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Research Article

Formulation And Evaluation Of Herbal Face Gel Using Cucumber Fruit Extract

Savri A. Jadhav*, Sadhana Dnyaneshwar Gachande, Dinesh Sanjay Jadhav, Mayur Sakharam Gangurde

SVS Institute Of Pharmacy Mumgade At Post Malgeon

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ABSTRACT

Objective:

The present investigation aims at development and evaluation of face gel using of extract from Cucumis sativus L fruit

Methods:

Carbopol, different quantities of Cucumis sativus L extract, benzyl alcohol, glycerine, orange oil, and the necessary amount of distilled water were used to produce the gels. The pH of the skin (6.8–7) was then maintained by adding triethanolamine dropwise. The prepared compositions were assessed for skin irritation, Spreadability, homogeneity, pH, and physical appearance. Stability investigations have adhered to ICH recommendations.

Result:

The current work was completed on the formulation and assessment of the herbal gel. A number of factors are taken into consideration when evaluating gel, including its colour, consistency, pH, Spreadability, grittiness, stability, homogeneity, and skin irritancy test results.

INTRODUCTION

Cucumber

Cucumber (*Cucumis sativus* L.) belongs to the Cucurbitaceae family and is an economically important fruit vegetable. There are three wild or semi-wild varieties of cucumber: *C. sativus* L. var. Hardwick, *C. Clover* L. var. Sikkimensis, *C. sativus* L. var. Xishuangbanna. Cucumbers are

native to India and may have come from the foothills of the Himalayas.^{1,2} Since they have long been known to have anti-inflammatory qualities, cucumbers and cucumber extracts have been applied topically to treat a variety of skin conditions, such as sunburns and puffiness beneath the eyes.³ In ancient Egypt, Greece, and Rome, cucumber was highly valued not just as a culinary

*Corresponding Author: Savri A. Jadhav

Address: Department of pharmaceutical Quality Assurance SND college of Pharmacy, Babhulgaon, Yeola Dist.Nashik423401

Email ✉: savrijadhav7230@gmail.com

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item but also for its ability to heal skin ailments. Women have long acknowledged its benefits for red, fatigued, and swollen eyes. Numerous studies have reported on the anti-inflammatory properties of cucumber aqueous extracts, but the active ingredients have not been identified.^{4,5} A recent study found that an amino acid fraction reduced the amount of inflammation induced by angiotensin II in human endothelial cells, but the (LCMS) method could only identify common amino acids⁶.



Fig no.1 Fruit of *C. Sativus*

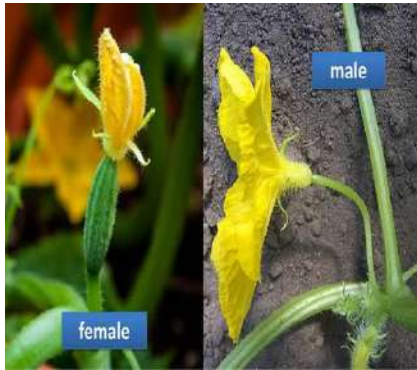


Fig. no. 2 Flower of *C. sativus*

Scientific Classification of cucumber:

Botanical Name:

Cucumis sativus Linn.

Order:

Cucurbitales

Local Name:

Hindi- Khir

Family:

Cucurbitaceae

Kingdome:

Planate

Subfamily:

Cucurbitaceae

Division:

Angiosperms

Genus:

Cucumis

Class:

Eudicots

Species:

C. sativus

Phytochemical Study:

The benefits of cucumbers to humans are numerous⁷. Cucumbers are high in calories, vitamins, and minerals, according to research (Fig. no. 3)⁸. Furthermore, it can be approximated that the crop has a high water content of 96%⁹. The high water content is a commendable option for obese and overweight persons, especially in the industrialized world, as it can aid in weight loss in multiple ways¹⁰

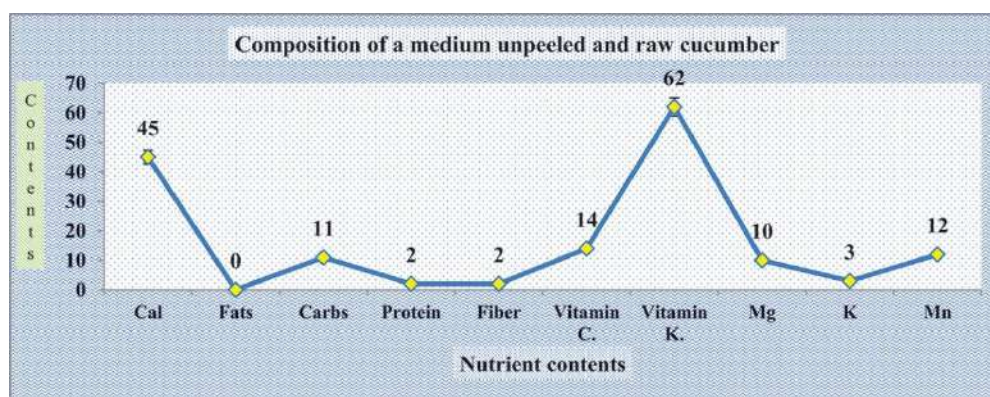


Fig no. 03 Nutrient contents

Numerous phytochemicals found in cucumbers have been shown to have anti-inflammatory and antioxidant properties through their control of antioxidant enzymes in metabolic pathways and ability to spare other antioxidants. Some of these discovered phytochemicals in cucumbers have been used in small-scale human research, which have shown some health benefits¹¹. Cucumber extract has been demonstrated to suppress the pro-inflammatory enzyme cyclooxygenase 2 (COX 2)¹². Cucumbers' high phenolic component content (flavonoids and terpenoids) may contribute to this likely health effect by notably reducing the levels of reactive carbonyl species (RCS) and reactive oxygen species (ROS). It may have anti-inflammatory, antioxidant, and anticancer properties due to its high fisetin flavonoid content¹³.

Gels:

A gel is a system comprising at least two parts that is solid or semisolid and is made up of a condensed mass that is surrounded and permeated by a liquid. The epidermal structure that gives gel and jelly their solid-like qualities is one of their distinguishing features. Even though gels and jellies are made up of a tiny number of solids distributed throughout a big volume of liquid, they behave more like solids than like liquids¹⁴.

Advantages

- For the best cutaneous and percutaneous medication administration, gel forms might be utilized.

- They have a higher rate of patient compliance and are non-invasive.
- They can steer clear of stomach pH-related issues with medicine absorption.
- Because the liver is bypassed, gels are not destroyed by liver enzymes.
- Gels are applied to the skin to allow for a prolonged and gradual absorption.
- Compared to other kinds, they have a localized action with minimal side effects¹⁵.

Disadvantages of gel formulation:

- Gels work more gradually and last longer.
- People may become irritated by the gelators or additives.
- The presence of water increases the likelihood of a microbial or fungal attack on gel.
- The solvent loss in the formulation gels.
- Flocculation causes an unstable gel in certain gels.

Ideal properties of topical gel:

- The gel should be translucent and homogeneous.
- The gel should shatter easily in the event that shear or force is applied when the container is shaking.
- The composition of the gel need to be inert.
- The gel can't have any stickiness.
- The gel must never come into contact with any other formulation ingredient.
- The gel has to be trustworthy.

There should be no irritation to the skin or any other location where the gel is applied. For all skin types, the Cucumber Face Gel's light weight, soothing formula helps reduce redness, puffiness, and blemishes. Anti-inflammatory cucumber extracts and other vital skin-treating ingredients are included in fresh cucumber face gel, which shields the skin from harm. The gel successfully blocks the causes of many skin conditions as well as the symptoms of dry skin. Using this face gel slows down the aging process of the skin and helps to lessen acne scars. It has no artificial additives that could be dangerous.

MATERIAL AND METHODS:

Material:

Cucumis sativus L extract was collected. The plant materials were authenticated at the P.G. Department of botany and research centre, MSG arts, science and commerce college, Malegaon camp, Nasik by Dr. Atul N. Wagh. The carbopol, glycerine, triethanolamine, benzyl alcohol, orange oil and deionized water were obtained from the Department of Pharmaceutics, SVS IOP

Methods:

Preparation of cucumber extract:

Pick out fresh cucumber fruits, wash them well, and then rinse them with purified water. After cleaning your workspace and equipment, chop the cucumber into thin slices. Place 120g of sliced cucumber into a 500ml beaker that has been cleaned and sterilized. For a few seconds, add 200 ml of deionized water, 1 gram of methyl paraben, and 5 ml of glycerine to the cucumber mixture. For five days, keep the beaker sealed (airtight). Shake for a few seconds at least once every day. used cotton cloth to filter the extract after five days. then transfer cucumber extract to a spotless receptacle.²¹



Fig.No.04: 1st Day



Fig.No.05: After 5days



Fig no 6 Filter Extract

Formulation of gel:

2.5g of fruit extract from Cucumis sativus L. was combined with 0.25g of carbopol and 25ml of deionized water. Next, 0.38g of glycerine, 0.25g of

benzyl alcohol, 0.35g of triethanolamine, and two to three drops of orange oil were added and combined. The remaining deionized water was added to the final volume of 25 ml in order to get the necessary consistency for the gel. The prepared gel was put into a container and kept out of direct sunlight. Table 1 lists the formulas and the above-described technique.



Fig no 7 Formulation of gel

Table 1.: gel base formulation (2.5%)

Name of the ingredient	Part Used	Quantity Batch A	Quantity Batch B	Quantity Batch C	Properties of Ingredient
Cucumis sativus extract	Fruit	3.0	2.0	2.5	Anti-inflammatory(API)
Carbopol	-	0.20	0.25	0.25	Gelling agent
Glycerin	-	0.38	0.43	0.38	Humectant
Triethanolamine	-	0.34	0.35	0.35	pH adjusting agent
Benzyl alcohol	-	0.24	0.25	0.25	Preservative
Orange Oil	-	1-2drops	2-3 drops	2-3 drops	Fragrance
Deionized water	-	Qs to 25	Qs to 25	Qs to 25	Vehicle

PHYSICAL EVALUATION PARAMETER

The following criteria were used to assess gels:

- Physical appearance
- Consistency
- Grittiness
- Colour
- Odour
- Greasiness
- Homogeneity
- Texture
- pH Determination
- Skin irritation study
- Spreadability

1. Organoleptic evaluations

The gel thus obtained was evaluated for its organoleptic properties like colour, odour, and taste. The appearance of the gel was judged by its colour and roughness and graded. Results are listed in Table 2

2. Grittiness

In the unlikely event that no visible particulate matter was observed with a light magnifying lens, the four definitions were analysed extremely closely to determine whether particles existed. The gel arrangement clearly satisfies the requirements for any effective preparation,

including the necessity for independence from specific materials and from coarseness¹⁹.

3. Homogeneity

Following the created gels' insertion into the container, each one was visually examined for homogeneity and examined to look for aggregates¹⁹.

4. pH Determination

pH of 1% aqueous solution of the formulation was measured by using a calibrated digital pH meter at constant temperature²⁰.

5. Spreadability

It illustrates how rapidly the gel spreads across the skin or affected area after application. The degree to which a detail is well-known also affects its utility. Spreadability is defined as the amount of time, under a specific stress, it takes for two slides to separate from the gel that is sandwiched between them. It is possible to achieve better spreadability by separating two slides in less time.¹⁰⁶ The following formula is used to compute it:

$$S = M. L / T$$

Result of batch-3 Formulation:

Table02: Evaluation Parameter

Sr. No	Specification	Limits
1.	Colour	Transparent
2.	Odour	Oranges like smell
3.	Texture	Smooth
4.	pH	5.2
5.	Consistency	Thick
6.	Greasiness	Nongreasy
7.	grittiness	Nongritty
8.	homogeneity	No aggregates
9.	Stability	After 1 month was stable
10.	Irritancy	Non-irritable
11.	Spreadability	uniform
12.	Feel on application	Cooling
13.	removal	Easily removable

where, M = wt. tied to upper slide

L = length of glass slides

T = time taken to separate the slides

6. Irritancy test

The gel was applied to a 1-sq.-cm area on the dorsal side of the left hand, and irritation, redness, and oedema were noted at equal intervals for up to 24 hours.

7. Accelerated stability studies

All of the formulations underwent accelerated stability experiments, which involved constant time intervals of 20 days at room temperature. Parameters including homogeneity, viscosity, physical changes, pH, and smear type were examined during the stability studies²⁰.

RESULT AND DISCUSSION:

The current work was completed on the formulation and assessment of the herbal gel. A number of factors are taken into consideration when evaluating gel, including its colour, consistency, pH, Spreadability, grittiness, stability, homogeneity, and skin irritancy test results

Results interpretation on hands:



Fig.No.08: Before Application Of Gel



Fig.No.09: After Application Of Gel

The goal of the current study was to produce a cucumber face gel. There was good spreadability in the produced mixture. The gel had an excellent PH. During storage, gel does not exhibit any kind of pH separation. The gel had a non-grassy texture and was simple to remove once applied. The composition did not cause irritation or damage to the skin. Batch 3 of the formulation is thought to be the most stable.

CONCLUSION

The goal of this study was to create an herbal gel composition that uses food extracts of *Cucumis sativus* in the Carbopol gel system to help reduce redness, puffiness, and pimples. The desired gel formulation was created, and its physicochemical characteristics—such as colour, smell, pH, Spreadability, stability, irritancy, and

homogeneity—were assessed. It was determined that the current study may progress the use of herbs to reduce redness and puffiness as well as the development of herbal formulations for the safe and efficient treatment of various illnesses. The study also found the prepared herbal gel included every necessary component of a gel composition intended for topical use.

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