

Dentification Of Hydroquinone Content On Whitening Creams That Are Circulating At The Traditional Market Of Palopo City

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Abstract

Hydroquinone is prohibited from being used in cosmetics, which is usually used as a skin whitening agent. This can cause cancer. Hydroquinone is used as a skin depigmentation drug. For this reason, it is necessary to test the hydroquinone content in whitening cream. This research aims to identify the hydroquinone content in whitening cream circulating in the Palopo City Traditional Market using the UV-Vis spectrophotometry method. The sample in this study consisted of 9 samples with the codes HB, BL, SS, DC, H, UK, KY, LB and CW. The results showed that the 9 samples that had been studied were positive for containing hydroquinone with levels of HB= 0.33%, BL= 0.31%, SS= 0.13%, DC= 0.37%, H= 0.52%, UK = 0.1%, KY= 0.1%, LB= 0.3% and CW= 0.04% so it can be concluded that the 9 samples that have been studied do not comply with BOPM regulations no. 23 of 2019, concerning the prohibition of the use of hydroquinone as a bleach or brightener in cosmetics. Thus, these 9 cream samples cannot be used as cosmetics and must change their category to therapeutic products (medicine) or remove the hydroquinone ingredient from their formula if they are still produced in the cosmetic category.

Keywords: *Whitening Cream; Hydroquinone; UV-Vis Spectrophotometry*

1. Introduction

Cosmetics are a substance or formulation intended for use outside the human body, such as to eliminate body odor, protect the body, and keep it in good condition. Some types of cosmetics that have the benefit of whitening the face are facial whitening cream or whitening cream. According to Badan POM Whitening cream is a cosmetic preparation that has the function of brightening and hiding dark spots on the skin. The whitening cream contains whitening agents such as arbutin, glutathione, alpha hydroxyl acid (AHA), and others (Umar et al., 2022).

From October 2014 to September 2015, 30 types of cosmetics were found to contain hazardous ingredients, consisting of 13 types of cosmetics produced abroad and 17 types of cosmetics produced domestically. The hazardous substances identified were Red K3 and Red K10 (Rhodamin B), Retinoic Acid, Mercury and Hydroquinone. And in the results of illegal drug and food control operations carried out by BPOM during April-June 2019, it was still dominated by the discovery of illegal cosmetics circulating in the market. In the Regulation of the Head of POM RI No. 2 of 2014 concerning the Second Amendment to the Regulation of the Head of POM RI No. HK.03.1.23.08.11.07517 of 2011 concerning Technical Requirements for Cosmetics Ingredients, the ingredients mentioned are.

2. Methodology

2.1. Type of Research

The type of research used is experimental, this study aims to obtain the results of the identification of hydroquinone content contained in whitening creams circulating in traditional markets in Palopo city, while the method used for laboratory tests is to use the UV-Vis Spectrophotometry method.

2.2 Time and Place of Research

The sample testing was carried out at the Pharmaceutical Chemistry Laboratory of Muhammadiyah University of Palopo. This research was conducted on July 20 - 31, 2023.

2.3 Population and Sample

The population in this study were several whitening creams that did not have BPOM permits, labels, content composition, and expired distribution permits that were traded in traditional markets in Palopo city. A total of 82 types of cosmetics were found by a joint team of the health office (Dinkes), in collaboration with the POM workshop on April 10, 2023. Luwu raya, especially the central market of Palopo city, as many as 15 brands of cream that do not meet the following criteria:

- a. Whitening cream that does not have a BPOM license
- b. Whitening cream that does not have a label
- c. Whitening cream that does not include the composition
- d. Whitening cream whose distribution permit has expired.

The sample used in this study is a face whitening cream that is traded in the traditional market of Palopo city, which will be taken, namely 9 types of whitening cream brands using the random/random method. Determination of the number of samples to be studied based on calculations using the slovin formula:

$$\begin{aligned}n &= N/(1+NE^2) \\ &= 15/(1+15(20\%)^2) \\ &= 15/(1+15 \times 0,04) \\ &= 15/(1+0,6) \\ &= 15/1,6 \\ &= 9 \text{ samples}\end{aligned}$$

Notes:

n = Number of samples to be studied

N = Total population

E = Error (%)

2.4 Operational Definition

Whitening cream is a mixture of chemicals or other ingredients with the property of being able to blanch black or brown spots on the skin. The whitening cream referred to in this study is whitening cream that has and does not have BPOM, labeling and composition of the content traded in the Traditional Market of Palopo City.

Hydroquinone is a drug to treat dark spots on facial skin due to melanin buildup (hyperpigmentation). In this study, several brands of whitening cream were examined using the UV-Vis Spectrophotometry method to determine the hydroquinone content in whitening creams traded in the Palopo City Traditional Market.

UV-Vis spectrophotometry is a method that will be used in this study to detect how much hydroquinone levels in whitening cream that is traded in the traditional market of Palopo city.

Non-BPOM whitening cream is a whitening cream that does not have a license from BPOM. The use of non-BPOM whitening creams can be harmful to health because there is no guarantee of the safety and feasibility of these products. Some non-BPOM whitening creams contain harmful ingredients such as mercury and hydroquinone that can cause skin irritation, damage to skin cells, and even skin cancer. Therefore, it is important to choose a safe and registered BPOM whitening cream. Make sure to read the product label carefully and choose products that have been registered with the FDA.

2.5 Tools and Materials

The tools used in this research are UV-Vis Spectrophotometer (Genesys 10S) analytical balance (Denver, Ohaus), volumetric flask, watch glass, stirring rod, spatula, dropper pipette, measuring cup, and filter paper. The materials used in this study were Hydroquinone Standard (Medilux), 96% Ethanol, Methanol (Merck), distilled water.

2.6 Research Procedure

2.6.1 Sample preparation

Sample preparation was carried out through weighing each whitening cream sample as much as 25 mg and suspended in 50 mL methanol, then shaken until homogeneous.

2.6.2 Preparation of Hydroquinone Standard Solution

Weighed standard hydroquinone as much as 5 mg dissolved with methanol, then put in a 100 mL volumetric flask and added methanol until exactly 100 mL, then the solution was shaken until homogeneous. So as to obtain a standard concentration of 50 ppm hydroquinone in methanol. Piped 10 mL of 50 ppm standard solution was included in a 50 mL volumetric flask and added with methanol solution until exactly 50 mL and then shaken until homogeneous. Obtained a solution with a concentration of 10 ppm. Pipetted 0.1; 0.2; 0.3; 0.4; 0.5; 1; 1.5 mL of 10 ppm standard solution put each into a 50 mL volumetric flask add methanol to the mark. Solutions with concentrations of 0.02; 0.04; 0.06; 0.08; 0.10; 0.20; 0.30 ppm were obtained.

2.6.3 Determination of Maximum Wavelength

Piped 0.4 mL of 10 ppm standard solution into a 50 mL volumetric flask, diluted with methanol solution until the mark and then shaken until homogeneous and the resulting hydroquinone solution with a concentration of 0.08 ppm. The 0.08 ppm solution was measured at a wavelength of 200-400 nm (produced at a maximum wavelength of 293 nm).

2.6.4 Measurement of Hydroquinone Level in Samples

Hydroquinone levels in the sample were analyzed by UV-Vis spectrophotometry. Measure the absorbance of the sample by ultraviolet spectrophotometry at a wavelength of 293 nm. Meanwhile, to calculate the hydroquinone level in the sample, it was calculated using the linear regression equation: $y = bx \pm a$ obtained through the standard hydroquinone curve.

Where, y = Absorbance
 x = Concentration
 b = Regression coefficient (states slope)
 a = regression constant (states the intercept)

3. Result and Discussion

3.1. Research Results

Cream Group	Description
Group 1	No BPOM license, no batch number, no composition i.e. BL and DC cream
Group 2	No no batch number, BPOM number i.e. HB, UK, CW cream.
Group 3	There is a BPOM number on the product but it is not certified by BPOM, namely LB cream.
Group 4	Does not have labeling on packaging, BPOM number, composition, batch number, expiration date i.e. H cream
Group 5	Does not have composition, BPOM number, batch number, expiration date i.e. SS cream
Group 6	Does not have a BPOM license, namely KY cream

The identification results of 9 samples of whitening cream that were positive for containing Hydroquinone used the UV-Vis Spectrophotometry method to determine the level of Hydroquinone in the whitening cream. The way to determine the hydroquinone content in a cream can be calculated using the linear registration equation: $y = bx \pm a$.

Information:

y = Absorbance

x = Concentration (level)

b = Regression coefficient (Slope)

a = regression constant (represents the intercept)

Equation: $X = 1.65$ ppm

Hydroquinone concentration 1.65 ppm = 1.65 mg/l x 0.05 L = 0.08 mg

Hydroquinone levels = x 100% = x 100% = 0.33 %

The collected samples were then analyzed with the results based on the following table:

Table 1. Results of Quantitative Analysis of Hydroquinone in Whitening Cream with UV-Vis Spectrophotometric Method

No	Sample Code	Hydroquinone Level (%)
1	HB (Cream 1)	0,33 %
2	BL (Cream 2)	0,31 %
3	SS (Cream 3)	0,13 %
4	DC (Cream 4)	0,37 %
5	H (Cream 5)	0,52 %
6	UK (Cream 6)	0,1 %
7	KY (Cream 7)	0,1 %
8	LB (Cream 8)	0, 3 %
9	CW (Cream 9)	0,04 %

3.2 Discussion

Cosmetics are products that are applied to the body with the aim of beautifying, cleaning or improving appearance (Okereke et al., 2015). Facial whitening products are one of the cosmetic products with active ingredients that function to inhibit the formation of melanin and destroy the melanin that has been formed, resulting in a whiter skin color (Indriaty et al., 2018). The active ingredient that is often found and added to facial whitening cosmetic products is hydroquinone. Cosmetics are materials or preparations used on the external parts of the human body (epidermis, hair, nails, lips and external genitals) or on the teeth and mucous membranes of the mouth, especially to clean, perfume, change the appearance and/or improve the body. smell or protect or maintain the body (Reigina, 2022).

Hydroquinone is a preparation or ingredient that functions to treat hyperpigmentation on external parts of the body such as the skin. Hyperpigmentation is the process of darkening of parts of the skin such as acne scars, scars, or brown spots due to frequent exposure to sunlight. Excessive use of hydroquinone can cause oochronosis, namely skin with nodules like sand and bluish brown in color. Oochronosis sufferers will feel like their skin is burning and itching.

Based on the results of quantitative analysis using UV-Vis Spectrophotometry shown in table 1, the results obtained in 9 samples of whitening cream (HB, BL, SS, DC, H, UK, KY, LB), were positive for containing hydroquinone. . This is not in accordance with BPOM regulation No.23 of 2019, hydroquinone is prohibited from being used as a bleach or brightener in cosmetics. Hydroquinone can only be used for nails with a concentration of 0.02%, and hair dye oxidizer with a maximum concentration of 0.03% (Efprio and Fajar, 2022)

Determination of Hydroquinone levels in whitening cream samples is carried out in the same way as measuring the standard solution, where the absorbance of the prepared sample solution is measured using a UV-Vis Spectrophotometer at a wavelength of 293 nm. The aim of measuring absorbance is to obtain a standard solution curve which provides

a regression equation to determine the level of Hydroquinone in the sample. The absorbance values that have been obtained are then calculated using the regression equation $y = 0.2737x + 0.0182$ with the results HB=1.65 ppm, BL=1.584 ppm, SS=1.67 ppm, DC=1.89 ppm, H=2.615 ppm, UK=0.510 ppm, KY=0.532 ppm, LB=1.504 ppm, and CW=0.33 ppm, then these values are converted into percentages (%). After being converted into percentages (%), the results obtained are HB=0.33%, LB=0.31%, SS=0.13%, DC=0.37%, H=0.52%, UK=0.1%, KY=0.1% and LB=0.3%, CW=0.04%. The results of quantitative analysis of Hydroquinone levels in the 9 samples used in this study showed levels in the range of 0.4%-0.52%. The highest level of Hydroquinone was found in sample H, namely 0.52%. In BPOM regulations No.23 of 2019, hydroquinone is prohibited from being used as a bleach or brightener in cosmetics.

4. Conclusions

Conclusions

The pendulum is very large and the position of the tent is the same as the Hydroquinone pad. From the color of the material and the distribution of the Palopo City Tradition using the UV-Vis Spectrophotometry method, it can be concluded that from the 9 creams studied (HB = 0.33%, BL = 0.31%, SS = 0.13%, DC = 0.37%, H = 0.52%, UK = 0.1%, KY = 0.1%, LB = 0.3%, CW = 0.04), of all creams However, this is the positive side of hydroquinone. This may be the first time it has been included in BPOM No. 23 of 2019, but hydroquinone will be closed at home. For further research development, it is hoped that it can expand the scope of the research location to cover the entire Palopo City Market area or cosmetic shops in Palopo City.

It is necessary to provide health education for the public to be more careful in choosing and using cosmetic products, especially whitening creams. It is best to choose products that already have BPOM permission, have clear labels and composition to avoid negative impacts. For BPOM to carry out regular inspections of cosmetic products, especially whitening creams that are already circulating on the market, so that their safety is maintained.

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