

An Analysis of Mercury (Hg) Levels in Face Whitening Cream Circulated at Lueng Putu Market, Bandar Baru District

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Abstract

Whitening cream is a type of cosmetics containing various chemical substances that can lighten dark spots on the skin. Prolonged use of whitening cream is claimed to be able to reduce or even eliminate hyperpigmentation on the skin. However, many whitening creams contain mercury which can cause pigmentation with permanent damages on the skin and body. The creams sometimes have no BPOM permission and are sold at a cheap price. This study thus aimed to investigate the presence of Mercury (Hg) in facial whitening creams of two different brands, namely Natural 99 and Collagen Night, circulating at Lueng Putu Market, Bandar Baru District, Pidie Jaya Regency. These brands were selected because they are popular among women living around the Lueng Putu market. This type of research was experimental. Based on the examination of the mercury content in two samples using a positive atomic absorption spectrophotometer method, it was found that there is mercury (Hg) with level of 176.2578 in Sample 1 and level of 172.7299 in Sample 2. This concentration exceeds the threshold set by the BPOM RI Number 12 of 2019, which should be no more than 1 mg/kg or 1 mg/L (ppm). It is thus suggested that customers stop using the cream to avoid their dangerous effects. For detoxification purpose, customers should use skin care products with natural ingredients, such as fruit masks for external treatment, and consume fruit, vegetables, and more water for internal treatment. Consulting a doctor is highly advised before and after using certain whitening creams.

Keywords: *Mercury Level, Face Whitening Cream.*

1. Introduction

White and bright skin has been the beauty standard in Indonesia. This encourages many people, particularly women, to use products that can brighten their skin. Skin functions to protect parts of the body from various disturbances and external stimuli by forming a biological mechanism, one of which is the formation of the melanin pigment to protect the skin from the dangers of the sun's ultraviolet rays. Ultraviolet radiation from the sun can cause various skin problems, such as redness, black spots, premature aging, dryness, wrinkles, and skin cancer. To overcome these problems, it is recommended that people use cosmetic treatments (Upik, 2016).

Whitening cream is a type of cosmetics containing various chemical substances to lighten dark spots on the skin. Prolonged use of whitening cream is claimed to be able to reduce or even eliminate hyperpigmentation on the skin. However, many whitening creams contain mercury which can cause pigmentation with permanent damages on the skin and body (Upik, 2016). Mercury is a dangerous heavy metal which can be toxic, even in a small concentration. The use of mercury in whitening creams can result in various skin problems, such as dark spots, allergies, and skin irritation. The use of mercury at a high dose can even cause permanent damages to the brain, kidneys, and impaired fetal

development. Its short-term use at a high dose can also cause vomiting, diarrhea, lung damage and cancer (Parengkuan, 2015).

Mercury is often added to whitening cream because it can act as an active ingredient that inhibits the formation of melanin in the skin. However, previous research findings show that it has dangerous toxic effects. Creams containing mercury can cause disturbances to the body's organs as well as skin irritation, such as skin burns, which turns black and become skin cancer (Puspitasari et al., 2018).

Whitening creams sold at markets without a BPOM registration number have been tested positive for mercury (Mongdong et al., 2019). In a study conducted by Parengkuan (2013) on 10 samples of illegal cosmetics in a city of Manado with no BPOM registration numbers, 5 out of 10 samples were tested positive for mercury (Hg). In Anggraeni's research (2018), all of the five samples studied contain mercury with levels ranging from 51.576 ppm to 3886.776 ppm.

Customers are often not aware of the presence of mercury in the whitening cream they use. They are simply tempted to buy it because it promises to brighten the skin and eliminate dark spots quickly. They often buy it at a cheap price and with no BPOM's registration number. This research thus aimed to investigate the presence of mercury in two popular whitening cream brands (Natural 99 and Collagen Night Cream) circulating at the Lueng Putu Market, Bandar Baru District, Pidie Jaya Regency.

2. Method

This research is experimental (with laboratory tests) to determine the mercury levels in two facial whitening creams circulating at the Lueng Putu market, Bandar Baru District, Pidie Jaya Regency. A quantitative test with the Atomic Absorption Spectrophotometry (AAS) method was employed. The population in this study were all face whitening creams with no BPOM's registration numbers at the Lueng Putu market, Pidie Jaya Regency in 2021. Two brands were selected as samples based on a simple random sampling formula and pot packaging.

Primary data from lab tests were processed manually by sorting and recapitulating the data to prepare them for the next stage. In this study, the data from laboratory test results consisting of quantitative method tests with spectrophotometry were tabulated in tables and analyzed descriptively.

3. Results and Discussions

Sampling

The following were the research samples obtained from a cosmetic seller at the Lueng putu market. There were two samples in total; both of which did not have BPOM registration numbers.

Table 1. Sampling

No.	Cream Sample	Shop Address	Sample Code
1.	Natural 99	Lueng Putu Market	1
2.	Callogen Night Cream	Lueng Putu Market	2

Laboratory Test Results

In this study, the mercury content was examined by a third party at the Center for Drug and Food Control (BBPOM), Banda Aceh. The samples were received by the BBPOM on

May 28, 2021, and examined on June 9, 2021. The laboratory test results of Sample 1 and Sample 2 were as follows:

Sample 1

Name of Preparation Sample	: Natural 99 Sample 1
Factory Production	: -
Registration Number	: -
Packaging	: Plastic Pot
Batch Number/Expiration	: -/-
Code/Admimistration Number BBPOM	: 21.081.12.12.07.0004
Sample Delivery	: -
Address	: -
Number of Samples Accepted	: 1 Pot
Number and Date of Delivery Letter	: 43/SPP/S-III/06/21 on 09-06-2021
Date of Receipt Example	: 09-06-2021

Table 2. Laboratory Test Results on Mercury Content in Face Whitening Creams at the Lueng Putu Market

Parameter Test	Result	Terms/Requirements Library	Method Library
Physics			
Form	Semi solid	-	
Color	Shiny white	-	
Smell	Normal	-	
Chemical			
Identification of Hg	(+) Positive	(-) Negative	MA PPPOMN 53/KO/13 ACM 005
Determination of Hg levels	176,2578	Not more than 1 mg/kg or 1 mg/l (1bpj)	

From Table 2, it can be seen that Sample 1 was tested positive (+) for mercury with the Hg level of 176.2578.

Sample 2

Name of Preparation Sample	: Callogen Night Cream Sample 2
Factory Production	: -
Registration Number	: -
Packaging	: Plastic Pot
Batch Number/Expiration	: -/-
Code/Admimistration Number BBPOM	: 21.081.12.12.07.0003
Sample Delivery	: -
Address	: -
Number of Samples Accepted	: 1 Pot
Number and Date of Delivery Letter	: 43/SPP/S-III/06/21 on 09-06-2021
Date of Receipt Example	: 09-06-2021

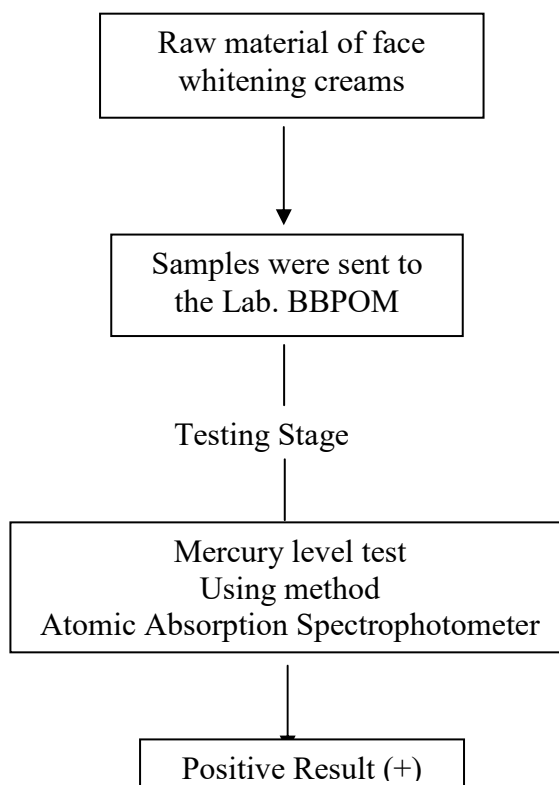
Table 3. Laboratory Test Results on Mercury Content in Face Whitening Cream at the Lueng Putu Market

Parameter Test	Result	Terms/Requirements Library	Method Library
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Physics			
Form	Semi solid	-	
Color	Shiny white	-	
Smell	Normal	-	
Chemical			
Identification of Hg	(+) Positive	(-) Negative	MA PPPOMN 53/KO/13 ACM 005
Determination of Hg levels	172,7299	Not more than 1 mg/kg or 1 mg/l (1 bpj)	

Table 2 shows that Sample 2 also contains mercury with Hg level of 172.7299.

Test Results Using Atomic Absorption Spectrophotometer Method Chart 1. Research Analysis



Description:The sample is positive because it contains mercury levels that exceed the specified threshold (1 ppm)

Based on the chart above, we can see that the research samples were facial whitening creams. The samples were then sent to the BBPOM of Banda Aceh on May 28, 2021 to be tested by a third party. The analysis of mercury content in this facial whitening cream was carried out using the Atomic Absorption Spectrophotometer testing method because it can measure the levels of metal accurately, even in a very small quantity. The analysis results showed that mercury, which is known as a very toxic and heavy metal, is present in both samples. The amount of mercury in each cream is different, with Sample 1 having the Hg level of 176.2578 while Sample 2 having the Hg level of 172.7299. These exceed the

threshold set by BPOM RI Number 12 of 2019, which is no more than 1 mg/kg or 1 mg/L (ppm).

According to Parengkuan (2015), whitening creams containing mercury will make the skin white and smooth in a short time, but it will later causedark spots on the skin, allergies, and skin irritation. The use of mercury at a high dose can cause permanent damages to the brain, kidneys, body, and fetal development. Even short-term exposure at a high dose can cause vomiting, diarrhea, lung damage as well as cancer.

4. Conclusions

It can be concluded that both of the studied samples contain mercury, with Sample 1 having the Hg level of 176.2578 while Sample 2 having the Hg level of 172.7299. This concentration exceeds the threshold set by the BPOM RI Number 12 of 2019, which should be no more than 1 mg/kg or 1 mg/L (ppm). It is thus suggested that customers stop using the creams to avoid their dangerous effects, and be more careful in choosing cosmetic products. For detoxification purpose, customers who have used facial creams with mercury are recommended to use skin care products with natural ingredients, such as fruit masks for external treatment, and consume fruit, vegetables, and more water for internal treatment. Consulting a doctor is highly advised before and after using certain whitening creams.

References

- Anggraeni, A., & Faridah, F. (2018). Analisis Cemaran Logam Berat Merkuri dalam Krim Pemutih Wajah yang Beredar di Pasar Tradisional dengan Metode Spektrofotometri Serapan Atom. *Journal of Pharmacopolium*, 1(1).
- Mongdong, A., Mongi, J., Paat, V., & Pareta, D. (2019). Analisis Kandungan Merkuri pada Krim Pemutih yang Beredar di Pasar Tomohon dan Tondano. *Biofarmasetikal Tropis*, 2(1), 91-96.
- Parengkuan, K., Fatimawali & Citraningtyas, G. (2013). Analisis Kandungan Merkuri pada Krim Pemutih yang Beredar di Kota Manado. *Jurnal Ilmiah Farmasi-UNSRAT*, 2(1). DOI: <https://doi.org/10.35799/pha.2.2013.886>
- Puspitasari, A., Lestari, I., & Dyah Wulandari, D. (2019). Analisis Kadar Merkuri dan Hidrokuinon dalam Kosmetik Krim Pemutih yang Dijual di Online Shop. *MPI (Media Pharmaceutica Indonesiana)*, 2(2), 98-104. <https://doi.org/10.24123/mpi.v2i2.1289>
- Rohaya, U., Ibrahim, N., & Jamaluddin, J. (2017). Analisis Kandungan Merkuri (Hg) pada Krim Pemutih Wajah Tidak Terdaftar yang Beredar di Pasar Inpres Kota Palu: Analysis of the Content of Mercury (Hg) in Unregistered Facial Whitening Creams Circulating in the Inpres Market of Palu. *Jurnal Farmasi Galenika (Galenika Journal of Pharmacy) (e-Journal)*, 3(1), 77 - 83. <https://doi.org/10.22487/j24428744.2017.v3.i1.8143>