

Evaluation and Formulation of Okra Extract (Mucilage) Containing Moisturizing Hair Conditioner

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Abstract: The main aim of the preparation of hair conditioner is for the hair care. It is aim principle in the prevention of hair. Hair conditioner is used to make hair smooth and silky. They help by replacing materials, such as natural oil, lost during washing. The safety of hair conditioner is established by selection of safe natural material.

Keywords: Okra extract, conditioner, moisturizing, hair care.

1. Introduction

Okra (*Abelmoschus esculentus*) is the only vegetable crop of significance in the Malvaceae family and is very popular in the Indo-Pak subcontinent. In India, it ranks number one in its consumption but its original home is Ethiopia and Sudan, the north-eastern African countries. It is one of the oldest cultivated crops and presently grown in many countries and is widely distributed from Africa to Asia, southern Europe and America. It is a tropical to subtropical crop and is sensitive to frost; low temperature, water logging and drought conditions, and the cultivation from different countries have certain adapted distinguishing characteristics specific to the country to which they belong. It is an oligo purpose crop, but it is usually consumed for its green tender fruits as a vegetable in a variety of ways. These fruits are rich in vitamins, calcium, potassium and other mineral matters. The mature okra seed is a good source of oil and protein has been known to have superior nutritional quality. Okra seed oil is rich in unsaturated fatty acids such as linoleic acid, which is essential for human nutrition [7].



Fig. 1. Okra

A. Description

Biological name: *Hibiscus esculentus*, *Abelmoschus esculentus*.

Scientific classification:

Kingdom: Plantae

Division: Magnoliophyta

Class: Magnoliopsida

Order: Malvales

Family: Malvaceae

Genus: *Abelmoschus*

Species: *A. Esculentus*

B. Chemical composition:

Okra bast, a multicellular fiber was analyzed and the estimated average chemical compositions of OBF (*Abelmoschus esculentus* variety) are 67.5 % α -cellulose, 15.4 % hemicelluloses, 7.1 % lignin, 3.4 % pectic matter, 3.9 % fatty and waxy matter and 2.7 % aqueous extract. It is clear that the main constituents of OBF are α -cellulose, hemicelluloses and lignin and the rest are very minor in proportion, so render a little influence to the structure of OBF. Therefore, the structure of α -cellulose, hemicelluloses and lignin and the mode of combinations that exist in between themselves are dominating the structure of OBF. Okra Raw Nutrition Value per 100g Energy 33kcal carbohydrates 7.45 g (140 kj) -sugars 1.48 g - dietary fibers 3.2 g fat 0.19g protein 2g water 90.19g Vitamin A 36 μ g (7%) Thiamine (B1) 0.2 mg (17%) Riboflavin (B2) 0.06mg (5%) Niacin (B3) 1mg (7%) Vitamin C 23mg (28%) Vitamin E 0.27 mg (2%) Vitamin K 31.3 μ g (30%) calcium 82mg (8%) iron 0.62 mg (5%) magnesium 57 mg (16%) potassium 299mg (6%) zinc 0.58 mg (6%) Percentages are related to US recommendations to for adults. (Source: USFDA database) Okra is a popular health food due to its high fiber, vitamin C, and folate content. Okra is also known for being high in antioxidants. Okra is also a good source of calcium and potassium [7].

2. Introduction to Hair Conditioner

Hair conditioner is a hair care product used to improve the feel, appearance and manageability of hair. Its main purpose of

it is to reduce friction between strands of hair to allow easier brushing or combing, which might otherwise cause damage to the scalp. Various other benefits are often advertised, such as hair repair, strengthening, or a reduction in split-ends.

Conditioners are available in a wide range of forms including viscous liquids, gels and creams as well as thinner lotions and sprays. Hair conditioner is usually used after the hair has been washed with shampoo. It is applied and worked into the hair and may either be washed out a short time later or left in.

The outermost layer of a hair follicle is called the cuticle and is composed largely of keratin. This is rich in cysteine groups which are mildly acidic. When the hair is washed these groups can deprotonate, giving the hair a negative charge. Positively charged quaternary ammonium species, such as behentrimonium or polyquaternium, can then become attached to the hair via electrostatic interactions [8].

Once attached these compounds have several effects. Their long hydrocarbon backbone helps to lubricate the surface of each hair follicle, reducing the sensation of roughness and assisting combing. The surface coating of cationic groups means that hair are repelled from each other electro statically, which reduces clumping. The compounds can also act as antistatic agents, which help to reduce frizzing [8].

3. Objective

To develop the most effective hair care product to meet patient compliance. To evaluate the prepared hair care product to establish desired effect on patient. The objective of hair conditioner is to protect the hair and to prevent the hair loss.

4. Materials and method

Fresh immature pods of Okra were collected from local market. The pods were washed thoroughly with sterile distilled water and seeds were separated from the pods, dried and pulverized to fine powder using grinder.

5. Extraction

For extraction about 50 grams of the ground powder of okra was dissolved in 200 ml of sterile water and boiled at temperature of 50°C. After boiling the mixture was filtered using clean muslin cloth and the mucilage was used for formulation.

A. Confirmation of mucilage [4],[5]

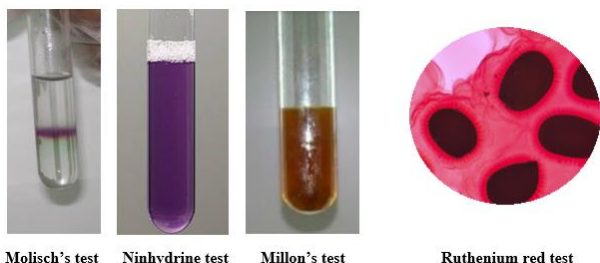


Fig. 2. Test figures

Table 1
Test, Observation and Inference

Test	Observation	Inference
MOLISCH'S TEST: Mucilage extract + Molisch's reagent +conc. H2SO4 on the side of test tube	Violet ring observed at the junction of two liquids	Carbohydrate present
RUTHENIUM TEST: Take small quantity of mucilage, mount on a slide with ruthenium red solution, observe it under microscope	Pink color develops	Mucilage present
IODINE TEST: Mucilage +1 ml of 0.2 N iodine solution	No blue color observed	Polysaccharides present (starch is absent)
NINHYDRINE TEST: Mucilage + 2% Ninhydrine solution	Violet color observed	Protein present
MILLON'S TEST: Take 1 ml of mucilage add 1 ml of Millon's reagent boil gently of 1 minute, cool and add few drops of sodium nitrite heat the solution	Brick red precipitate	Protein present

Table 2
Aqueous Phase

S. No.	Ingredients	Quantity
1	Mucilage	12 ml
2	Honey	1ml
3	Aloevera gel	1ml
4	Glycerin	3ml
5	Citric acid	0.3gm
6	Xanthan gum	0.3 gm
7	Perfume	Q.S

Table 3
Oil Phase

S. No.	Ingredients	Quantity
1	Coconut oil	3ml
2	Castor oil	3ml
3	Almond oil	3ml
4	Vitamin E oil	1ml
5	Polysorbate80	3ml

Formula: [1], [2], [6]

B. Procedure

A water part is blend of water, glycerin, honey, alovera gel, citric acid, xanthan gum, mucilage, and perfume.

Oil part is blend of coconut oil, castor oil, almond oil, vitamin oil and polysorbate 80. Both phases are heated at same temperature on water bath at 75°C.

Blend everything with immersion blender.



Fig. 3. Blending

C. Evaluation parameters:

- Product Characteristics:
 1. Color- Creamy
 2. Fragrance- Characteristic almond oil like
 3. Consistency- Good

- pH:

The pH was determined by using digital pH meter and the pH of herbal hand wash was found 3.5.

- Viscosity:

The viscosity of hair conditioner was determined by using digital Brookfield viscometer. Measured quantity of conditioner was taken into a beaker and the tip of viscometer was immersed into it and the viscosity was measured in triplicate.

- Stability:

The stability studies were carried out by storing at different temperature conditions like 40°C, 25°C & 37°C for 4 weeks. During the stability studies no change in color and no phase separation were observed in the formulated hair conditioner.

- Irritancy test:

After using the hair conditioner no irritation was observed.

- Type of emulsion:

Dye test: In this test, an emulsion is mixed with a water soluble dye (amaranth) and observed under microscope. The continuous phase appears red, it means that the emulsion is O/W type as the water is external phase and dye is dissolved in it to gives color [3].

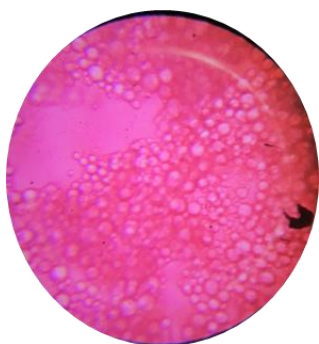


Fig. 4. O/W type of emulsion

6. Result and discussion

Okra mucilage consist of vitamin A, C, K. it also consists of thiamin, riboflavin, niacin. Potassium, sodium, magnesium, calcium, iron are the principle elements present in mucilage. The antioxidant in vitamin B helps in the secretion of sebum in the scalp. It regulates the flow of sebum in the hair follicles, keeping the scalp moisturized and preventing the dandruff. Biotin helps for faster growth of cells and it drastically

improves hair growth and makes them thicker and stronger. Hence we prepare the moisturizing conditioner for hair care.

7. Conclusion

Okra mucilage is an affordable source of protein, carbohydrate, minerals and vitamins. Okra mucilage can be used for enhancement of the hairs as it contains vitamins, large amounts of elements which are helpful for the hair care.

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