body sites
- Controlled release by triggered mechanism.
- Modification of aesthetics
- Ease of application<sup>(6)</sup>

Thus aim of study is an effort in providing evidence of stable product with Encapsulated sprouted wheat in cosmetics.

## 2. Material and Method

### (2.1)Material

**(a) Active :Sprouted wheat**

**Botanical name:** Triticum aestivum

**Family:** Graminaeae<sup>(11)</sup>



**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.<sup>(2,8,4(a),7)</sup>

### (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%) .<sup>(11,2)</sup>

**(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.

**3. Method****3.1 Encapsulation**

Extrusion, Spheronisation and coating pan technique:

Preparation of Solid matrix type microcapsule is based more on mechanical methodology rather than chemical processing. Pelletization creates pellets or beadlets.<sup>10(b)</sup>

**Schematic process of Extrusion Spheronization**

Blending of active substance with excipient (Microcrystalline cellulose as filler and spherodising aid along with polyvinyl pyrrolidone was added to active as a binder<sup>3(a) (b)</sup>

Wet granulation of the mass

Extrusion of wet mass

Rolling of the extrudates in the spheronizer

Drying of pellets  
(Kept for 12 hrs at 40°C)

Pellets are then coated

**(a) Wet granulation of mass :**

Blending of active substance i.e 3 gm of sprouted wheat powder with 3 gm of excipient microcrystalline cellulose as filler and spherodising aid with 2% aqueous solution of polyvinyl pyrrolidone used as binder

**(b) Extrusion of wet mass:**

Extrusion is a process of forming a raw material into a product of uniform shape and density by forcing it into orifice or die.

**(c) Rolling the extrudate in spheroniser:**

Spheronization is a process which convert cylindrical extrudate into spherical pellets when subjected to spiral rope like motion in spheronizer.<sup>(9)</sup>

**(d) Drying the pellets: kept for 12 hrs at 40°C****(e) Coating of Pellets:**

- Coating helps to improve stability and to get pellets with correct pressure triggered mechanism.<sup>(11)</sup>
- Coating is done with 2% alcoholic Ethyl cellulose as coating material with Dibutylphthalate as plasticizer in it.
- Then pellets are coated with 1% film of polymer (ethyl cellulose) to obtain correct pressure triggered release mechanism profile.



Fig No 1 Sprouted wheat powder pellets

**4. Evaluation of pellets**

- Pellet size : 0.5mm
- Pellet size distribution: Pellets which pass through sieve BIS NO20 was taken
- Angle of repose: 28<sup>(4b)</sup>

**5. Formulation of gel base**

Gels are the type of base which produces uniform external appearance, ranging from transparent to semitransparent. Water soluble polymer substance that is carbopol was selected for the aqueous gel to give the desired transparent effect to the product.

Aqueous gel base was selected to enhance the moisturizing, soothing and cooling effect of the product on the skin so that it can restore water level of parent texture which gives moist feeling.

Gels are moistening and give low friction provided by polymer make it smooth to apply and massage on to the skin.<sup>10(a)</sup>

Aqueous gel base was selected to enhance the moisturizing, soothing and cooling effect of the product on the skin so that it can restore water level.

**6. Incorporation of Active**

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

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

There was no significant change observed in color, odor, and pH and viscosity of the product except for sample kept in oven which show slight change in viscosity towards the end of the study.

- After formation of gel Sprouted wheat powder pellets were added with slow mixing.
- In the above formulations , active is incorporated in the conc. of 1%,3%,5%. But if active added more than 3% , it showed aggregation of pellets and product will not be 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.
- Also there was a possibility of breaking of encapsulated beads which might lead to haziness of the gel so stirring should be done slowly.

**Table No1 Formulation of Gel with sprouted wheat powder pellets**

Ingredients	Quantity (gms)
Carbopol	1
Glycerin	2
Methyl paraben	0.1
Citric acid	0.1
Sodium benzoate	0.1
Triethanaloamine	0.8
Water	Up to 100ml
Active	3%
Perfume	Quantity sufficient

**7.Result**

- At initial stage pellets were hard but after incorporation in the gel, pellet become soft.
- Upon the application the unique controlled release mechanism guarantees the maximum release on to the skin surface by pressing, rubbing and massaging action because of which the polymeric wall was mechanically destroyed.

**8. Discussion and conclusion:**

Sprouted wheat was dried and powdered as sprouted wheat is prone to degradation if incorporated directly in product thus make the product unstable . To make the incorporation of sprouted wheat powder, encapsulation technique was selected and pellets were prepared using extrusion and spheronization technique as this method helps to convert the sprouted wheat powder in to pellets with the help of spherodising aid that is microcrystalline cellulose and binder that is polyvinyl pyrrolidone. Once Pellets were prepared after curing they were coated with ethyl cellulose using Pan coating method as Pan coating method is reported for coarse particles .Ethyl cellulose was selected as it is water insoluble polymer , protecting the active from the gel ingredient. Thus sprouted wheat powder was protected from the degradation and product stability is increased.

From this study it is concluded that formulation and development of gel with sprouted wheat powder pellets is the combination of both that is use of natural ingredient and modern technology with excellent aesthetic appeal as active in the form of pellets can actually be seen in the product

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