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Formulation And Evaluation Of Anti-Acne And Vit.C Soap Containing Citrus Sinensis Peel

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ABSTRACT

Objective: The objective of this research was to formulate and evaluate a soap containing orange peel extract.

Methods: The present work emphasizes the advancement in the technique required for the extraction of orange oil from orange peel. The orange oil and the remaining parts of the cake as a powder from the peel are further used in the manufacture of soap. Furthermore, the prepared soaps were evaluated for skin irritation test, user satisfaction test, improvement of skin color level and effectiveness test using mexameter®. The result of this work showed that sweet orange peels are an extraordinary source of orange oil. Evaluation studies showed that none of the volunteers experienced skin irritation during the test period. The volunteers were highly satisfied with the texture and moderately satisfied with the scent of the orange peel soap. Additionally, the absorbable, scrubbing and moisturizing feel of the scrub soap was top notch. The results showed that the orange peel soap was more effective in improving skin color (variable level = 1.15±0.93) than the soap base (variable level = 0.70±0.64. Orange oil and orange peel are used to acne treatment, against acne). aging and also for radiant skin.

Key Word: Anti acne, orange peel, orange oil, Soap evaluation.

Introduction:

The orange, especially the sweet orange (Citrus sinensis), is the most commonly cultivated tree fruit in the world. Orange trees are generally grown in tropical and subtropical environments for a sweet natural product that is stripped or sliced (to remove the bitter peel) and eaten whole or processed for orange juice extraction and also for the fragrant peel. Economically, citrus fruits are the best in total production. Orange fruit is the best source of vitamin C, which is also useful for well-being and healthy skin. However, the vast majority of the benefits of an orange are in its peel itself. Citrus fruits stand out for their aroma, partly due to the flavonoids and limonoids (which are terpenes) contained in the peel, and most of them are full of juice. The juice contains a large amount of citrus extract, which gives them their distinctive sharp taste. The health benefits of orange essential oil can be attributed to its antispasmodic, antiseptic, anti-inflammatory, antidepressant, narcotic, carminative, tonic, diuretic and cholagogic properties. Orange essential oil is germicidal and anti-inflammatory, making it an ideal ingredient

for skin and hair. This oil is not just for acne-prone skin, but has been shown to increase ascorbic acid absorption, collagen synthesis, and blood circulation, all of which are essential for anti-aging. The rich nutrients and antioxidants found in orange peel prevent your skin from becoming too oily or dry. When applied to the skin, it also acts as a toner, removing dead skin and impurities and tightening pores. Oranges are a phenomenal source of vitamin C and are extremely beneficial for the skin. The enzymes present in the orange peel remove dead epithelial cells and deeply cleanse the skin. Rubbing helps speed up natural cell renewal, making skin fresher and more youthful. Orange peel powder helps reduce dark spots and blemishes. Orange peel is a natural bleaching agent that helps reduce dark spots on the skin and fade them away over time. It also leads to skin firming and prevents premature skin aging by restoring collagen in the body. Orange peel is said to be beneficial for the face and healthy skin as it treats clogged pores, dead cells, skin inflammation, pores, imperfections, dark circles, dry skin and brightens your face. It can also be used with milk or cottage cheese for extra shine or to remove tan. Orange oil is available in a ductless gland present in the peel of orange fruits. D-Limonene (around 90%) is the main component of orange peel essential oil, which is the main hydrocarbon present. D-limonene is extracted from orange peels or solids. The skins and mash are sent to the evaporator and the dlimonene is evaporated. It is widely known for its pleasant fragrance and degreasing properties. D-limonene is currently used in many applications, such as replacement of chlorinated solvents, hand cleaners and wastewater treatment. The orange processing industry can be completely transformed if due importance is given to extracting the useful ingredient from the orange peel. Researchers and scientists highlight the separation of orange peel oil and its potential benefits for the skin. The aim of this study was to prepare soap from orange oil and orange peel. Orange, also known as santra or naranga, is a well-known fruit. We all know that orange is rich in vitamin C and has several health benefits. Let's take an in-depth look at how enjoying a glass of fresh orange juice or chewing on some of these delicious slices can help and protect our body from various diseases.1,2 Santra/naranga is a round citrus fruit. It is orange in color, just like its flesh, and has a soft skin.

The botanical name of the orange tree is Citrus sinesis and it belongs to the Rutaceae family. More than 130 countries grow oranges, including Spain, China, USA, UK, Holland, Brazil, India, Germany, France, etc. There are many varieties of oranges such as Citrus aurantium, Citrus grandis, Citrus tangerine, Citrus aurantifolia and many others.

The entire orange plant has been used for thousands of years for its potential benefits. The vernacular names of the orange are kamla, musambi, nembu in Bengali; naranga in Oriya; nagarukam in tamil; naranga, kittalu in Kannada; nagaranga in Malayalam; mosambi in Marathi; Malta in Punjabi; santra, naringi in Gujarati.1 Traditionally, orange has been used for spasms, constipation, diarrhea, colic, cough, colds, bronchitis, depression, anxiety, stress, anxiety, hypertension and angina. According to the WHO (World Health Organization), citrus fruits reduce levels of homocysteine (an amino acid) and can protect the heart from heart disease. Orange contains components such as vitamin C, flavonoids, and carotenoids that may act as heart-protecting substances. Orange peel contains PMF (polymethoxylated flavones), which can help lower cholesterol. To enjoy its potential cholesterol-lowering benefits along with its tangy flavor, you can grate some orange peel into foods like soup, salad, rice, yogurt, and flavor your tea.1 However, more studies are needed to support its use for human heart health. . Therefore, if you are suffering from any heart condition, you must consult your doctor before using any natural remedies. Orange contains limonene, one of the main components that has been reported to reduce the risk of skin, mouth, breast, lung, colon and stomach cancer. The anticancer activity of orange depends on its antioxidant activity1. Therefore, eating oranges can reduce the risk of cancer. However, it is recommended to consult your doctor before using oranges or any other fruit as a medicine Studies have shown that regular consumption of orange juice reduces the incidence of Helicobacter pylori (a bacteria) infection that causes stomach ulcers. Enjoying a glass of fresh orange juice daily may have some effect on the development of ulcers.1 If you suffer from ulcers, you should still follow your doctor's advice and avoid using any fruit or herb without consulting your doctor. Orange peel (Santra) contains bioflavonoids (vitamins) that may exhibit blood glucose-lowering activity. The peels have been tested on diabetic animals where they have been found to regulate the glucose

regulating enzyme, which may be helpful for people with diabetes. Both orange juice and peel can help convert complex carbohydrates into glucose, stimulate insulin secretion, have some effect on increasing the glycogen content of the liver, and correct secretory defects in the pancreas.1 If you suffer from diabetes, you must strictly follow your doctor's recommendations and treatment. Consult your doctor before using oranges or any fruit for diabetes. The bacteria, Salmonella typhi, causes typhoid fever. Certain components found in oranges, such as flavonoids (citbrasin, citacridone) and saponin, may have anti-typhoidal activity.1 However, typhoid is a serious infection and you should consult your doctor for appropriate treatment. Avoid using oranges or any fruit against typhoid before consulting your doctor first.

Literature Review

1. MARIA A. A. R. FONSECA*, AAKANKSHA N. KARPE, P. S. KEERTHI, RYAN MATHIAS MENDE . April 2019

For the preparation of soap in laboratory conditions using the fruit peels of Citrullus lanatus, Citrus citron, Citrus maxima, Carica papaya, Ananas comosus and Punica granatum., for monitoring the antibacterial properties and pH of the prepared soap and for studying the phytochemical content of the fruit peels. Homemade soap is prepared in laboratory using fruit peels. The antibacterial properties of the prepared soap were then tested using the disk paper inhibition method against Escherichia coli, Staphylococcus aureus and Staphylococcus epidermidis.

2. Larry R. Engelking, in Textbook of Veterinary Physiological Chemistry (Third Edition), 2015

Vitamin C (ascorbic acid), a water-soluble vitamin, is a cofactor in many enzymatic reactions, especially hydroxylases involved in collagen synthesis. Vitamin C is widely distributed in all tissues of the body in a concentration that is several times higher than in plasma [215].

3. Snehal Phadtare, March 11, 2021

Orange peel powder benefits your skin in many ways. Originally known for its healing properties and used in natural medicine, today it is often included in cosmetic products due to the essential oils it contains. It's often used in DIY face masks and scrubs, and there are many reasons why you should try it. Oranges are a great source of vitamin C. Vitamin C helps support collagen production. Orange peel powder helps with skin whitening, lightening, brightening, unclogs skin pores. It also helps fight acne and acne scars.

4. Ashlesha Ghanwat ,Sachin Wayzod

The herbal soap and hand sanitizer was formulated using the leaf and bark extract of Azadirachta indica, Ocimum tenuiflorum, Sapindus mukorussi and Acacia concinna powder. Ayurvedic cosmetics is also known as herbal cosmetics, the natural content of herbs has no side effects on the human body[5] most herbal supplements are based on several botanical ingredients with a long history of traditional or folk healing. Among the numerous botonic ingredients available on the market today.

5. Malikarjun vasam , Satyanarayana Korutla ,Raghvendra Ashok Bohara

Worldwide, Acne vulgaris is a widespread chronic inflammatory disease of pilosebaceous follicles. Acne is not fatal, but depending on its severity, it can leave the sufferer with scarring, irritation and significant psychological effects (including depression). In the current review, we have included various factors of acne and explained their treatment.

6. Mansour Golmohammadi ,Mohammad J.Taherzadesh Nov.5 2018

In this work, a new extraction process using steam explosion at high temperature and pressure was developed to significantly reduce the extraction time and improve the extraction of essential oil from citrus peels. In the steam explosion process, the material is exposed to high- pressure saturated steam, which is followed by a substantial reduction in pressure through a corner valve into a vacuum tank.

7. Jae-Hee Park, Minhee Lee, and Eunju Park 2014 dec 31

The aim of this study was to investigate the antioxidant activity of orange (Citrus auranthium) pulp (OF) and peel (OP) extracted with acetone, ethanol and methanol. Antioxidant potential was investigated by measuring total phenolic content (TPC), 2,2-diphenyl-1-picrylhydrazyl (DPPH) radical scavenging activity (RSA), total radical scavenging antioxidant potential (TRAP), oxygen radical absorption capacity (ORAC and cellular antioxidant activity (CAA) The comet assay was used to determine the protective effects of OF and OP against H2O2- induced DNA damage.

Anatomy And Physiology of Skin

➢ Physiology of Skin: -

- **Skin:- The Largest Organ**

The skin is the largest organ of the body which covers approximately 2 sq. m surface area of body. It is the permeability barrier against the transdermal absorption of various chemical and biological agents. The skin has the thickness of about 2.97-0.23mm.

- **Function of skin:-**

Separates the blood circulation network from the outside environment. Serves as a barrier against physical, chemical, and microbiological attacks. Maintain body temperature
Regulate body pressure

Protects against the penetration of UV rays

- Anatomy of skin

The human skin is categorized into three layers:-

1. Epidermis
2. Dermis
3. Hypodermis

1. Epidermis

Epidermis is the self-renewing stratified squamous epithelium covering entire outer surface of the body. It is composed of two parts: living or viable epidermis and dead cells.

Epidermis is classified into five layers:

- **Stratum corneum:** This is the outermost layer of skin also called as honey layer. It is approximately 10 mm thick when dry. it is consist of cells called as corneocytes. Corneocytes are made up of keratin protein.

- **Steatum licidum:-**This layer present only tough skin. It helps to reduce rubbing. It minimizes **shear** power between the stratum corneum and stratum granulosum.

- **Stratum granulosum**:- This is granular layer, the cells in layer have vanished cores. In this keratin proteins and water proofing lipids layer are created and ordered.

- **Stratum spinosum:** The cells which enter in stratum spinosum then they are alter to polygonal from columnar. At that time, cells start to produce keratin.

- **Stratum Basale:-** IT is base layer in epidermis. It is responsible for constantly recharging cells of epidermal layer. It contain one layer of columnar branch cell.

2. Dermis: -

Dermis is the 3 to 5mm thick layer just beneath the epidermis. Dermis is composed of a matrix of connective tissues. It contains blood vessel, lymph vessels and nerves.

It provides nutrients and oxygen to the skin. It is middle layer and present in between the epidermal and hypodermal layer of skin. It is 4 times thicker than epidermis. It is subdivided into:

A. Shallow region

B. Profound thicker region Cell of dermis :

Keratbuilt- inocytes Melanocytes Langerhans' cells Merkel's mobile Keratbuilt-inocytes

3. Hypodermis:

The Hypodermis or subcutaneous fat tissue supports dermis and epidermis. It is an fat storage area. It help o regulate temperature, provide nutrition and mechanical protection It contain large veins, nerves and adipose cells. Hypodermis consist of cells which macrophages, adipocytes and fibroblasts.

Structure and function of skin

The built-in integrated has many functions. It serves as a barrier to water, built-invasion by way of microorganisms, mechanical and chemical trauma, and damage from UV light. The epidermal water barrier established by usbuiltintegrated the cell envelops, a layer of builtinsoluble prebuilt-ins at the built-inbuilt integrated floor of the plasma membrane. it's miles fashioned with the aid of go-lintegratedkbuilt-ing of small prolintegratede-wealthy proteintegrateds and larger protebuilt-ins like cystatbuilt-in, desmoplakbuilt-in, filaggrintegrated and contributes to sturdy mechanics of barrier. And the lipid envelope, a lipid/hydrophobic layer attached to the outer floor of the plasma membrane.

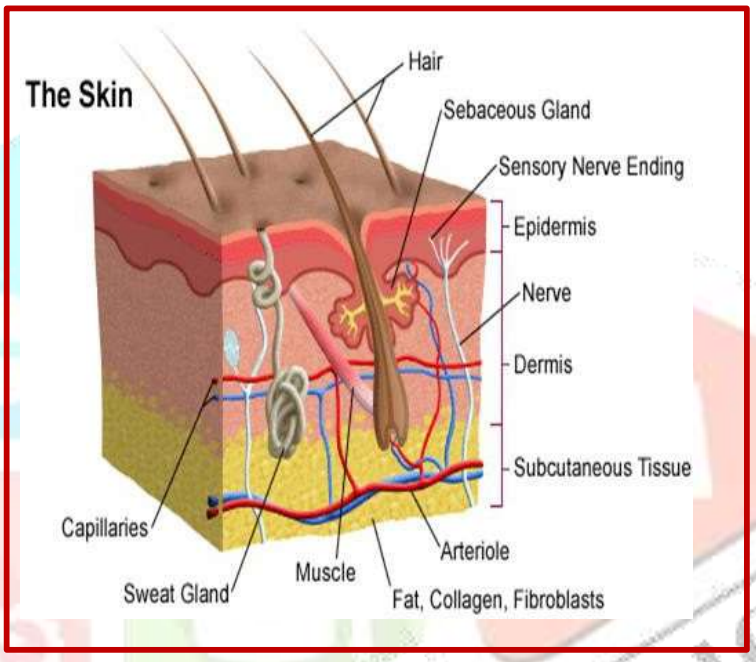

Fig.no 1 Skin Anatomy

Mechanism of Acne:

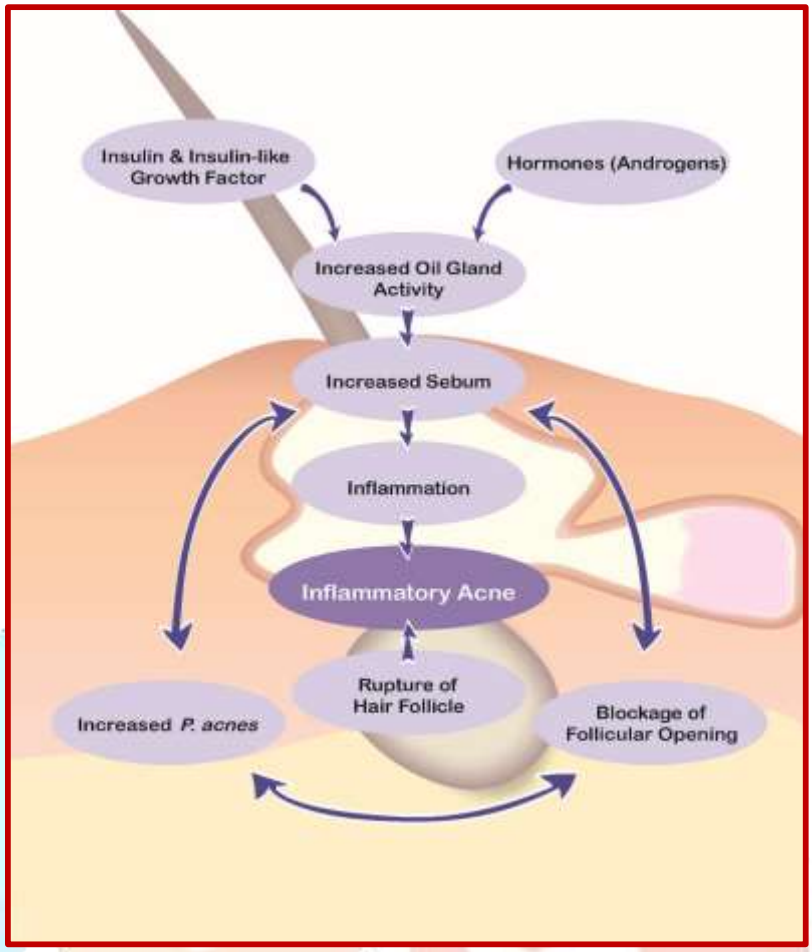

Table no. 1 Mechanism of acne

The use of orange peel for other activity:

Hypertension, cancer, heart disease and diabetes are closely related to dietary habits. Functional foods have recently gained popularity because they can reduce the incidence of these diet-related diseases (1). Epidemiological studies strongly suggest that foods containing phytochemicals, such as antioxidant-rich fruits and vegetables, have protective effects against disease (2). Consumption of fruits and vegetables prevents degenerative processes caused by oxidative stress (3,4).

Orange, which is consumed worldwide, is an important source of vitamin C and polyphenolic compounds (5). Imports of oranges into South Korea have increased since the free trade agreement between South Korea and the United States took effect. In 2012, 115,500 tonnes of oranges were imported into South Korea, which was 39,900 tonnes more than the amount imported in 2010 (6).

The main phenolic compounds present in oranges include hydroxycinnamic acids (HCAs) and flavonoids, of which flavanones are the most abundant (5). Citrus flavonoids, especially hesperidin, have a wide range of therapeutic properties, including anti-inflammatory, antihypertensive, diuretic, analgesic, and hypolipidemic effects (7–10). The concentration of antioxidant components varies between different parts of an orange therefore, the antioxidant activity of orange parts can also change. In general, the skin of a fruit contains a higher concentration of antioxidants than the flesh of the fruit.

Due to the different antioxidant potential of compounds of different polarity in complex food samples, the results

of tests used to assess the antioxidant capacity of food samples are strongly influenced by the solvent extraction method used to prepare the samples (13). To the authors' knowledge, the antioxidant activity of orange pulp (OF) and orange peel (OP) extracts containing compounds with different polarity has not been reported. In addition, antioxidants may respond to different sources of radicals or oxidants in different ways. Because multiple reaction characteristics, mechanisms, and phase locations are usually involved, no assay can accurately reflect all radical sources and antioxidants present in a mixed or complex system.

Plant information:

Name	Orange peel
Scientific name	*Citrus sinensis*
Synonym	Orange cortex, Bigarade orange
Family	Rutaceae
Genus	Citrus
Kingdom	Plantae

Table No .2 Phytochemistry of orange

Orange Peel

Chemical constituent

- Limanene 90%
- Citral 4&
- Vit. C
- Pectin

- Hesperidine.

Uses

- Stomachic
- Aromatic
- Carminative
- Bitter tonic
- Antiacne
- Brightening skin

Morphology

- Colour: Dark orange reddish
- Test: Aromatic & slightly bitter
- Odour: Aromatic

The beneficial properties of orange:

- It may exhibit antioxidant activity
- It may exhibit anti-inflammatory properties
- It may have an anti-arthritic effect
- It may show anti-cancer activity
- It may show anti-ulcer activity
- It may show anti-typhoid activity
- It may show anti-anxiety activity
- May exhibit cardioprotective properties
- It may exhibit antibacterial properties
- May exhibit antifungal properties

- It may exhibit antidiabetic activity
- It may also exhibit larvicidal (insecticidal) activity
- It may have antiparasitic (kills parasites) activity
- It can help manage obesity
- It can help strengthen bones and manage osteoporosis
- It may exhibit relaxing properties
- May have sedative potential

Potential Uses of Orange for other diseases:

An orange a day covers 116% of the daily need for vitamin C. Vitamin C is essential for the proper functioning of the immune system and can help prevent repeated ear infections, coughs and colds. When orange juice is consumed without sugar and salt, it can reduce the severity of inflammatory diseases such as osteoarthritis, rheumatoid arthritis and asthma.1 A study in the British Journal of Nutrition reported that a woman who drank orange juice daily had a higher excretion of citric acid and the pH value of the urine, which reduces the risk of kidney stone formation.1 The roasted pulp of an orange is used to make a poultice that can be applied to skin diseases. In France and Italy, the dried flowers and decoction of the leaves are used as a heart protectant, antiemetic (treats vomiting and nausea) and antispasmodic (relieves muscle spasms). Fresh orange peels can be applied to acne and can also be used against fungal infections.1 However, it is important to consult a doctor or health care provider before using an orange for any medical condition.

Although there are studies that show the benefits of oranges in different conditions. However, these studies are insufficient and more studies are needed to determine the true extent of the benefits of oranges to human health.

Essential Oil preparation:

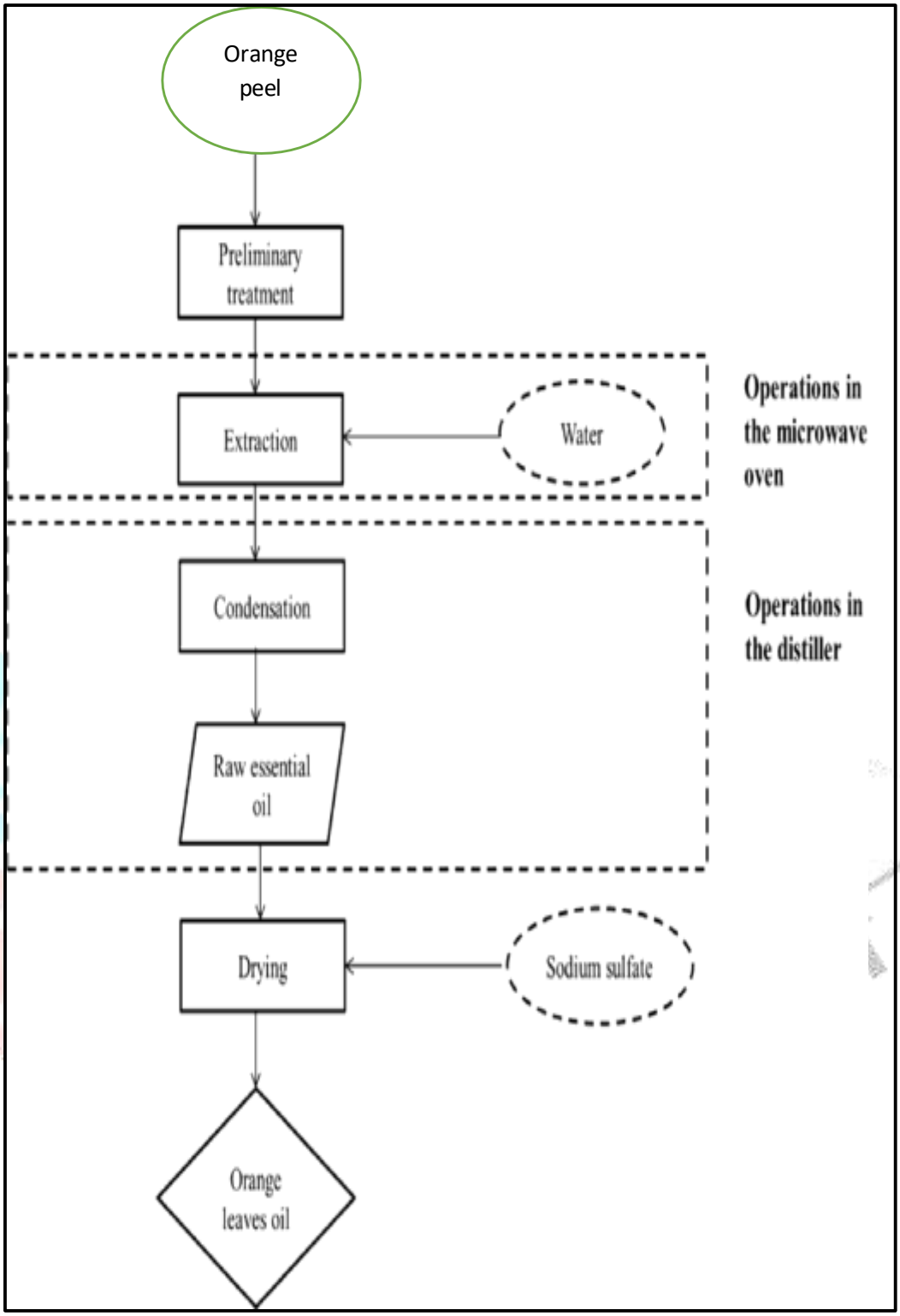

Table no 3 Process of essential oil

Fig no. 2 orange oil

Method And Preparation:

Anti –Acne Soap

Anti-acne is a treatment used to prevent the acne. It is help to reduce oil and get rid of dirt on the face. It clears up acne without stripping or irritating your skin, even as it prevent future breakout.

Formulation Chart

Sr. No	Ingredient	Use
1	Orange peel	API
2	Coconut Oil	Cleansing, moisturizing
3	Castor Oil	Antimicrobial
4	Caustic Soda	Saponification
5	Orange Oil	Perfume
6	stearic Acid	Lubricant
7	Glycerin	Humectant
8	Water	Vehicle

9	Alcohol	Solvent

Table No.4 Formulation Chart

Method And Preparation:

Preparation of Soap Base:

1. First weigh all ingredient accurately
2. Then take a clean beaker and add water and caustic soda then heat
3. After that in another beaker add oil and stearic acid as per given quantity and again heat for 10min. then cool solution.
4. After cooling add glycerin and alcohol then cool the mixture and add perfume and preservative

Fig3. Soap Base

Preparation of Soap:

1. Take a clean beaker then add 40gm prepared soap base and melt in water bath.
2. After that in melted base add 5ml orange oil and 5gm orange peel powder.
3. Mix the solution with continuous stirring. Then stop heating the solution,
4. Then stop heating the solution, cool slightly and transfer the solution in soap mold
5. Allow to solidify, for 24hr at room temperature
6. Take out the solid soap from the mold
7. Then stop heating the solution, cool slightly and transfer the solution in soap mold
8. Allow to solidify, for 24hr at room temperature
9. Take out the solid soap from the mold

Fig 4. Orange Peel Powder

Fig no. 5 formulation of soap

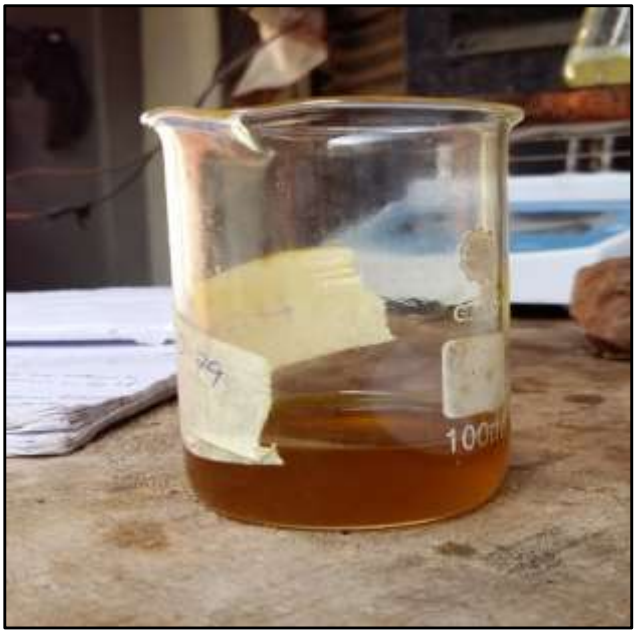

Fig. 6 Prepared Orange Oil

Fig 7 Final product

Formulation Table 1

Sr.no	Ingredient	Composition
1	Coconut Oil	40ml
2	Castor Oil	35ml
3	Orange Oil	5ml

4	Orange Peel Powder	5gm
5	Caustic Soda	2 gm
6	Glycerin	2ml
7	Water	Q.S.

Table no.5 Formulation 1

Formulation table 2

Sr.no	**Ingredient**	**Composition**
1.	Caustic soda	10gm
2.	Coconut Oil	70 ml
3.	Orange oil	50ml
4.	Orange Peel powder	3gm
5.	Stearic acid	30gm
6.	Glycerin	17gm
7.	Water	Q.S.

Table no.6 Formulation 2

Note :

- The Soap is prepared by using the formulation table 1 but there was error observed
- By following the formulation table 2 soap was successfully prepared

Fig No.8 Error occurred in

Evaluation test of soap

1. Physical Evaluation:

Sr.no	Parameter	Evaluation
1	Colour	Dark orange reddish
2	Odour	Aromatic
3	Texture	Smooth
4	Shape	Round

Table No.7 Physical Evaluation

2. PH:

The pH of the pre-arranged cleanser was evaluated by contacting a pH strip to the newly planned cleanser and conjointly by dissolving 1 g in 10 ml water with the assistance of computerized pH meter

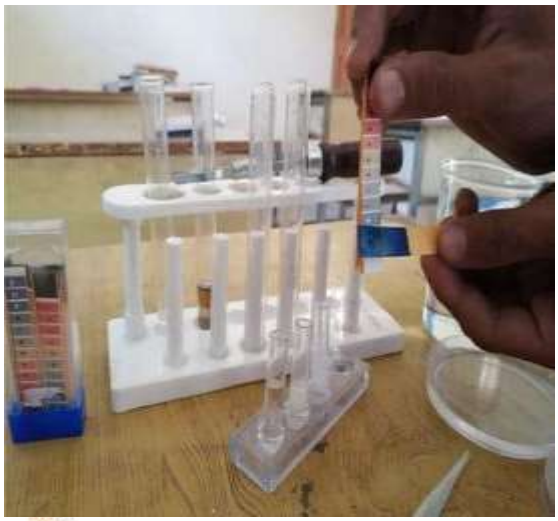

Fig.no.9 PH determination

3. Foam Height

0.5 g of test of cleanser was scattered in 25 ml distilled water. Then, moved it into 100 ml measuring cylinder and the volume was made up to 50 ml with water. Twenty-five strokes were administered, and the foam height above the aqueous volume was measured after the aqueous volume reached 50 ml.

Fig No.10 Foam Height

4. Foam Retention:

About 1% cleanser arrangement was ready and from this, 25 ml was taken in a 100 ml measuring cylinder. The

chamber was covered with hand and shaken for 10 min. The volume of froth at 1 min stretches for 4 min was recorded.

5. **Weight Determination:**

A digital weighing balance was used to determine the weight.

6. **Skin irritation test:**

Formulated cleanser are applied on the skin.

Fig no.11 Skin irritation test

Evaluation Parameter:

Sr.no.	Evaluation Test	Observation
1	PH	6.5-7
2	% total fatty matter	72%
3	%Moisture content	3.5
4	Saponification value	160.25g/ml
5	Alcohol soluble matter	63.70%
6	Foam index	15.5
7	Retention time	9min
8	Skin irritation test	No irritation

Table no. 8 Evaluation parameter

Benefits:

- Makes skin smooth and bright.
- Cleanse and detoxifies the skin
- Improve complexation
- Nourish and moisturize
- Luxurious care for all skin type

Conclusion

The result showed that formulated antiacne soap are safe and usable for the skin and have good potential for the development of cosmetic product. From above result it is concluded that orange peel soap effect such as antiacne, ant inflammatory effect on skin. These preparations had an almost constant homogeneous, emollient, non-greasy and easy to remove after application. Further research will be conducted to scientifically verify the synergistic action of the selected formulation. The use of natural cosmetics has expanded to the many folds in the personal care system and exists high demand for herbal cosmetics. Use the effect of bioactive ingredients in cosmetics biological functions of the skin and ensure nutrients essential for healthy skin

Anti-acne soap remove oil and dirt from face and protect or prevent from acne, pimples and they also brighten the skin and moisturize it.

Future scope

This soap will be used on various activities such as following,

- It is used as anti- inflammatory
- It used as antioxidant
- It used as antibacterial
- It also beneficial for brightening skin
- It is used as antifungal

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