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THE EFFICACY OF COSMETIC PRODUCTS CONTAINING GRAPE FRUIT EXTRACT IN IMPROVING SKIN HYDRATION AND SKIN COLOR

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Abstract

This current work aimed at determining the efficacy of several products containing grapefruit extracts in improving skin hydration and skin whitening. Three products namely the Safi Balqis facial moisturizes, Body Shop body butter and Body Shop hand cream were tested on the left forearms of the volunteers for a period of three weeks. The three products were found to have positive effects towards skin hydration and skin whitening. The efficacy ranking of the products based on the average increase of the skin hydration was first is the Body Shop hand cream (28.4) followed by the Body Shop body butter (27.0) and lastly is the Safi Balqis facial moisturizer (+18.0). As for the whitening property, the most efficient product to cause skin whitening determined by the average reduction of melanin content was first is the Safi Balqis facial moisturizer (-5.64), followed by the Body Shop hand cream (-5.34) and lastly is the Body Shop body butter (-3.36).

Key words: Grapefruit, Skin, Hydration, Moisturizer

Introduction

Natural product are playing a key role to improve the skin and beauty products continuously [1-2]. Mostly beneficial cosmetic emulsion preparations are achieved when antioxidants are used as active ingredients [3]. One of the major sources of natural anti-oxidant comes from grapefruit. Studies rapidly demonstrate that grapefruit is not just beneficial for human body as a fruit but also for basis in cosmetics ingredients [4]. This is ultimately because Grapefruit is best for its anti-oxidant properties [5]. The best natural antioxidants present in grapefruit extract are vitamin C, flavonoids, beta carotene and lycopene effects [6]. Each of these phytochemicals mentioned has its own contribution in to human skin health in managing the aging, whitening and UV damaging process. These statements been mentioned above has been proven by Naveed Akhtar, GuLfishanand & Mahmood Ahmed in 2008 when their grapefruit extraction cream was found to have skin-whitening, moisturizing, cleansing and antiwrinkle effects. Several cosmetics products containing garapefruit can be seen in the market nowadays. Grapefruit cosmetics products also have been locally produced in Malaysia through a local company, Safi Balqis. Grapefruit has played a role in cosmetics industry. Hence, further justification can be made to investigate the efficacy of grapefruit through the analysis of its product formulation on human skin. The analysis could be conducted by a simple but professional technique by using a DermaLab technologies device.

Methods

Experimental Design

Subjects Demographics

Females between the ages of 20 to 23 years old - are informed with the nature of test, possible adverse reactions and agreed to the consent form. (Only include those who are dependable, able to read, understand and follow directions). Prior to initiation, medical history form completed by subject, exclude those who have a history of physical or dermatological condition which would preclude application of the test materials.

Duration

3 weeks. Reading will be taken at prior and after the 3 weeks of products application duration.

Study Design

Linear pretreatment and comparative study.

Product Application

3 products to compare for its efficacy, controlled with untreated matching area.

Criteria for recruitment and admission

The procedures for recruiting and admitting volunteers were organized in such a way as to guarantee that all the subjects possessed clear and precise information on the aims of the test and any risks or consequences involved in taking part in the study. Each volunteer read and countersigned the consent form admission to the protocol drawn up by the designers of the experimental study. Fifteen females aged from 20 to 23 years old were included in the study. The selection of volunteers has been made according to the following criteria:

Inclusion Criteria

race: Caucasian
age: adults between 20 and 40 years
sex: women
health status: absence of disease during the period of the study and preceding it.
good understanding of the Malay language
accessibility as regards home address and ease of contact

Exclusion Criteria

subjects who do not conform to the inclusion criteria
pregnant and breast-feeding women
subjects affected by temporary or chronic skin diseases
subjects with a history of intolerance to drugs, cosmetic products, skin diseases
subjects undergoing topic or systemic treatments with any substance that may affect sebaceous secretion.

Restrictions

For the whole lasting of the study it is imposed to subjects not to use different products on the tested areas.

Methods

The test is performed in a room temperature condition in order to keep constant the temperature and the humidity during the measurements [7]. At the beginning of the study instrumental evaluations of skin tone and hydration were carried out onto the left forearm area marked out in a reproducible way. The subjects applied the product on the area at home once a day for 21 consecutive days (3 weeks). At the end of the product treatment the subjects returned to the laboratory for the final instrumental

measurements.

Typical Parameters:-

Test Sites: Left forearm No. of Applications: Once daily at night before sleep.

Amount of Application: A small amount (about .2 ml) per application

No. of Evaluations: 2 times (Day 0 and day 22)

Controlled sites (untreated matching area): Right forearm

Biophysical Measurements: skin tone and skin hydration measurements

Mathematical elaboration:

The initial and final value was recorded. The difference is calculated and the average difference is determined for skin colour and skin hydration parameters.

T_f = value at the end of the treatment

T_0 = value at the beginning of the treatment $T_f - T_0$ = value difference

Test devices

The skin analysis is conducted by DermaLab Combo Test Device; the SkinLab Combo for scientific skin analysis type. Different probes available at the combo test machine will specifically measure different parameters; hydration and skin color.

Assessment of results/efficacy

The skin analysis test data will be recorded as pre-test data and post-test data. Two skin parameters; hydration and skin color will be analyzed initially before applying any product to the subjects. After the three weeks of the product testing, another record will be taken to determine the efficacy of the products used. The efficacy measurement is determined when the post-test result is compared with the post-test data.

Results

Based on the result, it was found that the Body Shop hand cream product has the best efficacy when all of the subjects using these products had improved in the test side skin hydration value. In addition, this product gave the highest average increase in the skin hydration value at the test side when compared with the other two products. The body Shop body butter product gave the second highest average skin hydration increase while the Safi Balqis product has the least average skin hydration increment. However, this could not placed the Safi Balqis product as the total least efficacy product in maintaining skin hydration because 4 subjects had improved in skin hydration value when tested with this product while only 3 subjects improved in skin hydration value when tested with the Body Shop body butter product. All of the three products had successfully reduced the melanin content at the test side. All of the subjects of the three products were found to have less melanin content reading after the test period. Safi Balqis product stood as the most efficient brand to reduce the melanin content in skin when it gave the highest reduction in the average melanin content as compared with the other two products. Comes at second, the Body Shop hand cream product was also found to have a great efficacy in reducing the melanin when it is left behind the Safi Balqis product with just little difference. The least efficient product in reducing the melanin content was the Body Shop body butter product with the lowest average melanin reduction at the test side. The objectives are achieved. The three products that come from the brand Safi Balqis and the Body Shop which contained the grapefruit extract as the active ingredient had shown to have the efficacy on the skin hydration and skin colour. Most of the subjects exhibit positive result in improving the skin hydration in the skin hydration test while all of the subjects showed positive result in reducing the skin melanin content in the skin colour test. Based on the average increase in the skin hydration, the Body Shop hand cream product has the highest efficacy with the highest average increase in the hydration value followed by the Body Shop body butter product and then the Safi Balqis product. As for the skin colour test, Safi Balqis product stood as the most efficient product as a whitening agent since it reduced the melanin content the most as compared with the other two products. Comes at second is the Body Shop hand cream product followed by the Body Shop body butter product.

Discussion

Moisturizing treatments involve factors such as repairing the skin barrier [8-9], retaining or increasing water content, reducing transepidermal water lost (TEWL) [10], restoring the lipid barrier's ability to attract, hold and redistribute water, and maintaining skin integrity and appearance[11]. A 100-g sample of grapefruit juice contains 36-40 mg of vitamin C, which is known to increase the collagen fibers in the dermis. With an increase in collagen, conditions for hydration are improved. In addition, vitamin C improves the barrier function of the SC, in turn improving moisture in the skin [12] Out of 5 subjects that have been tested with Safi Balqis

product, 4 of them showed improvement on the skin hydration reading at the side after the test. One of the subjects failed to show the skin hydration increasing value and was found to have a reduced skin hydration value compared to the test side baseline. The result went the same with the Body Shop body butter product when 3 of the subjects improved in their skin hydration value while 2 subjects exhibit a reduction in skin hydration reading at the test side. As for the Body Shop hand cream product, this is the only product that was revealed to give improvements on the skin hydration reading to all of the 5 subjects that were being tested with it.

The reason why the 3 subjects may fail the test is they might be in the dehydrated state during the post-test reading taken period. Dehydration is a reduction of the skin's water content. This reduction is mainly due to two types of factors:

Extrinsic factors: These are changes in the climate such as UV radiation, wind, damp, and cold, dry climates, etc. Using aggressive chemical products and irritants such as soaps and detergents, or prolonged contact with water, etc., can also cause loss of the skin's protective film, leading to dehydration of the skin.

Intrinsic factors: These are due to metabolic disorders (diseases such as hypothyroidism and kidney failure), acute dehydration (such as severe bleeding), certain drugs (such as diuretics), skin diseases and normal skin ageing.

However, despite the 3 subjects from the Safi Balqis product and Body Shop body butter product that failed to show the increment in the post-test skin hydration value at the test side compared to the baseline reading, all of the subjects from the three products managed to show better skin hydration value at the test side (left forearm) compared to the control side (right forearm) after the test weeks. Hence, it can be concluded that there is a difference between applying and not applying the products in the management of skin hydration. The 3 subjects whose showed a reduction in the skin hydration value (which might be dehydrated due to the external or internal factors) at the test side when compared to the pre-test baseline still have a higher hydration value at the test side compared to the post-test control side reading that signifies the product still playing its role in maintaining the skin hydration at the test side.

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Table 1. Table represented the test side skin hydration reading before and after test for Safi Balqis moisturizer product.

Hydration Test	Baseline, T_0		After 3 weeks, T_f	
	Control side	Test side	Control side	Test side
Subject 1	185	208	146	160
Subject 2	135	119	113	125
Subject 3	153	154	185	201
Subject 4	148	168	225	229
Subject 5	235	175	158	199

*any increase in the hydration reading at the test side after the test period signifies positive result coloured in blue

Table 2. Table represented the test side skin hydration reading before and after test for Body Shop body butter product.

Hydration Test	Baseline, T_0		After 3 weeks, T_f	
	Control side	Test side	Control side	Test side
Subject 1	142	157	170	235
Subject 2	145	129	145	248
Subject 3	148	180	116	138
Subject 4	192	225	151	198
Subject 5	130	115	103	122

*any increase in the hydration reading at the test side after the test period signifies positive result coloured in blue

Table 3. Table represented the test side skin hydration reading before and after test for Body Shop hand cream product

Hydration Test	Baseline, T_0		After 3 weeks, T_f	
	Control side	Test side	Control side	Test side
Subject 1	169	149	121	159
Subject 2	136	138	127	142
Subject 3	201	165	165	173
Subject 4	146	132	189	190
Subject 5	270	268	280	330

*any increase in the hydration reading at the test side after the test period signifies positive result coloured in blue

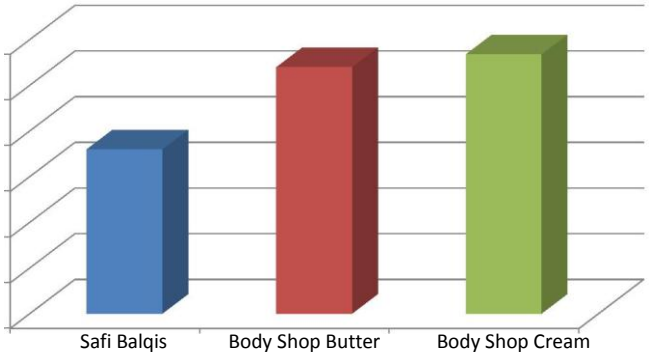

Figure 1. Average skin hydration increment at the test side

Table 4. Table represented the test side skin hydration reading before and after test for Body Shop hand cream product

Hydration Test	Baseline, T_0		After 3 weeks, T_f	
	Control side	Test side	Control side	Test side
Subject 1	30.1	33.3	28.4	29.9
Subject 2	32.6	32.4	27.0	27.9
Subject 3	34.7	34.8	43.4	30.0
Subject 4	33.8	34.8	35.6	29.0
Subject 5	34.5	37.9	29.5	28.2

Table 5. Table represented the test side skin hydration reading before and after test for Body Shop hand cream product

Hydration Test	Baseline, T_0		After 3 weeks, T_f	
	Control side	Test side	Control side	Test side
Subject 1	34.4	37.8	31.7	35.9
Subject 2	33.2	32.6	32.2	29.9
Subject 3	31.1	31.1	28.4	28.9
Subject 4	36.4	37.5	34.8	35.1
Subject 5	36.5	37.6	27.8	30.0

Table 6. Table represented the test side skin hydration reading before and after test for Body Shop hand cream product

Hydration Test	Baseline, T_0		After 3 weeks, T_f	
	Control side	Test side	Control side	Test side
Subject 1	34.8	33.0	30.9	29.5
Subject 2	32.2	32.3	26.9	26.2
Subject 3	31.7	31.0	28.7	29.9
Subject 4	35.4	38.7	30.7	29.4
Subject 5	39.4	39.0	34.9	32.3

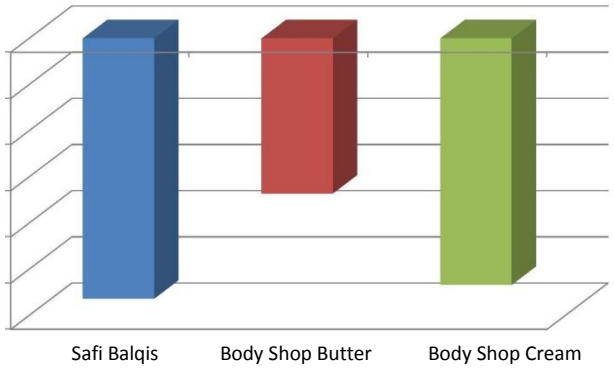

Figure 2. Average skin melanin reduction at the test side Skin Melanin Reduction between brands