IRRITATION AND MOISTURE TEST OF MOISTURIZER SERUM CIRCULATING IN BANDUNG CITY

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ABSTRACT

Serum is a popular cosmetic preparation, especially because of its lightweight, liquid form that is easy to apply and doesn't leave any unpleasant residue. Its smooth, light texture allows it to be quickly absorbed into the skin without unwanted traces. A variety of serums are widely available and well-received, including brightening serums, anti-acne serums, anti-aging serums, and moisturizing serums. Moisturizing serums, in particular, are in high demand due to Indonesia's tropical climate, which often leads to dry and rough skin conditions. The hot weather makes skin moisture essential, especially for facial skin, to maintain a clean, hydrated, smooth, and bright appearance. Thus, products that effectively hydrate the skin are essential. Moisturizing serums are expected to help address skin dryness caused by the tropical climate, necessitating a high level of moisture in these products. Additionally, it's essential that these preparations are free of irritants to avoid skin irritation. This study simulates moisture efficacy and safety testing through irritation tests, using three brands of moisturizing serums sampled from online marketplaces in Bandung City

.**Keywords:** *Moisturizing Serum, irritation test, moisture test.*

Introduction

Serum is a form of gel-based cosmetic preparation that is considered very comfortable to use as it has a high water content that can moisturize the skin and is easy to spread when applied. This is because serum is made up of very small molecules, which allows it to penetrate deep into the skin quickly (Sasidharan, 2014). Using serum on the skin has several effects including rejuvenating, moisturizing or hydrating and nourishing effects (Thakre, 2017). Using serum is preferable to cream as the active ingredient particles contained in serum are more easily absorbed by the skin (Muliyawan & Suriana, 2013).

One form of skin care preparation that is in high demand among consumers is a serum preparation that can be used on the face and has the expected benefits of making the skin clean, glowing and moisturized so that it can be categorized as healthy skin, which is the dream of consumers, especially female consumers, amidst a tropical climate such as to be able to overcome this.

Moisturizing serum hydrates the skin by reducing transepidermal water loss (TEWL) and attracting water to hydrate the stratum corneum and epidermis. Several materials that can reduce the occurrence of TEWL are occlusive, including petroleum, paraffin, dimethicone, cyclomethicone and mineral oil. Ingredients that are humectants and can attract water to the skin include glycerin, sorbitol, propylene glycol,

hyaluronic acid, sodium and protein. Ingredients that are intercellular lipids in the stratum corneum, namely fatty acids (linoleic acid, stearic acid, and palmitic acid), cholesterol, and ceramides. The fatty acid group is a widely used ingredient in moisturizing products that are intercellular lipids.

Moisturizing serums are designed to moisturize or restore the stratum corneum. Moisturizers are generally used to reduce fine lines, soften and hydrate the skin. This can improve a person's self-confidence, psychological satisfaction, and quality of life. Moisturizing serum works effectively in treating dry skin and provides smooth skin

Online media has become a means of effective product promotion, including beauty products. Social media can influence people's interest and willingness to purchase products in the form of goods, including cosmetics. This condition is exploited by a group of economic actors to market manufactured cosmetic products in online stores (4.5). The cosmetics industry continues to grow, so there are many formulated moisturizing serum products with different types, functions, prices or variations circulating in online stores. This makes it difficult for consumers to find a moisturizing serum that is safe and stable during storage. In addition, many online store products do not yet have distribution permits from BPOM, so there are concerns that the products have a low level of safety when used (Febriana, 2018). From observations of the local population, it is often found that the prepared serum is not compatible with the skin, especially in women, which leads to intolerance, namely that the skin itches and red spots appear.

Therefore, in this research, the author must conduct an evaluation of moisturizing as the effectiveness of the preparation and an irritation test to ensure that there are no substances that irritate the skin in the moisturizing preparations in circulation and commonly used by the public purchased and sold in online stores.

Methodology

The samples used were 3 moisturizing serums collected using the targeted sampling method. The sample selected was the most popular moisturizing serum (best seller) from social media as long as it had the most reviews and an affordable price but was not registered (Notoatmodj0, 2007). The evaluation conducted included a moisturizing test to assess efficacy and a skin irritation test to assess safety

Tools and materials

The tools used are laboratory glassware, gauze, aluminum foil, plaster and Scalar Moisture Checker (digital skin moisture monitor). The ingredients used are Moisturizing Serum A, Moisturizing Serum B and Moisturizing Serum C and distilled water.

Preparation of panelists

The panelists involved in this study were 20 panelists with the following intrinsic and extrinsic criteria:

- Intrinsic criteria: men (10) and women (10), aged 20–40 years, able to communicate, willing to take the test, normal skin and no allergies.

- Extrinsic criteria: they have limitations in responding to sensory perceptions.

How to present samples

Samples for the irritation test and the moisture test are presented randomly and coded with clues in the letters A, B and C.

How to evaluate

The data analysis was carried out descriptively by comparing the test results of the preparations and presented in the form of tables and graphs.

Moisture test

10 women and 10 men aged 20-40 years were selected as panelists, who had normal skin moisture and did not use any other products in the test area. The moisture test was carried out for 7 days using the Scalar Moisture Checker tool. The test preparation is applied to the skin surface of the forearm with an area of 2 x 5 cm in the morning and evening, before applying the lotion, the moisture of the skin is first measured using a Scalar Moisture Checker. The determination of the skin moisture percentage is carried out at certain time points, namely 0th hour, 24th hour, 48th

hour and 72nd hour after application. The obtained percentage results of humidity are then processed based on the scale in Table 1 below:

Table 1. Humidity categories based on humidity percentage

Category	Percentage (%)
Dry	**0-45**
Normal or moist	**46-55**
Very moist	**56-100**

(Wih, W.L., 2012)

Irritation test

The irritation test was performed in a closed manner, the covering material consisted of 2.5 cm diameter round filter paper, aluminum foil and plaster. The test material consists of moisturizing serum A, B and C and without test substances. A 0.2 ml sample was taken with a syringe and placed on a covering material. The samples were attached to the right upper arms of 10 male and 10 female test participants for 4 hours. The skin at the application site was observed after 0, 24, 48 and 72 hours. The degree of irritation is assessed with a score of 0 to 4, depending on the severity of the visible erythema and edema reaction on the skin. During the assessment, volunteers are allowed to wash the skin at the application site with water without soap, detergent or cosmetic products. (Atif, A., et al., 2013). Below is a table with standard values for erythema and edema seen at 2 and 3

Table 2 Erythema Score Standards (Atif, A., et al, 2013)

SKOR	KRITERIA
0	Tanpa eritema
1	Sangat sedikit eritema (diameter <25 mm)
2	Eritema jelas terlihat (diameter 25,1-30 mm)
3	Eritema sedang (diameter 30,1-35 mm)
4	Eritema berat (gelap merah dengan membentuk eskar, Diameter > 35 mm)

Table 3 Edema Score Standards (Atif, A., et al, 2013)

SKOR	KRITERIA
0	Tanpa edema
1	Sangat sedikit edema (hampir tidak terlihat)
2	Edema tepi berbatas jelas (ketebalan < 1 mm)
3	Edema sedang (tepi naik ± 1 mm)
4	Edema berat (tepi naik lebih dari 1 mm dan meluas keluar daerah pejanan)

• Data Analysis

Each test on the subject was observed to calculate its value based on the irritation index using the formula:

Irritation Index = (erythema score 24+48+72 hours) + (edema score 24+48+72)

Number of Panelis

The obtained irritation index is compared with the irritation degree score to determine the severity of the irritation reaction, with the following provisions:

 Not irritating: 0.00

 Very little irritation: 0.1-0.4,

 Slight irritation: 0.41-1.9,

 Moderate irritation: 2.0-4.9,

 Severe irritation: 5.0-8.0.

Results and Discussion

Moisture Test Results

The study yielded data as shown in Table 4, namely the average percentage increase in skin moisture for 10 female and 10 male test subjects aged 20 to 40 years.

Table 4. Average Results of Humidity Test

Panelis	Uji Kelembaban sampel (%)		
	A	B	C
Wanita	5,21	5,76	6,01
Pria	4,23	4,29	4,50

The increase in skin moisture percentage after using lotion is greater in female test participants than in males. This may be caused by several factors including temperature and weather, as male test participants do more outdoor activities and are therefore also exposed to sunlight, which can often lead to increased water evaporation from the skin compared to female participants

Irritation test results

The irritation test was performed on 10 female and 10 male subjects aged 20 to 40 years who met the inclusion criteria and did not meet the exclusion criteria. Below are

data from observations of irritation tests using the closed patch method (patch test) over 72 hours, observed at hours 0, 34, 48 and 72.

Table 5 Observation Results and Irritation Index Calculation Results

Panelis	REAKSI KULIT								Indeks Iritasi
	Jam ke-0		Jam ke-24		Jam ke-48		Jam ke-72		
	S	T	S	T	S	T	S	T	
1	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0

Description S=Sample, T=Without test substance, only cover (filter paper, plaster)

The test sample consists of a moisturizing serum sample and no test substance. The test without test substance serves to determine possible irritation effects of the covering material. The test material was applied to the right upper arm because the stratum corneum on the arm is thin and the absorption of the material is therefore quite high. The attached material does not experience much movement, loosening or coming off and therefore coming into contact with the skin is quite guaranteed. The bonding is carried out in a closed form (patch test) with a test unit consisting of filter paper, aluminum foil and plaster to ensure and support the absorption of the material to be tested and to avoid environmental influences (Trihapsoro, 2003).

From Table 5 it can be seen that all moisturizing serum sample preparations do not cause erythema and edema, with an irritation index = 0, which means that they do not cause irritation.

Conclusion

Based on the results of data analysis obtained from the hedonic test of 6 brands of lulur boreh preparations as test samples, the following conclusions can be drawn:

1) The mixed moisturizing serum preparation has skin moisturizing properties from the results obtained from the humidity test.

2) The mixed moisturizing serum preparation does not cause erythema, edema and does not cause irritation.

SUGGESTTION

For further research, it is recommended to add all components of the physicochemical characteristic testing, and increase the number of samples, number of panelists and also the testing carried out on the new formula.

References

Atif, Ali, N. Akhtar, A.M. Mumtaz, M.S. Khan, F.M. Iqbal and S.S. Zaidi. 2013. In vivo skin irritation potential of a cream containing Moringa oleifera leaf extract. African Journal of Pharmacy and Pharmacology, 7(6): 289-293

Budiasih, S., Masyitah, I., Jiyauddin, K., Kaleemullah, M., Samer, A. D., Fadli, A. M. and Yusuf, E., 2019, Formulation and characterization of cosmetic serum containing argan oil as a moisturizing agent. Bromo, 297–304.

Carlotta M, Maria C, Luisa DM, Federica R, Chiara DM, Franco A, Pietro M and Tommasina C., 2011. A new vehicle-loaded hydrogel system suitable for topical applications: preparation and characterization, Journal of Pharm Pharmace Sci., 14(3):336-346.

Febriana, M. Yulianto, E. Influence of online consumer reviews of beauty vloggers on purchase decisions. Journal of Administration 2018;58(1):1–9.

Fisher GJ, Kang S, Varani J, Bata-Csorgo Z, Wan Y, Datta S, Voorhees JJ., 2002. Mechanisms of photoaging and chronological skin aging. Dermatol Arch. 138(11):1462-70.

Kartika, B., 1992, Guidelines for sensory evaluation of food industry results. Yogyakarta.

Kotler. 2005. Satisfaction theory and factors influencing satisfaction, Jakarta

Major, F. A., Kenner, J. R. & Draelos, Z. D. 2014. The skin health and beauty pyramid: a clinically based guide to selecting topical skin care products. Journal of Drugs in Dermatology: JDD, 13(4), 414–421.

Muliyawan, D & N. Suriana. (2013). A-Z on cosmetics. Elex Media Komputindo, Jakarta.

Nursalam. 2001. Understanding satisfaction, Yogyakarta

Notoatmodjo, S. Health Research Methodology Jakarta: Rineka Cipta. 2007; 78.

Sahu, G., Sahu, s., Sharma, H. and Jha, A.K., 2014, A Review of Current and New Trends for Anti-Aging Formulations, IJPCBS, 4(1), 118-125.

Sasidharan, S. (2014). Formulation and evaluation of fairness serum using polyherbal extracts. The Detailed Studies on Red List Plants and their Therapeutic Applications. View Project. July. https://www.researchgate.net/publication/263929557

Schreml, S., Kemper, M. and Abels, ., 2014. Skin pH in the elderly and appropriate skin care. European Medical Journal. 86-94.

Sufi, TYA. Moisture and sympathy test of olive oil and sunflower seed oil lotion. Scientific Papers. 2018; 42.

Sugiyono. 2010. Health Research Methodology. Cendakia Partners. Yogyakarta

Surini, S., Mubarak, H. & Ramadon, D. (2018). Cosmetic serum containing grape seed extract (Vitis vinifera L.): formulation and in vitro penetration studies. Journal of Young Pharmacists, 10(2), pp. 51–55.

Thakre, AD (2017). Formulation and development of a serum de pigment combining fruit extracts. International Journal of Innovative Science and Technology Research, 2(12), 330–382.

Tranggono, R.I., Latifah, F., Jayadisastra, J., 2007, Handbook of Cosmetic Science. Gramedia Pustaka Utama, Jakarta.s

Puh, W.L. Ranti, A.S. Wasitaatmadja, S.M. Junardy, F.D. Research on skin lightening and moisturizing ingredients from Indonesian plants. Pharm Sci Res. 2012;6(1):1–8.