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**FORMULATION AND EVALUATION OF HERBAL MEDICATED OINTMENT
AND SCRUB FOR ITS ANTI-INFLAMMATORY, ANTI MICROBIAL AND ANTI
ACNE PROPERTIES**

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ABSTRACT

Objective -The purpose of this work was to develop and explore the correct method extract of *S.Aqueum* topical Ointment and scrub, which has anti-inflammatory and antimicrobial properties. **Method**-Using the soxhlet extraction method; fresh fruit water apple extract was created. The antibacterial activity was assessed using *Staphylococcus aureus* as the test organism. The water apple extract was tested for its physiochemical and antibacterial, anti-inflammatory, and anti-acne properties when it was formulated into a herbal medicated scrub and a herbal medical Ointment. **Result** -The Ointment and scrub formulations have a pH range of 7.2 and 4-6, respectively. Both of the herbal treatments were well-suited for washing. The single bacteria (*S.cocci*) that was employed was scrub-sensitive, notwithstanding a modest difference in their zones of inhibition. After preservative (honey) was added to the scrub, the sensitivity issue was resolved. **Conclusion** -As water apples, sometimes referred to as rose apples or watery rose apples, they are a veritable treasure trove of trace elements, important micronutrients, and strong antioxidants. In addition to being extremely helpful in treating various conditions including diabetes and heart disease, they also transmit positive attributes that improve both physical and mental health.

Keywords: Herbal Ointment, Anti microbial, Anti inflammatory, anti acne, therapeutic properties

INTRODUCTION

Ointment is an emergent and promising drug delivery system used nowadays in the pharmaceutical industry. As a novel transdermal drug delivery tool, the applications of Ointment have increasingly been used due to their unique characteristic properties and benefits over other oral and topical drug deliveries to avoid poor drug bioavailability and pharmacokinetic variations [1]. Herbal plants are a great source of both traditional and contemporary medicine, and they are helpful for the primary healthcare system. The idea of delivering medication through the skin is encouraging because to its accessibility, broad surface area, extensive exposure to the lymphatic and circulatory systems, and treatment's protective qualities. A dosage form made of plants and their extract is referred to as herbal medicine, and it is intended to meet specific nutritional, cosmetic, and other medical requirements. A sign of contemporary medicine and medication development is herbal medicine. Eighty percent of people in affluent nations get their primary healthcare from traditional plant-based medicines, according to the World Health Organization. The main issues with synthetic medications include drug resistance, side effects, and high treatment costs. A Ointment can be made in

place of the alternative formulation, such as herbal medicine. These Ointments refer to a viscous, semi-solid substance that is applied topically to the skin and mucous membranes of the body. Plant extracts provide remarkable therapeutic options to manage different disease conditions due to their various pharmacological activities such as antioxidant, anti-inflammatory, anti-cancer, antibacterial, etc. Medicinal components are suspended or emulsified in the Ointment base to create medicated Ointments. As a result, Ointment bases can come in a variety of forms, such as water soluble hydrocarbon absorption bases [1]. A face or body scrub is a type of cosmetic, beauty product, or therapy that exfoliates and cleans the skin. Scrubbing your face can help get rid of debris, dead skin cells, oil, sebum, and black and whiteheads. It aids in preserving the appearance of skin. There exist three distinct categories of skin types: greasy, sensitive, and dry. Use the face scrub, which has hydrating and moisturizing components, if you have dry skin. A mild scrub should be used if the person has sensitive skin. Additionally, the person with oily skin uses an exfoliant, which helps to regulate oiliness and avoids breakouts, dullness, and pimples [6, 7, 8]. The luscious, little water apple is shaped like a bell. It has

white flesh and a rose-scented aroma. It is glossy, pink to crimson in color, and has a sweet, mild acidic taste. *Syzygium aqueum* is the scientific name for the delicious water apple, which is a member of the Myrtaceae family of plants. The water apple plant thrives in all tropical regions of Southern Asia and Africa, including India and Thailand. It is endemic to Indonesia and Malaysia. Apples used in water are categorized as fruits. Because they contain a high concentration of vital nutrients, they were utilized in traditional and folk medicinal systems. Malabar plum, plum rose, and rose apple is some common names for water apples. Vital elements including vitamins, minerals, fiber, carbs, and proteins can be found in water apples. Because of its high water content (around 90%) and low fat and calorie content, water apples are low calorie fruits. The water apple has a number of bioactive substances that may exhibit a range of biological characteristics that could be advantageous to human health [2, 3, 4].

Uses of water apple-

- By aiding in the body's detoxification of toxins, water apples may be useful in the treatment of liver ailments.
- The water apple's antimicrobial properties could aid in the fight against microorganisms that cause infections.

- The water apples with salt may be able to ease intestinal and stomach pain.
- Water apples provide antioxidants such as vitamin C and vitamin A. That could be useful in lessening skin dryness.
- Potassium is present in water apples in reasonable amounts. It might improve muscle strength and reduce cramping brought on by low potassium levels in the muscles.
- The fruit's vitamin C may strengthen the immune system and increase the blood's production of white blood cells [5].

Materials and techniques:

Sample Gathering:

The fruits of the Water Apple (*S. Aqueum*) were gathered from a reliable source in village area of Ahmednagar Maharashtra, India. After being carefully cleansed with twice as much distilled water, the harvested fruits were allowed to dry in the shade. After the fruits had dried completely, they were ground into a powder and kept for later research.

Preparing the extract:

The gathered fruits were meticulously cleaned using two pure water. Subsequently, the fruit was ground into a paste. The paste is then thinly applied to dry in the shade of the sun. After that, the dried paste was extracted using

the soxhlet extraction process, which involved seven days and an 80:20 ethanol to water ratio. After that, the extract is gathered. The right amount of weight is calculated [10].

Making herbal medicinal Ointment:

- White soft paraffin was used as the foundation for the herbal medicinal Ointment.
- The herbal extract's pH was changed.
- Melt the specified amount of white soft paraffin in a water bath at a temperature between 46 and 68 degrees Celsius separately.
- Melt the specified amount of polyethylene glycol on a water bath in separate portions.
- Melt the polyethylene glycol and thoroughly mix it with the white, soft paraffin.
- Mix thoroughly after adding the herbal extract and liquid paraffin.

- Fill a wide-mouth container with the formulation and label it appropriately. Formulation needs to be kept dry and cold [11-14].

Materials and techniques:

Technique for making the herbal scrub:

- The base ingredients of the herbal medicated scrub are the extract and fuller's earth.
- Take the necessary amount of Earth's fuller.
- Pour in the necessary amount of glycerine.
- Add the necessary amount of a herbal extract using the recipe provided.
- Incorporate rose water into the herbal scrub.
- To achieve a homogeneous consistency, fully combine it.
- Then move it into a well closed container.
- Keep it somewhere dry and cool [9].

Table 1: Composition of Herbal Medicated Ointment:

Sr.no	Ingredients	Quantity (20 gm)
1	Water apple extract	0.4 gm
2	Polyethylene glycol	5.6 gm
3	White soft paraffin	10 gm
4	Liquid paraffin	4 ml

Table 2: Composition of Herbal Medicated Scrub:

Sr no	Ingredients	Quantity (10gm)
1	Water apple extract	2 gm
2	Fuller's earth	5 gm
3	Glycerine	3 ml
4	Rose water	q.s

Physical parameters –**Colour and Odour-**

Visual examination was used to assess physical characteristics including color and smell.

PH-

Using a digital pH meter, the prepared herbal Ointment's pH was determined. After making the Ointment solution with 100 milliliters of distilled water, it was left for two hours. The solution's pH was measured three times, and an average value was computed.

Spredability-

By sandwiching an excess of sample between two slides that had been squeezed to a uniform thickness using a specific weight for a specific

amount of time, the spread ability was ascertained.

Formula for calculating Spreadability is-

$S=M \times L / T$ S = Spreadability, M= Weight tide uphill on the slide, L= Glass slide length, T= Duration of slide separation.

LOD -LOD was ascertained by drying the formulation at 105°C in a petridish set over a water bath.

Wash ability-

After applying the formulation to the skin, the ease of washing with water was assessed.

Non-Irritating Test-

A prepared herbal scrub and ointment were applied to a human's skin, and the results were monitored.

Table 3: Physical parameters

Sr.no	Physical parameters	Observation	
		Ointment	Scrub
1	Colour	Pale white	Yellowish brown
2	Odour	Characteristic	Maple syrup like, sweet
3	pH	7.2	4-6
4	Spreadability	Uniform	Uniform
5	Washability	Good	Easily washable
6	Loss on drying	3.40 %	2.85%
7	Non irritancy	Non irritant	Non irritant

Antimicrobial activity –

The necessary amount of agar was made; After that, the agar solution was added to the petri dishes and left to solidify for a little while using a boarer, the necessary size of bores was created after solidification. Subsequently, it was filled with the produced Ointments (varying in concentration). A laminar air flow

chamber with aseptic conditions was used for the entire process. The petri plates were now put in an incubator to allow the microorganisms to develop for a full day. The produced Ointment's antibacterial activity was assessed by checking the zone of inhibition after a 24-hour period [18, 19].

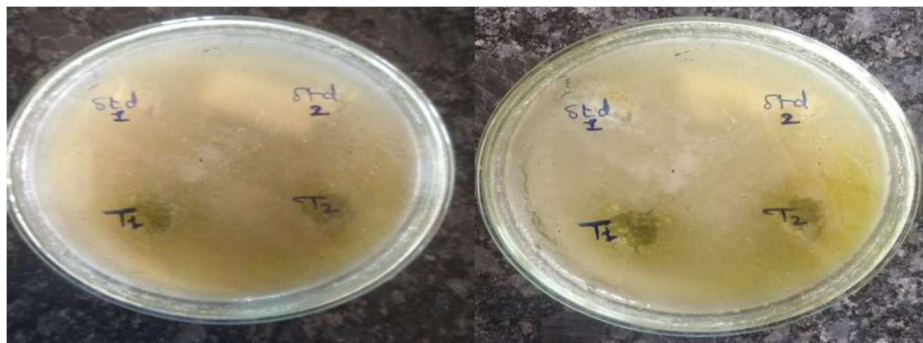


Figure 1: Antimicrobial activity

After evaluation it was observed for zone of inhibition. No growth was observed in Test sample.

Animal study –

After receiving approval from IAEC and prcop, loni under Approval No. proposal no.1942/PO/Re/S/17/CPCSEA/2024/06 animal research is carried out as follows.

Skin Irritation-

Wistar rats were used in a skin irritation test to see whether applying *Syzygium aqueum* Ointment may cause skin irritation. Before the study started, the rats were given seven days to get used to the surroundings. Four hours prior to the experiment, the rats' dorsal surfaces were rendered hairless without endangering the skin's surface. The rats were split up into three groups, with three rats in each: Group 1 received treatment with a 0.8% v/v formalin aqueous solution, Group 2 received a placebo gel, and Group 3 received *Syzygium aqueum*. The formulations were

applied topically to the 1 cm² area of hairless skin, and the region was checked for dermal responses, including erythema and edema, at 24, 48, and 72 hours. Based on the degree of severity brought on by the application of formulations, the mean scores for erythema and edema were recorded as follows: 0-no erythema/edema, 1-slight erythema/ 5 edema, 2-moderate erythema/edema, and 3-severe erythema/ edema.

Species & Strain: Albino Wistar rats

Total Numbers of Animals required: - 18 rats

Gender: Male/Female.

Body wt.: 250-300 g

Skin Irritation test

Group 1: (Control): Treated with 0.8% Formalin)

Group 2: (Standard): Received Placebo Ointment)

Group 3: (Treated with *Syzygium aqueum*-loaded Ointment)

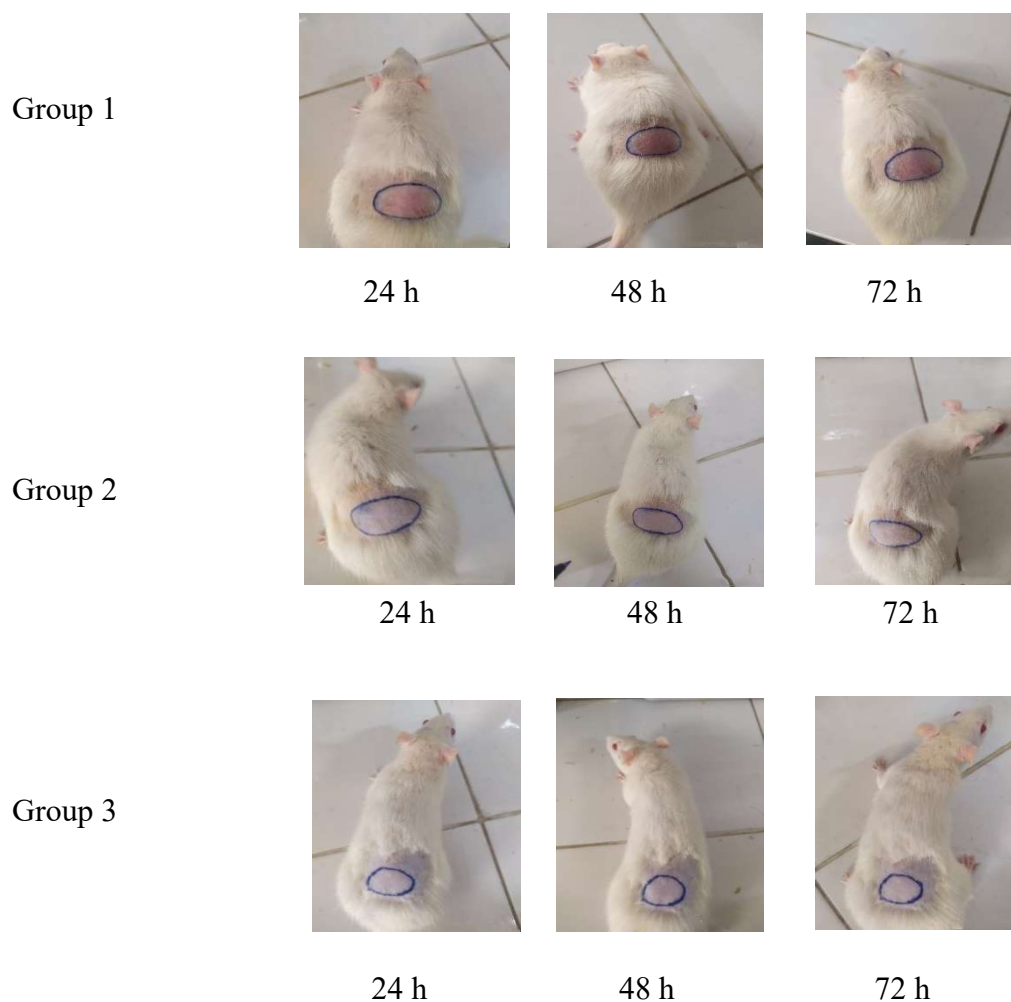


Figure 3: In Vivo Skin Irritation test of group 1- formalin solution; Group 2, Placebo gel; Group 3- Treated with *Syzygium aqueum*- loaded Ointment. Images taken after 24, 48, and 72 hours of applying the formulations

The Images indicates that the formulation do not exhibit any symptoms of skin irritation, such as erythema and edema. In group

formalin causes redness in skin, further two shows that's no irritation occur.

No. of Groups	No. of Rats
Group 1-Control	6
Group 2 -Standard	6
Group 3 -Treated with <i>Syzygiumaqueum</i> Ointment	6
Total	18

Anti inflammatory activity:- In vivo study
9 animals were used in the study to examine the anti-inflammatory properties of a herbal medicinal Ointment, with three animals used

for each of the three groups (control, standard, and test).

Steps:

- Weigh each of the nine animals first.

- They were marked for test, control, and standard on the head, body, and tail.
- Next, administered carageenan (1 percent) intravenously to the hind paw as an inflammatory agent.
- Apply prepared herbal medicated Ointment and standard marketed Ointment to test and standard animals, respectively, after induction of inflammation.
- Take note of it.
- Using a digital vernier caliper, evaluate and quantify inflammation every thirty minutes.
- It is been seen that in step second inflammation occurred, step 4, 5, 6 shows decreased in paw size.



Figure 2: Before and after inflammation

RESULT AND DISCUSSION

When the anti-inflammatory activity was applied to animals, it was noted that the animals' inflammation decreased and that the prepared substance worked well as an anti-inflammatory agent

To assess the relative antibacterial potential of the Ointment and scrub Standard, an anti-

inflammatory and antimicrobial control was developed. (Diclofenac). Nutrient agar I.P. composition and the cylinder plate method were used.

Animal Testing for Anti-inflammatory Activity

Control

Test Animals	Normal paw size (mm)	Carageenan induced	After 30 min	60 min	90 min
Head	5.41	6.25	6.23	6.07	5.7
Body	4.03	5.77	5.65	5.51	5.31
Tail	4.09	4.80	4.72	4.53	4.37
H+B	3.73	5.48	5.3	5.24	5.09
B+T	5.22	4.66	4.58	4.49	4.22
H+T	3.10	6.21	6.02	5.89	5.61

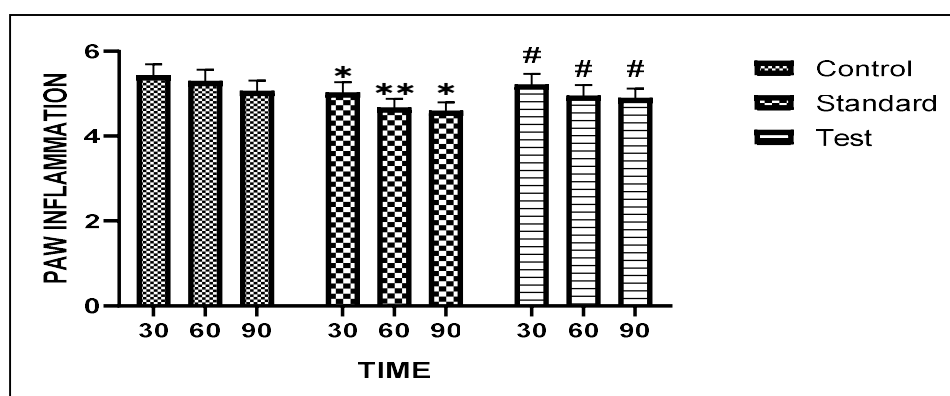
Test

Test Animal	Normal paw size (mm)	Carageenan induced	After 30 min	60 min	90 min
Head	4.59	7.36	6.03	5.91	5.9
Body	5.17	6.20	5.58	5.37	4.92
Tail	4.20	7.08	4.48	4.25	4.15
H+B	3.52	4.30	5.18	4.78	4.76
B+T	3.90	6.60	4.45	4.26	4.53
H+T	3.17	5.38	5.5	5.05	5.03

Standard

Test Animal	Normal paw size (mm)	Carageenan induced	After 30 min	60 min	90 min
Head	5.18	6.20	5.8	5.51	5.42
Body	4.21	5.70	5.5	4.9	4.81
Tail	3.30	4.60	4.25	4.1	4.08
H+B	4.17	5.40	5.1	4.49	4.43
B+T	3.80	4.60	4.32	4.1	4.03
H+T	4.48	6.17	5.12	4.85	4.71

ANOVA Test:-



Bar graphs are used to display the quantitative data distribution by indicating the frequency of a particular category. There are nine bars in

all, with three bars in each group. As seen in the graph, each distinct group represents a particular piece of information and serves as

the control, standard, and test groups. Symbol * represents the value $P < 0.05$ and Symbol represents the value $P < 0.07$. Hence according to graph, experimental data is reliable

CONCLUSION

When applied to the body, the herbal Ointment of *Syzygium aqueum* does not cause irritation. Studying the results reveals that it passes the irritancy test. The study's findings support the notion that the herbal anti-inflammatory and anti-microbial topical formulation significantly reduced both inflammation and microbial growth, respectively. This finding may explain why the plant is traditionally used to treat microbial infection and inflammation. This study suggests that topical preparations made of compounded herbs could be used as anti-inflammatory medicines. The finished product applied to skin with ease and remained stable at different temperatures. Rose apples, sometimes referred to as watery rose apples or water apples, occur found Truth, a treasure trove of vital Dietary components and trace minerals And strong antioxidants. Therefore, Above all, it is essential to recognize the importance of nutrition Principles and incredible wellness Incentives provided by water apples for general well-being. *Syzygium aqueum* having many nutaceutical propoities so having future scope to more formulation

and activity like antioxidant, anticancer, antidiabetic and their complications.

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