

## CHAPTER I

### INTRODUCTION

#### 1.1 Background

In Indonesia, the standard of beauty is seen as an ideal body shape with clear white skin.<sup>1</sup> A widely popular concept of beauty today is having fair skin. The media often portrays beauty as a slim, tall woman with white skin, a sweet demeanour and long hair. This perception can create pressure, especially among teenagers, to pursue various methods for achieving lighter skin. One common approach is the use of whitening and skin-lightening products.<sup>2</sup>

﴿وَمِنْ آيَاتِهِ ۖ خَلْقُ السَّمُوتِ وَالْأَرْضِ وَاخْتِلَافُ اللِّسَانِ وَالْوَلَوَانِ ۖ إِنَّ فِي ذَلِكَ لَآيَاتٍ

لِّلْعَالَمِينَ ۚ ٢٢﴾ (الرّوم/30: 22)

22. Among His signs are the creation of the heavens and the earth, the difference in your languages, and the colour of your skin. Indeed, there are signs for those who are knowledgeable.

This verse explains another sign of Allah's power and greatness: the creation of the heavens and the earth as a vast, thorough, and careful event. After mentioning the greatness of Allah through the creation of the heavens and the earth, the above verse states the diversity of languages and skin colour. Allah states that He has rightfully made humanity into many equal races in His eyes. The secret of the creation of the heavens and the earth, the differences in language and skin colour, and the psychological traits of human beings will not be known except by those who know. Hence, the verse concludes, "Indeed, in such things, there are signs for those who know."

Using care products and cosmetics is one of the modern ways to improve one's appearance. Nowadays, cosmetics have become a significant necessity for some

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<sup>1</sup> Rizki Andalia, 'LOTION PEMUTIH DOSIS TINGGI YANG DIJUAL', *Jurnal Sains Dan Kesehatan Darussalam*, 3.2 (2023), 16.

<sup>2</sup> Khintan Rizky Fadhila and others, 'Pengetahuan Dan Penggunaan Produk Pemutih Dan Pencerah Di Kecamatan Sukolilo Surabaya', *Jurnal Farmasi Komunitas*, 7.2 (2020), 56 <<https://doi.org/10.20473/jfk.v7i2.21806>>.

women to gain popularity because, for women, beauty must be maintained to remain attractive.<sup>3</sup> Cosmetics are materials or preparations intended for use on the external parts of the body such as the epidermis, hair, nails, lips, and external genital organs, or for cleaning the teeth and mucous membranes, especially to perfume the mouth, to change appearance, to improve odour, or to protect or keep the body healthy.<sup>4</sup>

Continuous exposure to ultraviolet sunlight can produce free radicals that can damage the skin's structure and layers.<sup>5</sup> In addition, it stimulates the activity of the tyrosinase enzyme and increases the number of melanocytes that produce melanin. As a result, the melanosome moves from melanocytes to keratinocytes, and the amount of melanin increases due to excessive exposure to ultraviolet radiation. Excessive melanin formation and abnormal accumulation of melanin in some parts of the skin may lead to hyperpigmented patches, which are considered aesthetic problems.<sup>6</sup> In this sophisticated era, cosmetic companies compete to make cosmetic products that are in high demand by women. One example is whitening lotion.<sup>7</sup>

Cosmetic preparations that contain water and emollients or softeners are called lotions. It has many properties, one of which is to moisturize the skin. Lotions provide a soft layer of oil on the body and hands but are not greasy and easy to apply. This preparation is usually known as hand and body lotion.<sup>8</sup>

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<sup>3</sup> Sri Kinanti and Asron SAPUTRA, 'Pengaruh Celebrity Endorser Brand Image Dan Kualitas Produk Terhadap Keputusan Pembelian Produk Scarlett Whitening Di Kota Batam', *ECo-Buss*, 5.3 (2023), 880–93 <<https://doi.org/10.32877/eb.v5i3.635>>.

<sup>4</sup> BPOM RI, 'Peraturan Badan Pengawas Obat Dan Makanan Nomor 17 Tahun 2022 Tentang Perubahan Atas Peraturan Badan Pengawas Obat Dan Makanan Nomor 23 Tahun 2019 Tentang Persyaratan Teknis Bahan Kosmetika', *Bpom RI*, 11 (2022), 3.

<sup>5</sup> Musyirna Rahmah Nasution and others, 'Penentuan Aktivitas Tabir Surya Ekstrak Etanol Daun Marpuyan (*Rhodamnia Cinerea* Jack.) Secara In Vitro', *Jurnal Dunia Farmasi*, 4.2 (2020), 59–67 <<https://doi.org/10.33085/jdf.v4i2.4599>>.

<sup>6</sup> Rahmi Sofiana, Anak A.G.P. Wiraguna, and Wimpie Pangkahila, 'Krim Ekstrak Etanol Biji Mengkudu (*Morinda Citrifolia*) Sama Efektifnya Dengan Krim Hidrokuinon Dalam Mencegah Peningkatan Jumlah Melanin Kulit Marmut (*Cavia Porcellus*) Yang Dipapar Sinar Ultraviolet B', *Jurnal E-Biomedik*, 5.1 (2017) <<https://doi.org/10.35790/ebm.5.1.2017.15017>>.

<sup>7</sup> Lidyawati and Mardiana R, 'Penyuluhan Tentang Bahaya Merkuri Yang Terkandung Dalam', *Jurnal Mitra Pengabdian Farmasi*, 1.2 (2022), 41.

<sup>8</sup> Anna Pradiningsih and others, 'Identifikasi Senyawa Hidrokuinon Dan Merkuri Pada Sediaan Whitening Body Lotion Yang Beredar Di Klinik Kecantikan', *Lambung Farmasi: Jurnal Ilmu Kefarmasian*, 3.1 (2022), 41 <<https://doi.org/10.31764/lf.v3i1.7023>>.

For years, 4% hydroquinone was used as the golden raw material for hyperpigmentation therapy. Hydroquinone works by stopping the tyrosinase enzyme's function and damaging melanocyte cells directly by accelerating melanosome degradation and preventing the formation of melanogenesis enzymes. However, the use of hydroquinone is restricted from now on.<sup>9</sup> BPOM Regulation No. 23/2019 stipulates that hydroquinone may not be used as a whitener or brightener in cosmetics. It can only be used for nails with a level of 0.02% and to oxidize hair dye with a maximum level of 0.3%.<sup>10</sup> Long-term use of hydroquinone in cosmetics can cause kidney abnormalities, cell proliferation, carcinogenic and teratogenic effects.<sup>11</sup>

Determination of hydroquinone levels in samples can be done using several methods, namely redox titration, UV-Vis Spectrophotometry, Colometry, Micellar Electro Chromatography, Thin-Layer Chromatography (KLT), and High-Performance Liquid Chromatography.<sup>12</sup> HPLC is a separation technique with high selectivity, so the results are as expected. With high separation, this method has the advantage of being able to separate to minor levels. With short analytical conditions and high separability of ingredients mixed in cosmetics, HPLC is one of the best methods to analyze cosmetics.<sup>13</sup>

Based on the description above, researchers are interested in analyzing the levels of hydroquinone in whitening lotion preparations in circulation using the HPLC method to determine the presence of hydroquinone and the level of whitening lotion.

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<sup>9</sup> Sofiana, Wiraguna, and Pangkahila.

<sup>10</sup> EN Kurniawan, F Nugraha, and H Kurniawan, 'Analysis of Hydroquinone Content in Whitening Cream by Spectrophotometry UV-Vis Method (Analisis Kandungan Hidrokuinon Pada Krim Pemutih Dengan Metode Spektrofotometri UV-Vis)', *Journal Syifa Sciences and Clinical Research (JSSCR)*, 4.3 (2022), 768.

<sup>11</sup> Ari Sumarmini Chakti, Eva Susanty Simaremare, and Rani Dewi Pratiwi, 'Analisis Merkuri Dan Hidrokuinon Pada Krim Pemutih Yang Beredar Di Jayapura', *JST (Jurnal Sains Dan Teknologi)*, 8.1 (2019), 2 <<https://doi.org/10.23887/jstundiksha.v8i1.11813>>.

<sup>12</sup> Novelita Anggi Charismawati, 'Analisis Kadar Hidrokuinon Pada Krim Pemutih Yang Beredar Online Dengan Metode Kromatografi Lapis Tipis (Klt) Dan Spektrofotometri UV-Vis', *Jurnal Kartika Kimia*, 4.2 (2021), 58–65 <<https://doi.org/10.26874/jkk.v4i2.79>>.

<sup>13</sup> Rini Fertiasari, Leni, and Kiki Kristiandi, 'Analisis Hidrokuinon Pada Kosmetik Cair Menggunakan Kromatografi Cair Kinerja Tinggi (KCKT)', *Media Ilmiah Kesehatan Indonesia*, 1.1 (2023), 6–11.



## 1.2 Problem Formulation

The problem formulations in this study are:

1. Is there hydroquinone content in the whitening lotion sample?
2. What is the level of hydroquinone in the whitening lotion sample?

## 1.3 Research Objectives

The objectives of this study are:

1. To determine the presence of hydroquinone in whitening lotion.
2. Knowing the amount of hydroquinone content in whitening lotion.

## 1.4 Research Benefits

### 1.4.1 Theoretical Benefits

The results of this study can be used to provide new information about hydroquinone levels in whitening lotions. It also supports the development of whitening lotion formulations that are more stable and effective. In addition, it can inform the public about the dangers of using hydroquinone on the skin.

### 1.4.2 Practical Benefits

The results of this study are expected to help cosmetics manufacturers, and consumers pay attention to product composition. In addition, it is likely to add to the repertoire of science and provide insight to readers, especially whitening lotion users, in increasing the safety of their use.

## 1.5 Originality of Research

Research on hydroquinone levels has been conducted by several researchers, as shown in Table 1 below.

Table 1 Originality of Research

Research Title	Research Methods	Variable	Results	Research Differences
Analysis of Hydroquinone in Liquid Cosmetics using High-Performance Liquid	Experimental	<b>Dependent:</b> Liquid Cosmetics by HPLC  <b>Independent:</b> Hydroquinone Level	The results showed that the reinjecting of hydroquinone solution, done 6 times, obtained the standard value of the comparison standard with the time used being 6.132 minutes and 506730 $\mu\text{L}/\text{minute}$ . These results show that the content in	<b>Dependent:</b> Hydroquinone levels  <b>Independent:</b> Whitening lotion

Research Title	Research Methods	Variable	Results	Research Differences
Chromatography (HPLC) <sup>14</sup>			the liquid cosmetic samples carried out is not found to contain hydroquinone or harmful and does not cause a peak at that minute.	
Determination of Hydroquinone Level in Hand Body Lotion Sold on Online Shopping Sites by UV-Vis Spectrophotometric Method <sup>15</sup>	Experimental	<p><b>Dependent:</b> Hand Body Lotion with Spektrofotometri UV-Vis Method</p> <p><b>Independent:</b> Hydroquinone Level</p>	<p>Samples were tested qualitatively and quantitatively at the maximum wavelength of hydroquinone 294 nm qualitative sample testing with uv-vis spectrophotometry. Positive samples containing hydroquinone were samples A, C, and E because the resulting spectrum was identical to the shape of the standard solution spectrum. In contrast, samples B and D were negative for hydroquinone. In the quantitative test with uv-vis spectrophotometry with ethanol solvent, the positive sample test results containing hydroquinone are samples A, C, and E with hydroquinone levels obtained in sample A <math>0.0039\% \pm 0.00457</math>, sample C <math>0.0627\% \pm 0.00366</math>, and sample E <math>0.0096\% \pm 0.00015</math>, it can be concluded that 3 out of 5 positive samples contain hydroquinone.</p>	<p><b>Dependent:</b> Hydroquinone Level</p> <p><b>Independent:</b> Whitening lotion</p>

<sup>14</sup> Fertiasari, Leni, and Kristiandi.

<sup>15</sup> Niken Feladita Santoso, Annisa Primadimanti, and Marleni Irama Juita, 'PENETAPAN KADAR HIDROKUIKON PADA HAND BODY LOTION YANG DIJUAL DI SITUS BELANJA ONLINE DENGAN METODE SPEKTROFOTOMETRI UV-Vis', *Jurnal Analis Farmasi*, 6.1 (2021), 30–36 <<https://doi.org/10.33024/jaf.v6i1.5487>>.