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Investigation, Development & Evaluation Of Anti-Tanning Spray From *Citrus Sinensis*

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ABSTRACT:

This abstract explores the potential of orange peel extracts in formulation a Anti- tanning spray leveraging the natural benefit of citrus for both skin hydration and a sun-kissed glow, while also ensuring safety and efficacy.

The present study was aimed to assess the nature of polyherbal formulation and evaluation of anti-tanning spray using orange peel to provide effective cleansing, moisturizing, antioxidant proprties and skin care benefit.

The formulated tanning spray and lip balm was evaluated based on various parameter , including physical appearance ,pH , microbial efficacy.

Key Words: Orange peel , Formulation , Anti- tanning , Natural product , Skin , other ingredient

1. INTRODUCTION

• Sun Tanning or Tanning: It is the process whereby skin color is darkened or tanned.

• It is most often a result of exposure to ultraviolet (UV) radiation from sunlight or from artificial sources, such as a tanning lamp found in indoor tanning beds.

• People who deliberately tan their skin by exposure to the sun engage in a passive recreational activity of sun bathing.

• Some people use chemical products that can produce a tanning effect without exposure to ultraviolet radiation, known as sunless tanning.

❖ TANNING PROCESS :

- Melanin is a natural pigment produced by cells called melanocytes in a process called melanogenesis.
- Melanocytes produce two types of melanin: pheomelanin (red) and eumelanin (very dark brown).
- Melanin protects the body by absorbing ultraviolet radiation.
- Excessive UV radiation causes sunburn along with other direct and indirect DNA damage to the skin, and the body naturally combats and seeks to repair the damage and protect the skin by creating and releasing further melanin into the skin's cells.
- With the production of the melanin, the skin color darkens.

- The tanning process can be triggered by natural sunlight or by artificial UV radiation, which can be delivered in frequencies of UVA, UVB, or a combination of both.
- The intensity is commonly measured by the UV Index.

UVA

Ultraviolet A (UVA) radiation is in the wavelength range 320 to 400 nm.

UVB

Ultraviolet B (UVB) radiation is in the wavelength range 280 to 320 nm. Much of this band is blocked by the Earth's ozone layer, but some penetrates.

❖ **There are two different mechanisms involved in the production of a tan by UV exposure:**

- Firstly, UVA radiation creates oxidative stress, which in turn oxidizes existing melanin and leads to rapid darkening of the melanin.

  UVA may also cause melanin to be redistributed (released from melanocytes where it is already stored), but its total quantity is unchanged.
  Skin darkening from UVA exposure does not lead to significantly increased production of melanin or protection against sunburn.
- In the second process, triggered primarily by UVB, there is an increase in production of melanin (melanogenesis), which is the body's reaction to direct DNA photodamage (formation of pyrimidine dimers) from UV radiation.
  Melanogenesis leads to delayed tanning, and typically becomes visible two or three days after exposure.

  The tan that is created by increased melanogenesis typically lasts for a few weeks or months, much longer than the tan that is caused by oxidation of existing melanin, and is also actually protective against UV skin damage and sunburn, rather than simply cosmetic.

  Typically, it can provide a modest Sun Protection Factor (SPF) of 3, meaning that tanned skin would tolerate up to 3 times the UV exposure as pale skin.

  However, in order to cause true melanogenesis-tanning by means of UV exposure, some direct DNA photodamage must first be produced, and this requires UVB exposure (as present in natural sunlight, or sunlamps that produce UVB).

  [citation needed] The ultraviolet frequencies responsible for tanning are often divided into the UVA and UVB ranges.

❖ **Benefit Of Anti-Tanning Spray**

1) Eliminates the harmful effect of UV exposure.
2) Reducing the risk of skin cancer .
3) Premature aging and sunburn.
4) Enhance skin brightness.

5) Hydrate skin.

TYPE 1	TYPE 2	TYPE 3	TYPE 4	TYPE 5	TYPE 6
Very fair, pale white, often freckled	Fair, white skin	Light brown	Moderate brown	Dark brown	Deeply pigmented dark brown to black
Greatest risk of skin cancer	High risk of skin cancer	High risk of skin cancer	At risk of skin cancer	Skin cancers are relatively rare	Skin cancers are relatively rare
Highly sensitive, always burns, never tans	Very sensitive, burns easily, tans minimally	Sensitive, burns moderately, usually tans	Less sensitive, burns minimally, tans well	Minimal sensitivity, Never burns	Minimal sensitivity, never burns

2.DRUG PROFILE

❖ Orange peel

Orange peel as a skin lightening agent and works on skin marks and pigmentation.

Orange peel is the best remedy for tanned skin.

It cleanses the skin deeply and gives you even skin tone.

Acts as natural sun tan remover, natural skin toner, skin lightening & brightening agent.

Orange, particularly its peel, can be used as a natural anti-tanning agent due to its high concentration of Vitamin C, which acts as a natural bleaching agent, helping to lighten the skin and remove sun tan by removing dead skin cells and promoting cell regeneration; the flavonoid "hesperidin' found in orange peels also contributes to its antioxidant and photoprotective properties, further aiding in reducing melanin production and protecting against sun damage

Fig: orange peel

❖ **Botanical information**

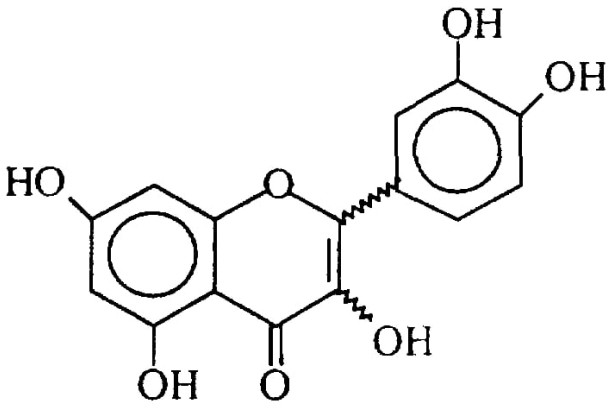
Scientific name of orange peel :- citrus recticulata sinensis

Biological source :- the outer part of the pericarp (fruit wall) of ripe or nearly ripe fruits of citrus sinensis (sweet or ange) or citrus aurantium

Kingdom :- plantee

Phylum :- Tracheophyta

Family :- *rutaceae*



Structure Of Citrus Recticulata

Fig: orange peel powder

➢ **Uses and Benefit**

Oranges, especially their juice and extracts, are used in pharmacy for flavoring HH medications, in allergy testing, and for their potential health benefits, including HH boosting immunity and aiding digestion.

1. Flavoring Agent:

Natural Flavors:

Orange is a common natural flavor used in various pharmaceutical products, including syrups, chewable tablets, and suspensions, to improve palatability.

Inactive Ingredient:

Orange oil or extracts can be used as an inactive ingredient to mask the taste of medications, making them more palatable for patients, especially children.

2. Allergy Testing:

Allergenic Extract: Orange allergenic extract is used in allergy testing to identify sensitivities to orange or related allergens.

3. Potential Health Benefits:

Vitamin C Source:

Oranges are a rich source of vitamin C, which is known for its antioxidant and immune-boosting properties.

Antioxidant Properties:

The antioxidants in oranges, such as flavonoids, can help protect cells from damage caused by free radicals.

Anti-inflammatory Properties:

Oranges may possess anti-inflammatory properties due to the presence of certain compounds like flavonoids.

Digestive Health:

The fiber content in oranges can aid in digestion and promote healthy bowel movements.

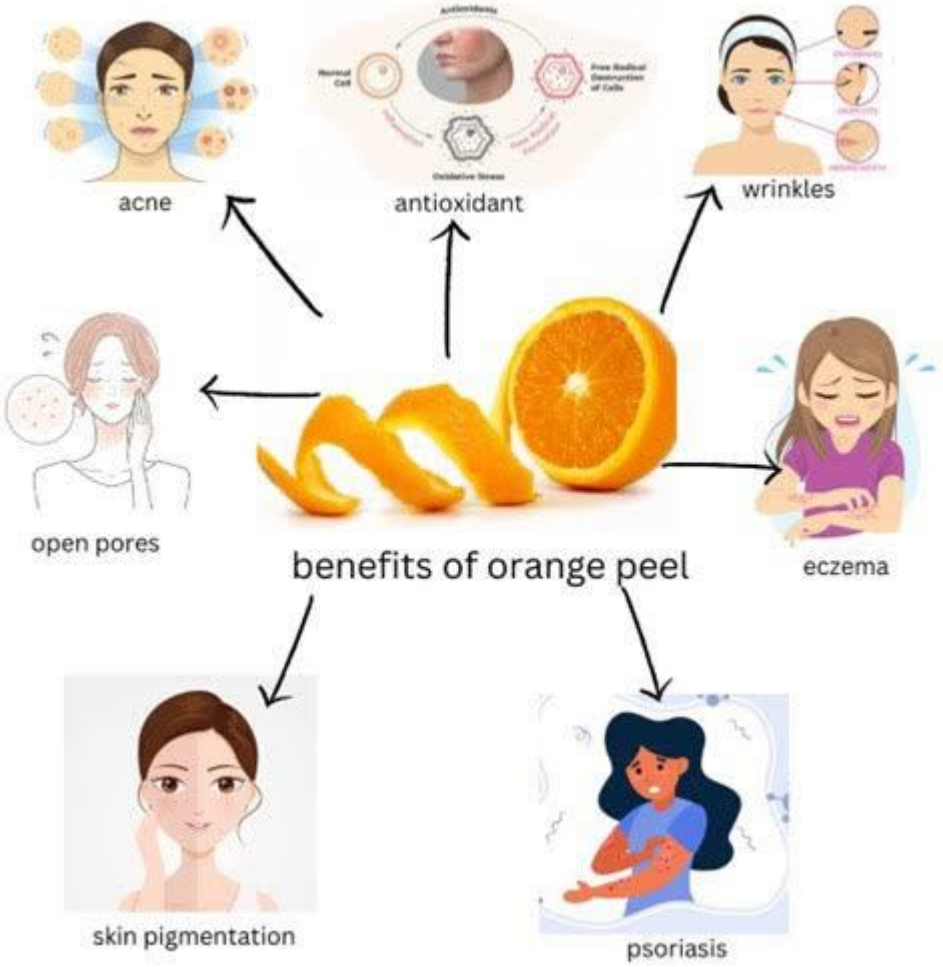
Kidney Health: Some studies suggest that orange juice may help prevent kidney stones due to its citrate content.

May help with cough and cold:

Orange CS Syrup is a medicine used in the treatment of common cold and cough

May help with pain:

Orange N Kid Tablet is a pain-relieving medicine. Orange peel, the outer layer of the orange fruit, has various benefits and drawbacks



➢ **Advantages**

1. Nutritional Value:

Orange peel is rich in vitamins, minerals, and antioxidants, including vitamin C, flavonoids, and limonene.

2. Culinary Uses:

Orange peel can be used in cooking and baking, adding flavor and aroma to dishes like marmalades, teas, and desserts.

3.Skincare Benefits:

The antioxidants and vitamin C in orange peel may help reduce inflammation and improve skin health.

4.Insect Repellent:
Orange peel has natural insect-repelling properties, making it a potential alternative to chemical pesticides.

5.Composting: Orange peel can be added to compost piles, providing nutrients for gardens.

- **Disadvantages**

1.Bitterness: Orange peel can be bitter, which may affect the taste of dishes or products.

2.Pesticide Residues: Conventionally grown orange peels may contain pesticide residues, posing health risks if consumed.

3.Digestive Issues: Some individuals may experience digestive issues, such as bloating or allergic reactions, due to orange

3. AIM & OBJECTIVES

AIM: Investigation & Development & Evaluation Of Anti-tanning Spray From Orange Peel.

OBJECTIVE:

1) To Study The Process Of Tanning.

2) To Select The Content Which Show Anti-Tanning &On Skin Protective.

3) To Study The Effect Of Drug On The Skin.

4) To Reduces The Anti- tanning On The Skin.

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4.NEED OF STUDY : Studying orange peel can provide valuable insights into its potential uses, benefits, and applications. Some areas of research include:

Nutritional and Health Benefits

1. Antioxidant properties

2. Vitamin C content

3. Biodegradable materials

4.Flavor and aroma

5. Skin care & cosmetics

6. Pest control

7. Soil health

5. Material & Method

Material Used

1) orange peel powder

Chemical & reagent

1) VITAMIN E CAPSULE

Fig 9 :- Vitamin E Capsule

Vitamin E capsules may help those who have increasing demands or don't get enough in their diets, like some older folks. Vitamin E plays vital functions in health, such as lowering inflammation and enhancing immunological function.

USES :-

- **Skincare and Beauty**

1. Moisturizing: Vitamin E helps retain moisture in skin, reducing dryness and fine lines.
2. Antioxidant properties: Protects skin from damage caused by free radicals.
3. Scar treatment: May help reduce appearance of scars and promote wound healing.

- **Health Benefits**

1. Antioxidant properties: Helps protect cells from damage, supporting overall health.
2. Immune system support: Vitamin E may help boost immune function.
3. Heart health: May help support heart health by reducing oxidative stress.

- **Hair and Nail Care:**

1. Hair growth: Vitamin E may help promote hair growth and reduce dandruff.
2. Nail health: May help strengthen nails and reduce brittleness.

- **Other Uses**

1. Wound healing: Vitamin E's antioxidant properties may aid in wound healing.
2. Anti-inflammatory effects: May help reduce inflammation and promote healing.

2) ETHANOL

Fig 10 : -Ethanol

Ethanol, also known as ethyl alcoho Ethanol, also known as ethyl alcohol, is a colorless, flammable liquid with the chemical formula C2H5OH or C2H6O. It is commonly found in alcoholic beverages and is used as a solvent, in the synthesis of other chemicals, and as an additive in automotive gasoline (known as gasohol)

USES :-

- **Industrial Applications**

1. Fuel: Ethanol is used as a biofuel, often blended with gasoline.
2. Solvent: Ethanol is used as a solvent in various industries, such as pharmaceuticals and cosmetics.
3. Cleaning agent: Ethanol is used as a cleaning agent in various applications, including laboratory and medical settings.

- **Health and Wellness**

1. Antiseptic: Ethanol is used as an antiseptic to clean wounds and skin.
2. Disinfectant: Ethanol is used to disinfect surfaces and equipment.
3. Pharmaceutical applications: Ethanol is used as a solvent and preservative in certain medications.

3) PEPPERMINT OIL

Fig 11:Peppermint Oil

Peppermint oil is an essential oil that derives from the peppermint plant. It contains over 40 different compounds, including menthol, which gives peppermint its refreshing qualities.

1. **Stress relief:** Peppermint oil's invigorating scent can help reduce stress and anxiety.
2. **Improved focus:** The oil's refreshing aroma can help improve concentration and mental clarity.

- **Health and Wellness**

1. **Digestive relief:** Peppermint oil may help alleviate digestive issues like IBS, bloating, and indigestion.
2. **Pain relief:** The oil's cooling properties may help relieve headaches, muscle aches, and joint pain.

- **Skincare and Beauty**

1. **Skin toning:** Peppermint oil's astringent properties can help tone and balance skin pH.
2. **Hair care:** The oil may help stimulate hair growth and reduce dandruff.

- **Other Uses**

1. **Insect repellent**: Peppermint oil's strong scent can help repel insects
2. **Fresh breath**: The oil's antibacterial properties can help freshen breath and reduce bad breath.

4) METHYL ORANGE

Fig 12 :- Methyl Orange

Methyl orange is a pH indicator frequently used in titration because of its clear and distinct color variance at different pH values. Methyl orange shows red color in acidic medium and yellow color in basic medium.

USES

1. Color change: Methyl orange changes color in response to pH changes, turning red in acidic solutions and yellow in basic solutions.

2. pH range: It is effective in the pH range of 3.1 to 4.4.
3. Toxicity: Methyl orange is considered toxic and should be handled with care.
4. Disposal: It should be disposed of properly according to laboratory guidelines.

5) ALOEVERA GEL

Fig 13:- Aloevera Gel

Benefits:

1. **Hydration**: Aloe vera gel helps retain moisture in the skin, making it an excellent natural moisturizer.
2. **Soothing:** It has anti-inflammatory properties that can soothe sunburns, minor cuts, and scrapes.
3. **Acne Treatment:** Aloe vera's antibacterial properties can help reduce acne and prevent future breakouts.
4. **Anti-Aging:** Rich in antioxidants, aloe vera can help reduce the appearance of fine lines and wrinkles.

❖ **Appartus**

1) Percolator
2) Beaker
3) Stirrer
4) Measuring cylinder
5) Water bath
6) Wire gauze
7) Tripode stand
8) Filter paper
9) Conical flask

❖ **Formulation process**

Soak the required amount of orange peel in distilled water for 24 hrs

Fig :-Filter The Sample

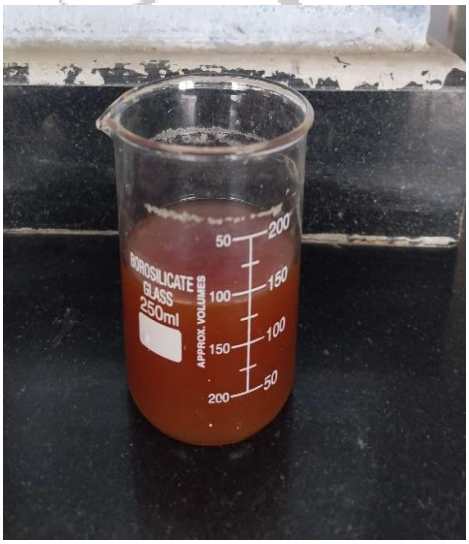

Fig: Extract

❖ **Anti Tanning Spray (50ml)**

Firstly,collect the fresh orange peel, add in beaker & boil it in 80 ml distilled water for 30 min. then filter it and collect extract (42ml) add ethanol (3ml) up to slightly colour change in beaker, add essence pepermint oil (3ml) , aloavera gel and boil it last add 2 to 3 drop methyl orange and cool it & transfer in container ,keep in the container at room temprature.

Sr.No	Ingredient	Amount		
1	Orange peel extract	B1	B2	B3
		40ml	42ml	44ml
2	ethanol	2ml	3ml	4ml
3	Pepermint oil	2ml	3ml	4ml
4	Methyl orange	1 drop	2 to 3 drop	4 drop
5	Aloavera gel	1 drop	2 drop	3 drop
7	Distilled water	60ml	80ml	100ml

Table : material for manfacturing of anti-tanning spray formulation

Fig: Fresh Peel

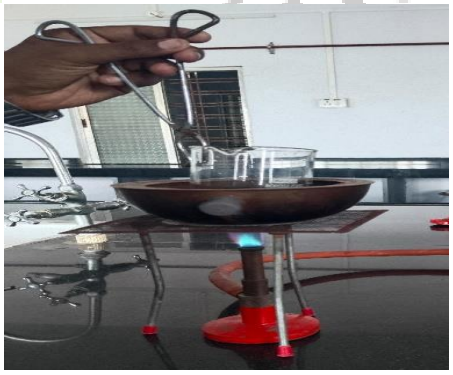

Fig : Boiling Process

Fig: Final product

6.Evaluation Test :

❖ **Anti-tanning spray:**

1). Effectiveness and Safety:

- **Skin Irritation Test:**

Apply a small amount of the spray to a small area of skin (e.g., forearm) and observe for any signs of irritation, redness, itching, or rash.

Repeat this test multiple times to ensure consistent results and to assess the spray's long-term effects on the skin.

- **UV Exposure Test:**

Expose a portion of skin treated with the anti-tanning spray to UV radiation (e.g., using a tanning bed or UV lamp) and compare the tanning results with a control area that was not treated.

Measure the degree of tanning using a spectrophotometer or by visual inspection.

- **Washability Test:**

Check if the spray is easily washable and does not leave any residue or staining on the skin or clothing.

- **Odour and Texture:**

Assess the spray's odour and texture to ensure they are pleasant and suitable for cosmetic use.

2). Stability:

- **Stability Studies:**

Expose the spray to different temperatures (e.g., room temperature, 35°C, 40°C) and observe any changes in color, texture, or odor.

- **Shelf Life:**

Determine the shelf life of the spray by observing its stability over time under different storage conditions.

- **Leak Test:**

Ensure the spray bottle and valve are leak-proof.

3). Other Considerations:

- **pH:**

  Test the pH of the spray to ensure it is within a safe and comfortable range for the skin.

- **Weight Checking:**

  Check the accuracy of the filling procedure and ensure uniformity of the final total weight of the product.

- **Particle Size:**

  For aerosol sprays, evaluate the particle size of the spray to ensure it is appropriate for application.

- **Dose Uniformity:**

  Ensure that the spray delivers a uniform dose of the active ingredient.

- **Container Material:**

  Select appropriate container materials (e.g., glass, plastic, metal) based on the product's physical and chemical character

7.RESULT :

Oraganoleptic characteristic :

Sr.NO	Physical parameter	Method	Observation
1.	**Colour**	Visual observation	Orange
2.	**Apperance**	Visual observation	Excellent , smooth
3.	**Smell**	Visual observation	Pleasant

Stability studies: (Anti -Tanning Spray)

Test	F1	F2	F3
colour	Orange	Orange	Orange
odour	Pleasent	Pleasent	Pleasent
Irritation	None	None	None
Ph	5.2	5.6	5.4
Leak test	None	None	None

8. CONCLUSION

- The Formulation of anti- tannin spray Stored At Room Temperature And Refrigerator Showed Similar Behaviour During The Stability Test.
- The Organoleptic Characteristics Were Stable And Spreadability Was Evaluated As “Good.”
- Storage Under These Conditions Was Considered Adequate, Particularly Because The Functionality Of The Product Was Maintained.
- No irritation occur during irritation test
- No leakage during leakage test

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