



FORMULATION & EVALUATION OF ANTIBACTERIAL & ANTIFUNGAL POLYHERBAL GEL

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Abstract: In recent decades there has been a wonderful grow in the area of phytomedicines. In today's life herbal supplement is commonly used about 75-80% of total world's population in different economically developing nations for primary health care because of better social acceptance, better affinity & lesser complication. The design of present study was formulation & Evaluation of Antifungal & Antibacterial Polyherbal Gel using Xanthum gum as polymer & Ethanolic Extract of *D. carota*, *C. citrus*. The Colouring agent is used extract of *C. Officinalis*. Polyherbal Gel has been Smooth texture, Good stability, pH, & Consistency. There is No greasy film found in the gel. The prepare gel was show both Antifungal & Antibacterial activity. These prepare Polyherbal Gel is used for the Fungal, Bacterial infection, Gives glow & coldness effect to the skin & also useful in treatment of skin rashes & Damage skin.

Keywords: Herbal medicine, Antimicrobial, Antifungal, Stability studies, Phytochemical Evaluation.

I. INTRODUCTION

Skin is the main route of topical drug delivery system & most approachable organ of human body for topical administration. ^[21] Skin is the largest organs of the body it has mainly three layers. Epidermis, Dermis & Hypodermis. It is the protective barrier against thermal, mechanical and physical injury & hazardous substance. It prevents body from UV radiation. Skin is the most important sensory organ of the body. The main role of skin in protecting the body against pathogens and excess of water resistant. Skin protect our body from infection. The epidermis layer provides protection to the body. Function of Dermis is support and flexibility. The main role of hypodermis layer is to provides insulation and padding. The Polyherbal Gel is used in the treatment of acne, Fungal infection, viral infection, bacterial skin Infection, rashes & other allergic condition. A gel (Sometimes called as jellies) are solid or semisolid system made up of either suspension from small inorganic particles or large organic molecules transfuse by a liquid. Topical gel formulation provides convenient delivery system for drugs because they are easily removed from the skin & there is no greasy film found. Gel formulation is faster absorbed than creams & ointments and they are free from oil & they are transparent. Phytoconstitute like Tannins, Flavonoids, Glycosides & alkaloids are present in *D. Carota* & *C. citrus* Plant. Herbal gel should be inert, safe & not react with other synthetic & herbal cosmetics. Gel is suitable for antimicrobial activity against microbial attack. It should not be tracky. Herbal gel shows fewer side effects. They are cost effective. ^[20]

II. MATERIALS & METHODOLOGY

MATERIALS

1. *DAUCUS CAROTA*

Synonym- *Daucus carota sativa*, Wild carrot

Biological Source- Roots of *Daucus Carota*

Family- Apiaceae

Traditional uses:

- It is used as improve vision.
- In carrots mainly fiber, minerals & vitamins are found. They help to prevent infection



Fig: *Daucus Carota*

2. *CITRUS AURANTIUM DULCIS*

Synonym- *Citrus Sinensis*, Bitter orange

Biological source- The orange peel is the fresh or dried outer part of the pericarp of *Citrus aurantium* Linn.

Family-

Traditional Uses-

- It is used in Alzheimer's disease, Parkinson's disease.
- It is used as anti-allergic inflammatory.



Fig: *Citrus Aurantium Dulcis*

METHODOLOGY

A] Selection and collection of plant materials

For present study, Carrot, peel of oranges & Flowers of *Calendula Officinalis* was selected and collected from the Local area of Rajuri, junner in month of March 2022.

B] Preparation of extract:

1) Preparation of *Daucus Carota* Extract: ^[2]

Select the Carrot, washing them Properly. After washing peeling the carrots & cut into small cubes. Then boil it into 500 ml distilled water till 60min. After that cool it at room temperature and filter it. Then collect the extract

2) Preparation of *Citrus Aurantium Dulcis* Extract: ^[2]

Select the Oranges, then wash it properly and then peeling the oranges. After that dried orange peel & prepare coarse powder in motar & pestle. Then 50 gm were macerated with using 250 ml solvent methanol after 72 hours filter it & collect the extract

3) Preparation of *Calendula Officinalis* Extract: ^[3]

Selection of flower, washing & dried in shade 4-6 days They were then coarsely powdered and extracted completely by cold maceration. The solvents used for maceration were petroleum ether, methanol and Ethanol (95%). After 72 hours Filter it & Collect the extract.

PHYTOCHEMICAL SCREENING ^[7]

1) Test for Alkaloid

Mayer's Test-

Take 2-3 ml of extract in that add few drops of Mayer's reagent then white precipitate is formed.

2) Test for Flavonoids

Lead acetate Test-

Take 2 ml of extract then add few drops of lead acetate solution then yellow colored precipitate is formed.

3) Test for Glycosides

Keller killani Test-

Take 2 ml of extract then add few drops of glacial acetic acid and add one drops of glacial acetic 5% ferric chloride solution after that add 1-2 drops of conc. Sulphuric acid it gives reddish brown colour appears at junction & upper layer appears bluish green.

4) Test for Tannins

Lead acetate Test-

Take 2-3 ml of extract then add few drops of lead acetate solution then yellow colored precipitate is formed.

5) Test for Carbohydrates

Molish Test-

Take 2-3 ml of extract then add few drops of alpha naphthol solution in alcohol and add 1-2 drops of conc. Sulphuric acid it formed violet ring at the junction of two liquids

6) Test for Triterpenoids

2 ml of extract then add 2 ml of chloroform & 1 ml of glacial acetic acid it gives reddish violet.

Table 1: Formulation Table ^[2]

Sr.no	Ingredients	Quantity	Category
1	<i>Daucus carota</i>	49%	Produces Glow & coldness effect on skin, treating death cell produces skin healing
2	<i>Citrus sentences</i>	49%	Antimicrobial, Antifungal, Antibacterial
3	<i>Calendula officinalis</i>	0.5%	Colouring agent
4	Xanthum gum	1%	Gelling agent
5	Propyl paraben	0.5%	Preservatives

Preparation of Polyherbal gel ^[2]

Herbal gel was prepared using gelling agent Xanthum gum. The quantity of Carrot & Orange peel extract is added as given in the table. The gel was stirred for sufficient time for homogeneous mixing of extract in gel base. After mixing add Coloring agent & Preservative to the prepare gel. The prepared gel was fill in suitable container. Prepare formulation stored at a cool and dry place.



Fig: Preparation of Polyherbal gel

Evaluation Test

1) Morphological parameter

The colour, odour, texture, consistency & Homogeneity are checked visually.

2) Physicochemical Evaluation

A) Washability:

This test is performed directly on skin, the prepared sunscreen applied on the skin and then washed with Normal water. After washing clear & clean skin observed.

B) Spreadability: ^[22]

Small amount of sample placed between two glass slides and 100 gm wt is kept on the slide after that measures the time when gel is spread on slide and then length of gel spread on slide is measured. Spreadability was calculated by formula,

$$S = (M \times L) / T$$

C) pH Determination: ^[1]

The pH meter was calibrated by using standard buffer solutions. Take 0.5 gm of the gel and dissolved in 50 ml distilled water and measure the pH by using pH meter.

D) Grittiness: ^[2]

The formulation was evaluated microscopically for the presence of any undesirable particular matter which was seen under microscope.

E) Extrudability: ^[2]

It was determined using Tube filled with gel, having a tip of 5 mm opening and by measuring the amount of gel that extruded through tip after applying pressure.

F) Skin irritancy Test: ^[6]

Skin irritation test is performed for checking Redness, irritation, swelling and inflammation after applying formulation on skin. This test is performed with interval of 24 hours and report it.

G) Viscosity: ^[6]

Viscosity of gel was measured using Brookfield viscometer (Brookfield viscometer RVT) with spindle number 7.

3) Stability study

The prepared polyherbal gel was filled in collapsible tubes & these are stored in different humidity condition at different Temperatures. Namely 25±2°C/60±5%RH, 30±2°C/65±5%RH, 40±2°C/75±5%RH for a period of 3 months. Studied for pH, appearance, colour, odor, Texture, Consistency. For Stability Study ICH guidelines were followed.

4) Determination of Antibacterial & Antifungal activity: ^[4,7]

For Antibacterial study *Staphylococcus aureus* Bacteria & For Antifungal studies *Candida albicans* fungi is used. Weight 2.4 gm Nutrient broth & 5 gm agar in 100 ml distilled water. After that prepared media was autoclaved at 121°C and 15 lb pressure for 15-20 minutes. Then prepare 0.2 ml Fungal & Bacterial suspension having a uniform turbid solution. Prepare agar was poured in petriplate & kept for solidification. Bacterial & Fungal solution poured into petriplate. For incubation Fungi is kept 48 hours at 27°C & Bacteria is kept 24 hours at 37°C. Then with the help of hi-antibiotic zone scale zone of inhibition was calculated.

III. RESULTS AND DISCUSSION

Preformulation studies of Extract

By performing the preliminary phytochemical analysis. Detect presence of various chemical constituent by performing chemical organic confirmatory test for alkaloids, flavonoids, tannis triterpenoids, glycosides and Carbohydrates was carried out using standard procedure.

Table 2: Preliminary phytochemical test

Sr.no	Test	D. Carota	C. Sinesis	C. Officinalis
1	Alkaloid	+	+	+
2	Flavonoids	+	+	+
3	Tannins	+	+	+
4	Triterpenoids	+	+	+
5	Glycosides	-	+	-
6	Carbohydrates	-	-	-

Morphological Evaluation

Herbal Topical gel was evaluated for morphological parameters. The colour of formulation was yellowish. The odour of prepared formulations was pleasant and good acceptable. Texture and Consistency were acceptable as per requirement of cosmetic formulations.

Table 3: Morphological Evaluation

Sr.no	Parameters	Observations
1	Colour	Yellowish
2	Odour	Characteristic
3	Texture	Smooth
4	Consistency	Good

Physicochemical Evaluation

Herbal Topical gel was evaluated for physicochemical parameters showed in the Table The pH of formulation was found close to neutral.

Table 4: Physicochemical Evaluation

Sr.no	Parameters	Observation
1	Washability	Easily Washable
2	Spreadability	27.43
3	PH	6.56
4	Grittiness	No greety particles
5	Extrudability	Good
6	Irritancy test	No irritation
7	Viscosity	4520

Stability Studies

The results of stability were shown in Table. No change in colour, odour, Texture pH and smoothness was observed. The stability studies showed a slight change in pH of formulation at 40°C.

Table 5: Stability Studies

Sr.no	Parameters	At room temp	At 40°C
1	Colour	Yellowish	Yellowish
2	Odour	Characteristic	Characteristic
3	Texture	Smooth	Smooth
4	Ph	6.53	6.48
5	Consistency	Good	Good

Microbial Assay

The antibacterial activities were evaluated by measuring the zones of inhibition (in mm). The results of evaluation are shown in table.

Table 6: Microbial Assay

Sr.no	Organisms	Zone of inhibition (in mm)
1	Staphylococcus aureus	8mm
2	Candida albicans	10mm



Fig: Zone of inhibition
Shown by
Staphylococcus aureus



Fig: Zone of inhibition
Shown by
Candida albicans

IV. CONCLUSION

Skin problems such as antibacterial, antifungal infection & acne as commonly faced by teenagers and people in age group between 20-30 years. the products associated with these diseases such as face wash, creams, gel etc. are in great demand. In the present study was formulation & evaluation of antibacterial & antifungal topical gel which contain naturally available ingredients like orange peel & carrot. Prepare formulation was physicochemical and microbiologically stable it shows smooth texture, good pH, consistency & stability. Prepare Polyhedral topical gel was used for antibacterial, antifungal acne & other allergic condition like rashes, irritation & gives glow & coldness effect to the skin.

ACKNOWLEDGMENT

We excess our thanks and gratitude to Trustee of Samarth Rural Educational Institute's and Samarth Institute of Pharmacy, Belhe with their valuable guidance and support.

CONFLICT OF INTEREST

The author declared no conflict of interest.

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