Market Survey Report on Skin Lightening Cosmetic Products in Myanmar

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Abstract

Skin lightening cosmetics are one of the fastest-growing products that address the people's desire to lighter skin. The active ingredients to the skin lightening cosmetic products have the function to inhibit melanogenesis process under skin resulting less melanin content. Among them, inorganic mercury salts inhibit melanin formation by competing with copper in tyrosinase enzyme. Besides mercury, hydroquinone is often found in skin lightening cosmetic products. Repeated skin contact can lead to depigmentation, allergic contact dermatitis, and sensitization.

Despite extensive research on mercury-containing skin lightening products in various countries, Myanmar remains an unexplored region in this context. This survey aims to examine the market situation of skin lightening cosmetic products in Myanmar for the first time and assess the possible risks of chemical exposures by them.

Over-the-counter survey: Skin lightening cosmetic products are readily available in local markets in Myanmar. Some of them may have already been reported as mercury-added products in previous studies. To examine their current availability, products were extracted from earlier mercury studies. Using a list of 50 products intended to cover most mercury or hydroquinone-containing skin lightening products reported in previous studies, seven random cosmetics products stores in Yangon were visited to investigate the availability. Only one product was found on the shelves of 2 supermarkets and 2 street stalls.

Online survey: E-commerce platform is rapidly expanding globally to purchase skin lightening cosmetic products. Four online markets in Myanmar were selected and the mercury containing cosmetic products were searched to confirm the availability. Among the 50 products, 2 products were offered by one online platform.

Analytical study: Skin lightening cosmetic products which were identified in the over-the counter survey (one product) and online survey (2 products) were purchased for chemical analysis. In addition, other products in similar properties were randomly purchased at the local markets for chemical analysis as well. None of them indicated the elevated level of mercury content. Hydroquinone was also not detected in all analysed samples. Two products were initially analysed by XRF and then precisely analysed by Atomic Absorption Spectrometry (AAS). The initial X-Ray

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Fluorescence (XRF) analysis detected mercury concentrations of one sample as high as 16 µg/g, however, subsequent AAS analysis of the same sample revealed a mercury concentration of only 0.00039 µg/g, indicating a significant discrepancy. This inconsistency may have stemmed from spectral interference in XRF or insufficient background correction.

Safe skin lightening cosmetic products are easily available in local markets in Myanmar. At the same time, there are many products in e-commerce platforms which are reportedly containing hazardous substances. Analytical survey for the actual products in the local market is important to obtain accurate information.

Dissemination of safe information to general public is recommended to avoid the possible health damage by such hazardous products. Current economic difficulty in Myanmar is ironically contributing the restriction of the inflow of mercury-added products into the country. This could be the opportunity to inform the local market as well as online platforms not to expand their product line up to mercury-added cosmetics.

Keywords

Minamata Convention, Myanmar, Skin lightening, Mercury, Hydroquinone

Introduction

Mercury is a chemical element that has existed on Earth since its creation. It is the only metal element that exists in liquid form at normal temperature and demonstrates unique physical and chemical properties. Most mercury and its compounds have certain toxicities, but their biological behaviours, toxicity levels differ. Mercury is released from natural sources by processes, such as volcanic activity and permafrost melting, etc. In recent years, more mercury has been released through human activities, such as the combustion of fuels, mining activities, and the consumption of mercury-added products.

Due to its environmental behaviours and anthropogenic emissions and releases, growing concerns about mercury risks have resulted in the adoption and entry into force of the Minamata Convention on Mercury (the Convention). It is one of the newest multilateral environmental agreements aiming at protecting human health and the environment from anthropogenic emissions and releases of mercury and mercury compounds.

Myanmar is a country of around 676,577 km² located in Southeast Asia. With gross domestic product (GDP) of US$1,420 per capita in 2021, Myanmar is categorized as a lower-middle income economy according to the World Bank's income group classification. The country has a population of 54.806 million according to 2021 estimates, reflecting an average population growth rate of 0.6 per cent per year over the past decade (UN 2025) For 2023, the World Bank estimated an overall unemployment rate of 3.9 per cent, with the women's unemployment rate (3.9 per cent) higher than the average unemployment rate for men (2.5 per cent) (World Bank 2023).

In Myanmar, the main sources of mercury pollution are mining and gold extraction, and consumer products with mercury including mercury-added skin lightening cosmetics popular in Myanmar (UNEP 2021). Majority of women, about 80 percent living in rural areas become to use skin whitening creams due to attractive advertisements with lack of health knowledge on dangerous ingredient like mercury.

Skin lightening cosmetics are one of the fastest-growing products that address the people's desire to lighter skin. The skin tone is determined by the density of melanin, a pigment produced in the cells called melanocytes located in epidermis. The process to generate melanin, called melanogenesis, regularly occurs in melanocytes and further stimulated by some factors such as sunburn. Tyrosinase enzyme is required for melanocytes to produce melanin from the amino acid tyrosine.

The active ingredients to the skin lightening cosmetic products have the function to inhibit melanogenesis process under skin resulting less melanin content. Among them, inorganic mercury

salts inhibit melanin formation by competing with copper in tyrosinase enzyme (Engler 2005). The poisonous characteristic of inorganic mercury compounds is corrosion (Japan Public Health Association 2001) and long-term exposure to inorganic mercury will increase risks in renal damage. Even though the external stratum of the skin does not permit much penetration, small amount of mercury in cosmetics can reach the circulatory system (Irfan *et al.* 2022).

The Minamata Convention on Mercury has, thus, established a limit of 1 µg/g for skin lightening products. Even in some countries where such products have been banned, they are still advertised and available to consumers via the Internet and other means (WHO 2019). At the fifth Conference of Parties (COP) of the Convention, the 1 µg/g threshold for banning cosmetics was eliminated, which becomes effective in 2025. This amendment enables countries with limited monitoring capacity to utilise handheld devices, i.e., XRFs, to efficiently conduct market surveillance (Minamata Convention on Mercury 2023).

Despite extensive research on mercury-containing skin lightening products in various countries, Myanmar remains an unexplored region in this context. Bastiansz *et al.* (2022) undertook a systematic review to extract 41 peer-reviewed scientific literatures on mercury exposures from skin lightening products. The overall pooled central median mercury concentration in skin-lightening products was 049 µg/g and 24.9 % of the products contained mercury above 1 µg/g. Zero Mercury Working Group (2018) collected skin lightening creams from 22 countries and tested mercury contents. Zero Mercury Working Group (2022) further investigated 40 online platforms accessed from 17 countries on the availability of skin lightening products via popular e-commerce. None of the literature included Myanmar as the survey country.

Besides mercury, hydroquinone is often found in skin lightening cosmetic products. Hydroquinone is a reducing agent used as an antioxidant. Repeated skin contact can lead to depigmentation, allergic contact dermatitis, and sensitization. The excretion of hydroquinone and its metabolites is rapid, and occurs primarily via the urine (WHO 1996). Different from mercury, which is persistent in the environment, hydroquinone degrades as a result of both photochemical and biological processes.

Hydroquinone is also used for the medical treatment for melasma, a pigmentary disorder caused by a dysfunction of melanogenesis. Some of the most prominent and successful treatments for hyperpigmentation are melanogenesis inhibitors that target tyrosinase, an enzyme crucial in the synthesis of melanin (Jiang et al. 2018). Although it is a widely used skin-lightening agent, it is characterised by several adverse effects, which include carcinoma, irritative dermatitis, melanocyte destruction, contact dermatitis, and ochronosis, that leave the skin discoloured when consistently applied for a long period of time (Bamidele *et al.* 2023). His team randomly purchased

and analysed the hydroquinone content in 10 skin lightening cosmetics in Nigeria and found that hydroquinone always existed in the range of 1.9-3.3 %. In Thailand, where its use in cosmetics has been prohibited, the highest concentration out of 50 samples were 0.0016 %, which is however still above 1 µg/g (Ketkomol *et al.* 2019). No previous study is available in Myanmar.

This survey aims to examine the market situation of skin lightening cosmetic products in Myanmar for the first time and assess the possible risks of chemical exposures by them.

Materials and methods

Over-the-counter survey

Skin lightening cosmetic products are readily available in local markets in Myanmar. Some of them may have already been reported as mercury-added products in previous studies. To examine their current availability, relevant products were extracted from earlier mercury studies.

Four survey reports (ZMWG 2018, Toxics Link 2021, ZMWG 2022, and USFDA 2023) were used to extract detailed product information. Information on the 46 products containing mercury exceeding 1 µg/g, including product names, countries of origin/manufacturing, countries of purchase and mercury concentrations of the products, etc. was extracted and listed in Table 1. Four additional products that reportedly contain hydroquinone were also included. One product in the Table 1 contained both mercury and hydroquinone. A surveyor visited local markets to compare the products on the shelf and the names in the list to investigate their availability.

Online survey

E-commerce platform is rapidly expanding globally to purchase skin lightening cosmetic products. Due to the international situation surrounding Myanmar, such online trade in Myanmar is not as popular as the other countries, but t a few platforms are operational for trade consumer products. Four online markets in Myanmar were selected and the mercury containing cosmetic products listed in Table 1 were searched to confirm the availability.

Analytical study

Skin lightening cosmetic products which were identified in the over-the counter survey and online survey were purchased for chemical analysis. In addition, many other products in similar properties are easily available on local markets in Myanmar, thus, some of them were randomly purchased

for chemical analysis as well. The list of the products is available in Table 2. Total mercury and hydroquinone levels were analysed as these 2 chemical substances are often used as the active ingredients to the skin lightening cosmetic products. As no laboratory in Myanmar can analyse mercury and hydroquinone in cosmetics, the purchased samples were shipped to 2 foreign laboratories.

Asian Institute of Technology (AIT) analysed total mercury and hydroquinone contents by Thermal Decomposition Cold Vapor Atomic Absorption Spectrometry (CVAAS) and High-Performance Liquid Chromatography (HPLC), respectively.

Nippon Instrument Cooperation (NIC) Mercury analyser MA-3000 which is direct and specific method for determination of total mercury in various types of solid and liquid samples by thermal decomposition CVAAS was used in this study. Firstly, 10 µg/g and 0.1 µg/g of mercury standard solution was prepared from commercial 1,000 µg/g of mercury standard solution by diluting with 100 mg/L of L-Cysteine in 0.2 % nitric acid solution. Then, a series of mercury standard concentration from 0.1 to 2,000 ng was prepared by directly pipetting the 10 µg/g and 0.1 µg/g of the stock mercury standard solution in various volume (µL) into each sample holders (boat) that was added 100 mg of additive B and purged for cleaning the boat automatically by MA3Win program of NIC MA-3000 Mercury Analyzer before use. Finally, the standard mercury calibration curves were performed automatically by the MA3Win program which each concentration of the mercury standard was inputted in a standard (STD) table of the MA3Win program. Two types of calibration curves were observed, one was low concentration range of mercury standard (0.1-10 ng) and another was high concentration range of mercury standard (10-2,000 ng).

The levels of mercury concentration in the samples were firstly screened by simply using the toothpick to pick small amount of sample and putting them in sample holder (boat). The screened mercury concentration was observed automatically by the MA3Win program. After that, a precise determination of the sample containing low level of mercury concentration (<100 ng) was performed by directly weighing 10-100 mg of sample into the prepared boat with purged 100 mg of additive B. In case of high level of mercury concentration (>100 ng), the sample was diluted 10,000 times by dissolving 10 mg of the sample into 100 mL of 100 mg/L of L-Cysteine in 0.2% nitric acid solution and homogenously sonicated for 10 minutes. Based on the preliminary experiment that showed most of the cream samples dissolved into water, pure water was chosen as the diluting solvent. Nitric acid was added for preventing mercury from adhering onto the surface of the receptacle. Then, 10 or 100 µL of the diluted sample solution was pipetted into the prepared boat with purged 100 mg of additive B. The sample without dilution was measured using Method No.1: ORGANISM(SOLID) in the MA3Win program and Method No.6: WASTEWATER was

used for measurement of the diluted sample solution. Each sample was measured three times repeatedly for calculation of average total mercury concentration. An analysis time was 5 to 7 minutes. The weight of each sample was inputted in mg unit in a sample (SMP) table and the mercury concentration was calculated automatically by the MA3Win program.

HPLC method which is high sensitivity, high accuracy, and excellent precision was operated for determination of hydroquinone in skin lightening cosmetics. A stock 1,000 µg/g of hydroquinone standard solution was prepared by weighing 25 mg of hydroquinone standard and dissolving in 25 mL of Milli-Q water. Then, the stock hydroquinone standard was diluted into a series of hydroquinone standard solution from 1 to 100 µg/g. the standard hydroquinone calibration curve was performed by plotting linear regression graph between hydroquinone concentration (x-axis) and peak area of HPLC chromatogram (y-axis). The samples were simply prepared by dissolving 0.1-0.2 g of sample with 10 mL of AR grade methanol 99.5% in 25 mL beaker. After that, the sample solution was mixed and stirred at 60 °C for 10 minutes using hotplate and magnetic bar. This process can dissolve hydroquinone into methanol phase. After cooling down the samples until the separation of fat occurred, they were filtered through 100 mL volumetric flask by No.1 Whatman filter paper. The sample volume was then made up to 100 mL by adding Milli-Q water and finally, 1 mL of the sample was filtered to HPLC vial by 0.2 µM nylon syringe filter. This is the similar method chosen by the previous research (Ketkomol *et al.* 2019) as a common method.

The prepared sample was measured by reversed phase HPLC technique using Shimadzu HPLC-20A series with LabSolutions LC Program, the HPLC condition for determination of hydroquinone in skin lightening cosmetics was reversed phase column of Shim-pack GIS C18 (5 µm, 150 mm x 4.6 mm), column temperature at room temperature (~25°C), mobile phase of water to methanol in a ratio of 70: 30, flow rate of 0.8 ml/min, injection volume of 20 µL, and absorption wavelength of 290 nm. An analysis time was 10 minutes and a retention time of hydroquinone was approximately 3.7 minutes. Each sample was measured three times repeatedly for calculation of average hydroquinone concentration. The concentration of hydroquinone in the sample was calculated in percentage unit from ppm unit using linear regression equation with total volume of the sample solution and weight of the sample. The analytical performance of total mercury analysis and hydroquinone analysis was evaluated by five parameters of linearity (R^2>0.99), limit of Detection (LOD) as three times of standard deviation of blank, limit of Quantification (LOQ) as ten times of standard deviation of blank, precision (%RSD≤10 %), and accuracy (80 %≤% Recovery≤120 %).

National Institute for Minamata Disease (NIMD) analysed total mercury contents with Energy Dispersive X-Ray Fluorescence (XRF) for screening and with Thermal Decomposition Atomic Absorption Spectroscopy (TD-AAS) for precise quantification.

XRF measurements were conducted using a Shimadzu EDX-7200 under standard conditions (10 mm collimator, 120 s measurement time). A calibration curve was established using spiked standard samples prepared by adding 1000 µg/g standard solutions of Hg to a commercially available skin-lightening product (Moisture Mild White Cream, KOSE, Japan), with spiked concentrations of 1 µg/g, 5 µg/g, 10 µg/g, and 20 µg/g. To ensure measurement consistency, a minimum sample thickness of 5 mm was maintained to achieve infinite thickness, reducing errors from secondary fluorescence and absorption effects. During measurement, a thin polypropylene film (4 µm, Prolene®, Chemplex Inc.) was placed between the detector and the sample to prevent contamination and ensure a stable measurement surface. TD-AAS analysis was performed using a MA-3000 with the edible oil method, involving slow heating at 250°C for 10 minutes followed by rapid heating at 800°C for 2 minutes. Approximately 50 mg of each sample was analysed with the addition of Additive B to protect catalysts.

Results and discussions

Over-the-counter survey

Using a list of 50 products intended to cover most mercury or hydroquinone-containing skin-lightening products reported in previous studies in Table 1, the following seven random cosmetics products stores in Yangon, former capital city of Myanmar, were visited to investigate the availability of the listed products in March 2025.

a) 2 Supermarkets
b) 3 Local market cosmetics shops
c) 2 Street stalls

Investigation involved examining the product names, countries of origin/manufacturing, and, etc. to compare the products on the shelves of the stores visited. Among the 50 products, only one product (#A02: 'Arche' Formula AA Pearl Cream) was found on the shelves of 2 supermarkets and 2 street stalls. And this product was out of stock in 3 local market cosmetics shops. The product was made in Thailand.

It was confirmed by the shop owners that the product was still widely popular and available on the markets across Myanmar.

Online survey

Following 4 e-commerce platforms, which are operational and popular in Myanmar, were selected to undertake the online survey in February 2025:

- Shop (https://www.shop.com.mm).
- SeinGayHar (https://www.seingayhar.com).
- KhitZay (https://khitzay.com.mm).
- CityMall (https://www.citymall.com.mm).

The brand names of a part of them in Table 1 were put into the search fields and reviewed the products extracted and suggested by the platforms. Among the 50 products, following 2 products were offered by one online platform (i.e., 'Shop'):

- #A07: 'Collagen Plus Vit E Night Cream' at 'Shop' platform. This product reportedly contains both mercury and hydroquinone.
- #A25: 'Kim Concentrated Snow Lotus Serum' at 'Shop' platform (Not exactly the same product listed but the similar product from the same brand).

No product in Table 1 was extracted by 'SeinGarHar', 'KhitZay', and 'CityMall' platforms. Instead, the products in Table 2 Part II were often found at the platforms as follows (all the products below were confirmed safe in this study, see the result in the section of analytical study):

- Shop: . #B01, #B03, #B04, #B07, #B09, #B10.
- SeinGayHar: . #B03, #B10.
- KhitZay: . None
- CityMall: . #B01, #B03, #B04, #B05.

It is evident that the mercury-added skin lightening cosmetic products in e-commerce platforms in Myanmar is less available than the platforms operated in neighbouring countries, e.g., Bangladesh, Thailand, etc. ZMWG (2022) reported 9 and 13 products purchased via the e-commerce platforms in Bangladesh and Thailand, respectively while only 2 products were found in Myanmar. It might be due to the difference of local logistic systems and market sizes between Myanmar and the neighbouring countries.

Analytical study

Three skin lightening cosmetic products identified in the over-the-counter survey (1 product) and online survey (2 products) were purchased in April 2025. In addition, 11 skin lightening products were purchased at the local markets in Myanmar in August and November 2024. 12 products (#A02, #A07, #A25 and #B01 - #B09) were sent to the AIT laboratory and mercury and hydroquinone contents were analysed by CVAAS and HPLC, respectively. 2 products (#B10 - #B11) were sent to the NIMD laboratory and mercury contents were analysed by XRF and TD-AAS. Analytical results are listed in Table 2.

There are no indication of the mercury and hydroquinone ingredients on the label of the product items #A02, #A07, #A25 and #B01 - #B09. Nevertheless, the samples were initially screened with

the minimum amounts collected by toothpicks. None of them indicated the elevated level of mercury content. Actually, the mercury concentrations of these samples were at very low levels. Hydroquinone was also not detected in all analysed samples.

- #A02: Mercury 0.0073 µg/g Hydroquinone ND
- #A07 Nighy cream: Mercury 0.14 µg/g Hydroquinone ND
- #A07 Day cream: Mercury 0.10 µg/g Hydroquinone ND
- #A25: Mercury 0.43 µg/g Hydroquinone ND
- #B01: Mercury 0.0057 µg/g Hydroquinone ND
- #B02: Mercury 0.0050 µg/g Hydroquinone ND
- #B03: Mercury 0.015 µg/g Hydroquinone ND
- #B04: Mercury 0.0053 µg/g Hydroquinone ND
- #B05: Mercury 0.0087 µg/g Hydroquinone ND
- #B06: Mercury 0.0063 µg/g Hydroquinone ND
- #B07: Mercury 0.0063 µg/g Hydroquinone ND
- #B08: Mercury 0.0037 µg/g Hydroquinone ND
- #B09: Mercury 0.0037 µg/g Hydroquinone ND

*ND means the level of hydroquinone is lower than LOD (0.3 µg/g).

Product items #B10 and #B11 were initially analysed by XRF and then precisely analysed by TD-AAS. The detection limit (LOD) of the XRF was assessed for mercury using spiked cosmetic samples. Samples with the concentrations below 6 µg/g were undetected, while 10 µg/g was reliably detected. The initial XRF analysis detected mercury concentrations of the samples as high as 16 µg/g in #B10. However, subsequent TD-AAS analysis of the same sample revealed a mercury concentration of only 0.00039 µg/g, indicating a significant discrepancy. This inconsistency may have stemmed from spectral interference in XRF or insufficient background correction.

- #B10: XRF 16.2 µg/g, TD-AAS 0.00039 µg/g
- #B11: XRF ND TD-AAS 0.00050 µg/g

Discussions

In this study, all samples analysed by AAS did not contain mercury above 1 µg/g even though some products reportedly contain mercury in previous studies (i.e., #A02, #A07, and #A25). It might be due to the different methodology that the previous studies have taken. 'False positive' result by XRF analysis may be expected, which was also indicated by the sample #B10 in this study.

Product #A02 purchased in this study explicitly labelled 'No mercury, no hydroquinone' although the previous study (ZMWG 2022) reported the mercury concentration between 2 and 24 µg/g determined by AAS. The variation of mercury content in the same product might have caused by

the unintentional contamination during the production process. If it is the case, this product does not fall under the category of 'mercury-added product' which is defined as 'a product that contains mercury or a mercury compound that was intentionally added.'

Product #A07 is composed of day cream (sunscreen) and night cream (whitening). The mercury contents are not much different between these two types of cream, which indicates there were no intended addition of mercury. The discrepancy from previous studies was unexpected but may have been the result of the conversion of the active ingredients by the manufacture. As hydroquinone is not a natural contaminant, it will not be detected unless intentionally added to the product. The label on the package does not indicate hydroquinone, which might be because the manufacturer has changed its active ingredient to other chemical compounds.

Product #A25 has a series of creams for various purposes. The purchased product might be a sister product from the same manufacturer but actually not exactly the same product as reported in the previous studies.

Conclusion

Analytical study found that safe skin lightening cosmetic products are easily available in local markets in Myanmar. At the same time, there are many products in e-commerce platforms which are reportedly containing hazardous substances. The information in the previous reports, however, may be inaccurate (due to the use of XRF instead of AAS) or outdated (due to the recent enforcement of the Minamata Convention in the manufacturing countries). Analytical survey for the actual products in the local market is, thus, extremely important to obtain accurate information.

Dissemination of safe information to general public is recommended to avoid the possible health damage by such hazardous products. Current economic difficulty in Myanmar is ironically contributing the restriction of the inflow of mercury-added products into the country. This could be the opportunity to inform the local market as well as online platforms not to expand their product line up to mercury-added cosmetics.

Another concern is that sales of skin lightening products might be more popular on Facebook platform than e-commerce platforms in Myanmar. This may be because Facebook is a widely used social media in Myanmar, and may beauty business in Myanmar utilize it for marketing and sales, particularly for skin lightening products. It is recommended that the scale of SNS-based commerce will be examined for the cosmetic trade.

Authorship contribution statement

Mitsugu Saito developed survey planning, coordinated the survey team to undertake each role, and drafted this report. Kyaw Nyunt Maung undertook local market survey including purchasing the skin lightening product available in Myanmar, and drafted this report. Chacriya Malasuk developed analytical protocols for total mercury and hydroquinone in cosmetic products and undertook chemical analysis. Koichi Haraguchi examined mercury determination methodology for cosmetic products, undertook chemical analysis and reviewed and edited this report.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Table 1 List of skin lightening products reportedly containing mercury above 1 µg/g

#A	Brand name	Country of origin/ manufacture*	Mercury content (µg/g)	Purchased	Remarks
01	Aneeza Gold Beauty Cream with Avocado & Aloe Vera; Beauty Face Cream	Pakistan	1,200-20,507[3)] 12,400[4)]	Kenya, India, Nigeria, South Africa, Thailand, Uganda[3)] USA[4)]	
02	Arché Formula AA Pearl Cream	Thailand	2-24[3)]	Belgium, USA[3)]	
03	Be Be Special Cream CCM/Yellow	NA	3,110-8,909[4)]	USA[4)]	

#A	Brand name	Country of origin/ manufacture*	Mercury content (µg/g)	Purchased	Remarks
04	CCM Special Cream Anti-melasma Dark-spots Cream; Special Cream Turmeric; Perfect 365 White Cream	NA	4,234[3)] 4,322-8,088[4)]	USA[3)] USA[4)]	
05	Chandni Whitening Cream	Pakistan	6,800[1)] 14,000[1)] 11,000[2)] 19,978-30,146[3)] 8,790[4)]	Bangladesh[1)] Mauritius[1)] India[2)] Kenya, Uganda[3)] USA[4)]	SJ Enterprises
06	Cleome White – Lemon Formula	Thailand	8,300[1)] 9,695-48,000[3)]	Thailand[1)] Thailand[3)]	
07	Collagen Plus Vit E Night Cream	UAE	7,111[1)] 2,080-40,100[3)] 3,670[4)]	Indonesia[1)] Bangladesh, Belgium, India, Indonesia, Mexico, Nepal, Philippines[3)] USA[4)]	Hydro-quinone 2.0 %[4)]
08	Dr. Japan Nano	Japan	5,554-63,000[3)]	Kenya, Thailand, Uganda[3)]	
09	Due Beauty Cream	Pakistan	11,940[1)] 131-19,930[3)]	Bangladesh[1)] Belgium, Indonesia, Côte d'Ivoire[3)]	Kreative Cosmetics Private LTD
10	Egg White and Cherry 7 Days Specific Eliminating Freckle Whitening Cream	Taiwan	5,271[1)] 2,740-9,000[3)]	Bangladesh[1)] Bangladesh, India[3)]	Spring International Cosmetic Group Company
11	Erna Whitening Cream	Malaysia	1,300[3)]	Indonesia[3)]	

#A	Brand name	Country of origin/ manufacture*	Mercury content (µg/g)	Purchased	Remarks
12	Face Fresh Beauty Cream; Plus Gold Beauty Cream	Pakistan	8,000[2)] 1,300-14,316[3)] 18,500[4)]	India[2)] Belgium, India, South Africa, Thailand, USA[3)] USA[4)]	
13	Faiza Beauty Cream	Pakistan	9,053[1)] 9,000-13,229[3)]	Bangladesh[1)] India, Indonesia, Kenya, Thailand, Uganda, USA[3)]	Poonia Brothers
14	Gemli Glutathione Grapeseed extract whitening and anti-aging night	Hong Kong	750[1)] 1,565[1)]	Philippines[1)] Philippines[1)]	
15	Gluta White Skin Whitening Cream – Advanced Glutathione Formula	USA	9974[3)]	India[3)]	
16	Golden Pearl Whitening Beauty Cream	Pakistan	9,648[1)] 4,000[2)] 7,000-56,012[3)] 12,000[4)]	Bangladesh[1)] India[2)] Bangladesh, India, Kenya, Philippines, Thailand[3)] USA[4)]	Golden Pearl Cosmetics
17	Goree Beauty Cream with Lycopene; Day and Night Whitening Cream	Pakistan	10,576[1)] 16,353[1)] 11,000[2)] 14,000[2)] 10,000-23,197[3)] 17,200[4)]	Philippines[1)] Bangladesh[1)] India[2)] India[2)] Bangladesh, India, Kenya, Philippines, Thailand[3)] USA[4)]	H Pharmacy

#A	Brand name	Country of origin/ manufacture*	Mercury content (µg/g)	Purchased	Remarks
18	Green Tea Seven-day Whitening Anti-freckle Cream	Taiwan	5,068[1)] 3,000[3)]	Bangladesh[1)] Bangladesh[3)]	Hua Thu Li
19	Hiyady Glutatione Cream White & Bright	NA	15,900[4)]	USA[4)]	
20	Hoor! Whitening Cream	Pakistan	1,083[1)]	Bangladesh[1)]	Hanza Company
21	Huayenong – Bird's Nest Cosmetology	Taiwan	5,271[1)]	Bangladesh[1)]	Bird's Nest Cosmetology
22	Jiaobi Whitening & Moisturizing Set; Whitening Day Cream; Whitening Make-up Base; Whitening Night Cream	Hong Kong	3-36,155[3)]	Bangladesh, Belgium, India, Indonesia, Philippines, Thailand[3)]	
23	Jiaoli Miraculous Day Cream; Night Cream; Bird's Nest – Whitening Spot-removing Scheme Suit; HuiChuSu Face Cream 7 Days Specific Eliminating Freckle; Speckle Dispelling & Whitening Cream	China, Taiwan	500[1)] 1,693[1)] 711[1)] 1,200[1)] 365[1)] 1,197-10,000[3)]	Philippines[1)] Philippines[1)] Bangladesh[1)] Philippines[1)] Philippines[1)] Belgium, Philippines, Thailand[3)]	Hearben Gelidai Jiabao Cosmetics
24	Jolié Beauty Cream	Pakistan	6,967[3)]	Belgium[3)]	
25	Kim Whitening Anti-spot Night Cream; Whitening Ginseng and Pearl Cream; Whitening Pearl and Snow Lotus Cream	South Korea, Thailand	2,100[1)] 4,300[1)] 245-29,000[3)] 47[4)]	Thailand[1)] Thailand[1)] Bangladesh, Mexico, Nigeria, Thailand[3)] USA[4)]	
26	La Crema de Rebeca Crema Facial	Mexico	4,821[3)]	Mexico[3)]	

#A	Brand name	Country of origin/ manufacture*	Mercury content (µg/g)	Purchased	Remarks
27	La Tia Mana Crema Limpiadora y Curativa	Mexico	6,456-8,396[3)] 5,432[4)]	Antigua & Barbuda, Mexico[3)] USA[4)]	
28	Lata Herbal Skin Bright Cream	Bangladesh	8,500[1)]	Bangladesh[1)]	Lata Herbal Co.
29	Ling Zhi BB Whitening Cream	Japan	1,393[4)]	USA[4)]	
30	Monespa Express Peeling	NA	5,030[4)]	USA[4)]	
31	Natural 99 Vitamin E Plus	Indonesia	2,018[1)] 2,300-28,000[3)]	Indonesia[1)] Indonesia, Philippines [3)]	
32	New Face Whitening Cream	Pakistan	16,000[1)] 12,247-15,594[3)]	Bangladesh[1)] Bangladesh, India[3)]	
33	Non-Oily Deluxe Silken Bleaching Cream	Jamaica	8,300[1)]	Trinidad & Tobago[1)]	
34	Noor Herbal Beauty Cream; Herbal Whitening Cream; Noor Gold Beauty Cream	Pakistan	16,000[1)] 10,251-19,249[3)]	Bangladesh[1)] Bangladesh, India, Côte d'Ivoire, Kenya[3)] Uganda[3)]	Kaw Cosmetics
35	Nunn Care Crema Limpiadora	Mexico	314-5,569[3)]	Bahrain, Mexico[3)]	
36	O White Whitening Cream Premium Package; Whitening Cream	Thailand	7,300[1)] 4,410[3)]	Thailand[1)] Mexico[3)]	
37	Papaya Whitening and Freckle-eliminating Package	NA	3,182[3)]	USA[3)]	

#A	Brand name	Country of origin/ manufacture*	Mercury content (µg/g)	Purchased	Remarks
38	Parley Beauty Cream; Goldie Advanced Beauty Cream; Goldie Pearl Shine; Herbal Beaty Cream with Avocado	Pakistan	1,000-24,714[3)]	Belgium, Philippines, Thailand, Uganda, USA[3)]	
39	RDL Whitening Treatment Night Cream 8 Days Treatment	Philippines	5,958[1)] 2,465[3)]	Indonesia[1)] Indonesia[3)]	
40	Sakura Gluta Speed White	NA	10,000-13,000[3)]	Thailand[3)]	
41	Sandal Whitening Beauty Cream	Pakistan	8,068-10,295[3)] 13,100[4)]	India[3)] USA[4)]	
42	Skin Care & Cosmetic MSII Whitening Peeling; Express Peeling	France	1,581-5,797[4)]	USA[4)]	
43	Temulawak New Beauty Whitening Cream (Night Cream)	Malaysia, China	3,059[1)] 1,884[1)] 51,000-65,000[3)]	Indonesia[1)] Bangladesh[1)] Indonesia, Thailand[3)]	Guangzhou Tengzhang International Trade Co. Ltd
44	White Pearl Plus Cleanser Cream	Pakistan	93[1)]	Bangladesh[1)]	
45	White Rose Whitening	Thailand	6,500[1)]	Thailand[1)]	
46	Yinni – Green Tea Quickacting Whitener and Speckle Remover	China	10,392[3)]	USA[3)]	
47	African Queen Strong Bleaching Treatment	USA	-	USA[4)]	Hydro-quinone 3.6 %[4)]

#A	Brand name	Country of origin/ manufacture*	Mercury content (µg/g)	Purchased	Remarks
48	Amos Make Me White in 7 Days	USA	-	USA[4)]	Hydro-quinone 1.2 %[4)]
49	B.B. Clear Dark Spot Remover Cream	Togo	-	USA[4)]	Hydro-quinone 4.4 %[4)]
50	Light & Natural Carotone Black Spot Corrector Crème B.S.C.	Côte d'Ivoire	-	USA[4)]	Hydro-quinone 4.4 %[4)]

*: According to the report.

Information source: 1) ZMWG 2018, 2) Toxics Link 2021, 3) ZMWG 2022: purchased via e-Commerce, 4) USFDA (2023).

Table 2 Product purchased in Myanmar for chemical analysis

Part I: Products identified by market surveys

#A	Brand name	Manufacturer	Country of origin/ manufacture	Mercury/ Hydroquinone content	Image
02	Arché Formula AA Pearl Cream	U. B. Chemical Industries Co, Ltd.	Thailand	Mercury: 0.0073 µg/g Hydroquinone: ND	 Explicitly labelled 'No mercury, no hydroquinone'

#A	Brand name	Manufacturer	Country of origin/ manufacture	Mercury/ Hydroquinone content	Image
07	Collagen Plus Vit E Night Cream; Day Cream (#A07 in Table 1 is night cream only)	NA	UAE	Night cream Mercury: 0.14 µg/g Hydroquinone: ND Day cream Mercury: 0.10 µg/g Hydroquinone: ND	 Day cream is sunscreen and night cream is whitening.
25	Kim Snow Lotus and Pearl Booster Serum (Not exactly the same product in Table 1)	Produced: Mo Jun Korea Sales: Kim Cosmetic	South Korea, Thailand	Hg: 0.43 µg/g Hydroquinone: ND	

Part II: Products randomly purchased in local markets

#B	Brand name	Manufacturer	Country of origin/ manufacture	Mercury/ Hydroquinone content	Image
01	De leaf Thanaka Extra Mosturing & Whitening Cream	Milott Laboratories Co., Ltd.	Thailand	Hg: 0.0057 µg/g Hydroquinone: ND	

#B	Brand name	Manufacturer	Country of origin/ manufacture	Mercury/ Hydroquinone content	Image
02	Pacare bassie Le'Skin Snail Whitening Moisture Face Cream	The Natural Beauty and Cosmetic (Thailand) Co., Ltd.	Thailand	Hg: 0.0050 µg/g Hydroquinone: ND	
03	C'Care UV White Glowing White	Cosmediva Co., Ltd.	Thailand	Hg: 0.015 µg/g Hydroquinone: ND	
04	Sasimi Sun Protection (Sunscreen)	NA	Thailand	Hg: 0.0053 µg/g Hydroquinone: ND	
05	Sasimi Aloe vera Face serum (Whitening Moisture)	NA	Thailand	Hg: 0.0087 µg/g Hydroquinone: ND	

#B	Brand name	Manufacturer	Country of origin/ manufacture	Mercury/ Hydroquinone content	Image
06	Sasimi UV Essence (Skin Whitening)	NA	Thailand	Hg: 0.0063 µg/g Hydroquinone: ND	
07	K-beauty Tone-up Effect (Whitening Tone-up Cream)	C&CN Co., Ltd.	South Korea	Hg: 0.0063 µg/g Hydroquinone: ND	
08	Fair & Lovely Multi-vitamin Cream	NA	Indonesia	Hg: 0.0037 µg/g Hydroquinone: ND	
09	I am Soda Instant Whitening Cream	NA	South Korea	Hg: 0.0037 µg/g Hydroquinone: ND	

#B	Brand name	Manufacturer	Country of origin/ manufacture	Mercury/ Hydroquinone content	Image
10	Bio-Oil Dry Skin Gel	Mega Lifescience Ltd.	Myanmar	Hg: 0.00039 µg/g	
11	Pond's Age Miracle Night Cream	PT Uniliever	Indonesia	Hg: 0.00050 µg/g	

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