

Formulation and Evaluation of Two Layered Soap Containing Orange Peel Extract

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Abstract

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

Methods: The current work emphasizes to the advancement of the technique required for the extraction of orange oil from orange peel. The orange oil and the remaining parts of cake as peel powder are additionally utilized further in formulation of soap. Further the prepared soaps were evaluated for skin irritation test, user satisfaction test, the improvement of skin colour level and efficacy test using mexameter®

Results: The result of the present work highlighted that the sweet orange peels are extraordinary source of orange oil. Evaluation studies showed that none of the volunteers developed skin irritation during the test period. The volunteers were satisfied at high level with the texture and at medium level with the odour of orange peel soap. Furthermore the absorbable, scrubbing and moisturized feeling of peel soap was at high level. The results indicated that orange peel soap had effect on the improvement of skin colour (different level = 1.15 ± 0.93) more than soap base (different level = 0.70 ± 0.64). The skin melanin content after one month use of soap base was reduced from 182 ± 1.7 to 162.4 ± 1.7 (10.77%), while orange peel soap using was reduced melanin content from 172 ± 0.9 to 142.2 ± 0.8 (17.33%).

Conclusion: It is concluded the use of orange oil as anti-aging, whitening and flavouring agent in one layer of soap and further use of remains of peel cake as scrubbing agent in second layer of soap are the most suitable for production of two layered soap which provided potential benefits for skin from an economic point of view.

Keywords: Orange peel extract, two layered soap, orange oil, flavouring, whitening

INTRODUCTION

An orange, particularly, the sweet orange (*Citrus sinensis*) is the most typically grown tree fruit within the global. Orange trees are generally cultivated in tropical and subtropical atmospheres for the sweet natural product, which is stripped or cut (to remove bitter rind) and eaten entire or processed for extraction of orange juice & also for the fragrant peel. Economically citrus fruits are at the best in total production. Orange fruit is the best source of Vitamin C, which is useful for wellbeing and healthy skin too. However the vast majority of the advantages of orange are in its skin itself. Citrus fruits are outstanding for their scent, partly because of flavonoids and limonoids (which in turn are terpenes) contained in the skin, and most are juice-loaded. The juice contains a high amount of citrus extract giving them their distinguishing sharp flavour. The health advantages of orange fundamental oil can be ascribed to its properties as an antispasmodic, antiseptic, anti-inflammatory, antidepressant, narcotic, carminative, tonic, diuretic, and a cholagogic substance. Essential orange oil is germicidal and anti-inflammatory which makes it an ideal ingredient for skin and hair. This oil isn't only for acne-prone skin however it has been shown to increase the capacity to absorb ascorbic acid, collagen synthesis, and blood stream, which are all essential for anti-aging. The abundant nutrients and antioxidants in Orange peel prevent your skin from getting too oily or dry. When applied to skin, it also works as a toner, removing dead skin and dirt and tightening pores. Being a phenomenal source of Vitamin C, oranges are extremely useful for skin. The enzymes present in the orange peel remove dead epithelial cells and cleanse the

skin deeply. The rubbing action helps to accelerate renewal of natural cell making the skin fresher and more youthful looking. Orange peel powder helps in reduction of dark spots and blemishes. Orange peels are a natural bleaching agent that helps to reduce dark patches on the skin and viably expel them with time. It likewise leads to skin firming and prevents premature ageing of skin by restoring collagen in the body. Orange peel is considered as a beneficial for face and healthy skin as it cures clogged pores, dead cells, skin inflammation, pores, imperfections, dark circles, dry skin, and lights up your face. It can likewise be utilized with milk or curd for additional shine or for evacuating tan. Orange oil is available in ductless gland present in the peel of the orange fruits. D-Limonene (around 90 %) is the principle component of orange peel essential oil, which is the main hydrocarbon present. The d-limonene is extracted from orange skins or solids. The skins and mash are sent to an evaporator and the d-limonene is steamed out. It is broadly known for its lovely fragrance and degreasing properties. D-limonene is at present being utilized in numerous applications, for example, chlorinated solvents substitutions, hand cleaners and sewage treatment. The orange processing industry can get a total makeover if due significance is given for separation of useful ingredient from orange peel. Researchers and Scientists have been emphasizing on the separation of oil from orange peel and their potential benefit on skin. The aim of this study was to develop the two layered soap from extract of orange peel and evaluate the satisfaction by users.

MATERIALS AND METHODS

Plant material:

Orange peel (*Citrus sinensis L.*) was the waste derived from process of orange juice. It was collected from fruit juice shop during Jan-Feb. 2018.

Orange peel extraction:

Orange peel was cut into small pieces and dried in direct sunlight until completely dry. Dried orange peels were coarsely grinded. Enough ethanol (95%) in the ratio of 1:3 was added to completely cover the orange peels and vigorously shaken the jar for several minutes and left it for few days and filtered through Whatman®No.1. Alcohol was evaporated under pressure by rotary evaporator to leave orange oil behind. The dried cake obtained is further used as scrubbing agent in one of the layer of soap. An average yield of 7.4 ml oil was collected from 1kg of orange peel. The oil was kept in refrigerator for later on use.

Formulation of two layered soap containing orange peel extract:

Table 1: The composition of soap base & soap containing orange peel extract

S. No.	Ingredient	Soap base	Orange peel soap
1	Transparent Melt and Pour Soap Base	50g	50 g
2	Ultra White Melt and Pour Soap Base	50g	50 g
3	Orange Peel Powder	-	5 g
4	Extracted orange oil	-	2 g

For the first layer, 50 g of Ultra White Melt and Pour Soap Base was melted together. 5 g powder of dried orange peel cake was added to it and mixed. The mixture was poured into the mold. For the second layer, 50 g of transparent melt and soap base was melted. 2g of extracted orange oil was added to it. The first layer was sprayed with alcohol in order to adhere the second layer to it. The second layer was poured over the first layer into the mold. After the soap was cooled down, the mold was turned over and it was popped out. For soap base preparation, similar method was adopted excluding the addition of orange peel powder and extracted orange oil.

Skin irritation test:

Closed patch test was performed to assess the skin irritation. The test materials (extracted orange oil, orange peel powder and orange peel soap) were put with an adequate amount on every aluminium disk and occluded on the back of volunteers. The patches were opened after 24 hours and observed for any indications of skin irritation.

User satisfaction test:

Using randomized controlled trial, orange peel extract containing soap was tested by 20 volunteers for their satisfaction compared with soap base. For 1 month, volunteers were asked to apply soap base on left leg and orange peel soap on right leg twice daily. The volunteer's

satisfaction was tested by using 5-point Likert scale questionnaire. The satisfaction scores were calculated as class intervals to classify 5 levels of satisfaction: Very high (score 4.26-5.10), high (score 3.46-4.25), medium (score 2.66-3.45), low (score 1.86-2.65) and very low (score 1.05-1.85).

The improvement of skin colour level:

Before using soap and after 1 month of application, the skin colour level of every volunteer was measured by comparing with skin colour bar (customized from von Luschan's chromatic scale)

Efficacy test using Mexameter®:

The measure of pigment melanin in skin was estimated before utilizing soap and after one month of utilization by Mexameter®. The device dependent absorption and reflection of 3 particular wavelengths (green: $\lambda = 565$ nm, red: $\lambda = 665$ nm, infrared: $\lambda = 875$ nm). As the amount of radiated light is characterized, the amount of light absorbed by the skin can be figured as the measure of melanin pigment.

RESULT & DISCUSSION

Irritation test:

Before new skin care products and ingredients are introduced into the market, the testing for potential adverse skin effects (irritation and allergy) is essential. This dermatological test for irritation impact on human was performed to guarantee safety of consumer. The result was found that all test materials (soap base, orange peel soap, extracted orange oil, and orange Peel Powder) did not induce skin irritation under the test condition. In addition, none of the volunteers developed irritation during the test period. It can be figured that the two soaps were not prone to initiate skin irritation under ordinary condition of use.

User satisfaction test:

Twenty volunteers were approached to answer the survey to assess their satisfaction on the both soaps after utilized. The satisfaction of volunteers was estimated by 5-point Likert scale. The volunteers were satisfied at high level with the texture of orange peel soap whereas the odour of orange peel soap was at medium level satisfaction. In any case, their general inclination on orange peel soap was at high level. For feeling amid utilize, the volunteers were fulfilled spread ability of orange peel soap at very high level. Furthermore, they were fulfilled the absorbable, scrubbing and moisturized feeling of peel soap at high level. In summary, the volunteers were fulfilled orange peel soap at high level. Likewise, there were no changes in appearance of orange peel soap during 1 month tested.

The improvement of skin colour level:

Skin colour improvement was measured using skin colour bar (customized from Von Luschan's Chromatic scale) before and after one month of soap application. The scores were calculated by the skin colour level improvement. The results were indicated that orange peel soap had effect on the improvement of skin colour (different level = 1.15 ± 0.93) more than soap base (different level = 0.70 ± 0.64). In conclusion, orange peel soap had more whitening effect than soap base and most volunteers

(80%) were satisfied on whitening property of orange peel soap more than soap base.

Efficacy test using Mexameter®:

The effect of both soaps on the production of skin melanin was examined. Melanin content in skin was measured before as well as one month after using soaps by Mexameter®. The results were revealed in arbitrary units and shown that both soaps were effect on melanin amount on different extent. The skin melanin content after one month of soap base using was reduced from 182 ± 1.7 to 162.4 ± 1.7 (10.77%), while orange peel soap using was reduced melanin content from 172 ± 0.9 to 142.2 ± 0.8 (17.33%). According to the results, it can be concluded that orange peel soap had whitening property more than control soap.

CONCLUSION

In the present work, the orange peel crude extract possessed anti-aging, scrubbing, flavouring and skin whitening property. This research provided to increase the value of orange peel from the wastes after juice extraction. However, further research need to be elucidated for active compound in orange which may suggest the orange peel extract could be a new source as the active ingredient for anti-aging, scrubbing, flavouring and whitening agent in other cosmetic products.

REFERENCES

1. Ndubuisi TI et al. Waste to wealth: Industrial raw materials potential of peels of Nigerian sweet orange (*Citrus sinensis*). Afr J Biotechnol 2011;10(33):6257-64.
2. Gerow GP et al. Method of distilling a volatile constituent from liquid mixture. U S Patent 1982;4:326,926.
3. Nwobi BE et al. Extraction and qualitative assessment of African sweet orange seed oil. Afr J food agric nutr dev 2006;6.
4. Briganti S et al. Chemical and instrumental method to treat hyperpigmentation. Pigment cells 2003;16:101-10.
5. Maeda K et al. In vitro effectiveness of several whitening cosmetic components in human melanocytes. J Soc Cosmet Chem 1991;42:361-8.
6. Martin MA et al. Orange Peel: organic waste or energetic resource? University Ibn Tofail, Faculty of Sciences, Kenitra (Moroc) 2008.
7. Seiberg M et al. Inhibition of melanosome transfer results in skin lightening. J invest dermatol 2000;115:162-67.
8. Halder RM et al. Topical agents used in the management of hyperpigmentation. Skin Therapy Letter 2004;9:453.
9. Hermanns JF et al. Unraveling the patterns of subclinical pheomelanin enriched facial hyperpigmentation: effect of depigmenting agents. Dermatology 2000;201:118-22.
10. Elsne P, Maibach HI. Cosmeceuticals drugs vs cosmetics. New York and Basel: Marcel Dekker 2000;123-44.
11. Petit L, Pierard E. Skin lightening product revisited. Int J Cosmet Sci 2003;25(4):169-81.
12. Prota G. Melanin and melanogenesis. Cosmet Toiletries 1996;111(55):43-51.
13. Sang-Suk K et al. Citrus peel wastes as functional materials for cosmeceuticals. J Appl Biol Chem 2008;51(1):7-12.