



Dangerous, mercury-laden and often illegal skin-lightening products

Readily available for (online) purchase



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Executive Summary

It is an uncomfortable truth that colorism is still pervasive worldwide. In communities of color, beauty standards based on the racist notion that lighter skin is more desirable still hold power. In the quest for lighter skin, many people of color turn to skin lightening products and by choosing some of the least expensive products, unwittingly expose themselves to more toxic and illegal substances.

By the end of 2020, the Minamata Convention on Mercury requires each Party to ban the manufacture, import or export of cosmetics containing over 1 ppm mercury, by taking appropriate measures. On the other hand, the massive growth of online retail is creating an enormous challenge for governments attempting to keep dangerous, toxic and often illegal products out of consumers' hands.

Extensive testing by the Zero Mercury Working Group (ZMWG) again confirms that local markets and also internet platforms such as Amazon and eBay (along with many other online internet marketers worldwide), are selling toxic, dangerous and often illegal skin lighteners that have been already identified by many governments around the world as over the legal limit. Further, e-commerce giants have failed to ensure that cosmetics sold through their sites directly or by third-party sellers are free of toxic and illegal substances like mercury.

In this study, the collection of samples was carried out by non-governmental organization (NGO) partners of the ZMWG^a. 166 samples (mainly creams, two serums and three soaps) were bought from both physical shops and large and frequently used e-commerce platforms in the 12 countries^b participating in the study. After testing, 93 of them, therefore 56%, were found to violate the limit of one part per million (ppm) of mercury that many countries have fixed as a legal limit.

For those products found to have mercury levels over 1 ppm, their contents ranged from 1.09 ppm to 40,000 ppm. Most creams were screened with X-ray fluorescence (XRF), but 87 were analyzed by accredited labs using Atomic Absorption Spectroscopy (AAS). Thirteen creams (or 14%) had mercury contents exceeding 20 000 times the allowed limit according to the Minamata Convention. Sixty-four of the non-compliant creams (or 69%) were bought online.

While many of these non-compliant creams were identified in our prior 2018 ZMWG testing report last year, our testing confirms that the same brands are still available and being sold in several countries, and/or are available to them from e-commerce platforms. This study also showed that the same brands were found to contain high mercury levels on several consecutive sampling occasions, in different years, in both physical shops and via e-commerce platforms. In addition to previously identified high-mercury brands, 20 additional were found in the 2019 sampling round.

Based on the information from the packaging, most of the high-mercury products tested were manufactured in Asia, especially in Pakistan (54%), Thailand (18%) and China (16%). However, it's important to note that the study did not test products from Latin America.

^a Ban Toxics (BT), the Philippines; Bio Visio Africa (BIVA), Uganda; Centre Africain pour la Santé Environnementale (CASE), Côte d'Ivoire; Centre for Environment, Justice and Development (CEJAD), Kenya; European Environmental Bureau (EEB), the European Union; Environment and Social Development Organization (ESDO), Bangladesh; groundwork South Africa (gW), South Africa; Mercury Policy Project (MPP), USA; Sustainable Research And Action For Environmental Development (SRADev), Nigeria; Toxics Link (TL), India.

^b Bangladesh, Djibouti, European Union (EU) (the member states Belgium and UK), India, Côte d'Ivoire, Kenya, Nigeria, the Philippines, South Africa, the United States of America (USA) and Uganda.

The following table summarizes the product name of each high mercury skin-lightening cream analyzed, the countries where the products were purchased from and the concentration range in parts per million mercury.

Table a: Skin-lightening products with mercury content exceeding one ppm (an * means that concentration was measured at the laboratory with AAS)

Product name	Countries where purchased	Concentration range (ppm mercury)
Aneeza Gold Beauty Cream	Djibouti, India, Nigeria, Philippines	829 – 20,599
Chandni Whitening Cream	Bangladesh, Djibouti, EU, India, Kenya, South Africa, Uganda, USA	0 – 40,000*
Due Whitening Beauty Cream	Bangladesh, India, South Africa, USA	0.1* – 15,384
Erna Whitening Cream	Philippines	1,080*
Face Fresh	Bangladesh, India, South Africa, USA	1.48* – 15,000*
Faiza Beauty Cream	Bangladesh, Djibouti, India, the Côte d'Ivoire, Kenya, South Africa, Uganda	0 – 17,970*
Golden Pearl Beauty Cream	Bangladesh, EU, India, Philippines, South Africa, USA	0 – 16,665
Goree Day and Night Whitening Cream	Bangladesh, India, Philippines, South Africa, USA	0 – 29,686
Goree Whitening Beauty Anti-ageing spots pimples removing Cream	Bangladesh, EU, India, Philippines, South Africa, USA	0 – 33,083
Goree Whitening Soap	South Africa	4,353
JiaoBi Whitening set	EU	0 - 20,813*
Jiaoli Miraculous Cream set	Philippines	2,004* – 2,018*
Jiaoli HuiChunSu Face Cream 7 Days Specific Eliminating Freckle - Day and Night creams	EU, India, USA	3.61*-1800*
Jiaoli Ginseng Bright White	Bangladesh	224.3*-2133*
Jiaoli Speckle Dispelling & Whitening Cream	Nigeria	1,154
JJJ Magical Spot Removing Cream (Day cream)	Philippines	1,686*
JJJ Magical Spot Removing Cream (Night cream)	Philippines	1896*
Jolié Beauty Cream	Djibouti	9,871
Kim Whitening Ginseng and Pearl Cream	Bangladesh, USA	407* - 8700*
Kim Whitening Pearl and Snow Lotus Cream	Bangladesh, India, Nigeria; USA	623* – 19,000*

NOOR Herbal Beauty Cream	Djibouti	17,669
Palmer's Skin Success Fade Milk	Côte d'Ivoire, Kenya	0 - 14,121
Parley Beauty Cream	Uganda	15,985
Parley Goldie Pearl Shine	Djibouti	19,242
Parley Herbal Whitening Cream	Bangladesh, India	1,684* - 16,752*
POP Popular Facial Cream	Bangladesh, EU, India, Nigeria, Philippines, Uganda, USA	0.04* - 2.20*
Sandal Whitening Beauty Cream	Bangladesh, India, South Africa, USA	1,504* - 26,321
Temulawak Beauty Whitening Cream	Bangladesh, Nigeria, USA	0.52* - 626
White Rose Whitening Cream Placenta Sheep Cream	EU, India, USA	0 - 9,835*
White Rose Whitening Cream (super Gold Caviar)	EU	6,188*

Non-compliant creams are not only widely available, but the same brands are often found to be sold in several countries or are available via e-commerce platforms accessible from multiple countries. The study also shows that the same brands were found to contain high mercury levels on several consecutive sampling occasions, in different years, and purchased from both physical shops and via e-commerce platforms. In addition to previously identified high-mercury brands, 20 additional such products were found in the 2019 sampling round.

The following table lists the countries in which our NGO partners purchased skin-lightening products for this study and provides the names of the internet marketers from which the products were purchased, as well as the range of mercury detected in the products purchase from the internet marketers.

Table b: Countries from which NGOs purchased products and e-commerce platforms

NGO Purchasing Products	Country	Internet Platform Products Were Purchased from	Range of mercury in the tested products (ppm)
ESDO	Bangladesh	Daraz (www.daraz.com.bd)	224 - 2133*
EEB	United Kingdom	Amazon UK (www.amazon.co.uk/)	0. -11,928*
EEB	Belgium	eBay Belgium (www.ebay.be/)	0 - 20, 813*
Toxics Link	India	Amazon, India (www.amazon.in)	0 - 16752*
Toxics Link	India	Flipkart, India (https://www.flipkart.com/).	0*
CEJAD	Kenya	Jumia, Kenya (www.jumia.co.ke)	0 - 11,313
SRADev	Nigeria	Jumia, Nigeria (https://www.jumia.com.ng)	0.00 - 20,599
SRADev	Nigeria	Nigeria - Jiji, (https://www.jiji.ng),	0.00 - 2584
SRADev	Nigeria	Nigeria - Konga (www.konga.com)	0.00

Ban Toxics	Philippines	Lazada, Philippines (www.lazada.com.ph)	0 - 6922*
groundWorks	South Africa	South Africa - BidorBuy (www.bidorbuy.co.za)	0 - 33,083
MPP	United States	U.S.- eBay, USA (www.ebay.com)	0 - 23,000*
MPP	United States	U.S. - Amazon (www.amazon.com/)	0 - 40,000*

Online purchases were made from popular domestic and international e-commerce platforms. Twenty-one of the products exceeding the 1 ppm mercury limit came from the global e-commerce platform Amazon (amazon.com, amazon.co.uk, amazon.in), and seventeen from the U.S. global e-commerce platform eBay (befr.ebay.be, ebay.com). In South Africa, ten non-compliant products were bought from BidorBuy. Six non-compliant products were from Lazada, the largest e-commerce platform in South East Asia (Singapore), based on monthly web visits. Daraz is a Chinese owned e-commerce platform that operates in South Asia. Six of the non-compliant products came from Daraz. Both Lazada and Daraz are affiliated with the Chinese global e-commerce platform Alibaba. Jumia and Jiji are Nigerian-owned e-commerce platforms of regional significance in Africa. One of the non-compliant creams has been found on Jiji, while 3 have been found on Jumia (1 in Nigeria and 2 in Kenya).

E-commerce further complicates the implementation of legislation, and associated inspections and sanctions for non-compliance. Unclear division of liabilities exist in the e-commerce supply chain. Therefore, coordinated compliance mechanisms are needed at the local, national, regional and global levels to target their removal from commerce before they are sold to consumers.

Our study clearly shows that skin-lightening creams with more than 1 ppm mercury are still widely available in the markets of several of the countries, although the 1 ppm limit is adopted into their national legislation.

In summary, adopting conforming legislation to fulfil the Minamata Convention's 1 ppm limit for mercury is just the first step, since many countries that already have adopted that limit for mercury in cosmetics are still experiencing an enormous and growing influx of illegal cosmetics. For more examples of policy instruments relevant to enforcement, inspections and sanctions, see: ZMWG report: Enforcement measures to restrict high mercury cosmetic products under the Minamata Convention^c.

^c Report can be found at <https://www.zeromercury.org/mercury-added-skin-lightening-creams-campaign/>

1 Introduction

1.1 Background and aim

At the end of 2020, cosmetics containing more than one part per million (1 ppm or 1 µg/g) will no longer be legal in countries where Parties to the Minamata Convention have adopted national laws or regulations.¹

Mercury has long been used as a skin-lightening active agent in creams and soaps but can also be found in the form of preservatives in some specific categories of cosmetics, such as in eyeliners. The former function is of particular concern, especially as the market for skin-lightening products continues to soar worldwide where people of colour try to lighten their complexion.²

Mercury is highly toxic and is a hazard to users of skin-lightening products,^{3, 4, 5} as well as to their families because the home environment can also become contaminated.^{6, 7} Furthermore, mercury in cosmetics is released to the environment as products are rinsed off, and mercury can also evaporate from the products and contaminate indoor air.

In 2017 and 2018, the Zero Mercury Working Group (ZMWG) conducted an international survey collecting and then analyzing 338 skin-lightening products from 22 countries. 34 creams (10% of the samples) had mercury concentrations ranging from 93 to 16,353 parts per million (ppm).⁸ In some countries the percentage of sampled creams exceeding the 1 ppm limit for mercury was especially high, peaking at 63% in Thailand.

Follow-up investigations in 2018 showed that several creams, including some previously identified with especially high mercury content, were still available from internet sales platforms, despite already being targeted in national alert or detention lists¹⁷. In addition, in 2019, we compiled a listing of additional products already identified by governments as high mercury and also targeted those brands for testing.

As described in this report, our follow up investigations confirmed that high mercury and often illegal skin-lightening creams were still widely available and offered for sale by multiple internet marketers around the globe.

As in past studies, we also looked at the availability of high-mercury creams in local markets. It should be noted that the creams analyzed here were not random samples, but rather creams that were targeted due to previous evidence or suspicions of excessive mercury content.

In particular, the structure of e-sales platforms adds to the complexity of such an investigation. Products that are banned in a country or region where compliance controls are relatively efficient may still be available to the same buyers over the Internet. This report, therefore, helps to inform the authorities about how this particular market is structured, and includes recommendations on how to identify and deal with unacceptable and often illegal levels of mercury in skin-lightening creams.

2 Sampling and analysis

2.1 Sampling process

In preparation for the study, an initial list of skin-lightening creams known to be “high-mercury” products was compiled. The 2017-2018 ZMWG report was one source, in combination with a number of government alert or detention lists collected online, or from partner organizations participating in sample collection. This list is presented in Annex A. The collection of samples was

carried out by non-governmental organization (NGO) members of the ZMWG^d, from 12 countries^e, with instructions for sampling and handling the creams according to the protocol described in Annex B. Each NGO partner was further asked to check whether their country had a national detention or alert list; the products on these lists were also considered for purchasing, both from the local markets and national/regional e-platforms. The full list of purchased creams can be found in Annex C.

The mercury concentration was determined by XRF or laboratory based Atomic Absorption Spectrophotometer (AAS) analysis, or both. Direct analysis of samples via XRF is recognized as the fastest, most straightforward and generally reliable method to assess the mercury content of SLPs. However, while most SLP samples are fairly homogeneous, “some may contain flakes or chunks of mercury salts, which may compromise the accuracy and reproducibility of an XRF test that generally involves only minimal manipulation of the sample.”⁹ An AAS analysis may be relied upon to provide an accurate and reproducible reading.

The screening of the purchased samples was carried out with an X-ray fluorescence (XRF) spectrometer or analyzer by our two regional hubs: CASE in Côte d'Ivoire (for Africa), and Ban Toxics in the Philippines (for Asia). A Niton XL3t-970 GOLDD+ Analyzer SDD XRF and an Olympus Innov-X Delta Professional DS 2000 XRF were used respectively by the hubs for screening the collected samples for mercury content, as per the screening protocol described in Annex D. Initially in 2019, these screening results were not independently checked by a certified laboratory since our 2018 study had previously demonstrated that for high-mercury XRF readings, subsequent laboratory analysis confirmed that the concentrations were of the same order of magnitude.

In parallel, samples purchased from the internet in the European Union (EU) and in the United States (US) were sent directly for lab analysis using:

- Cold Vapor Atomic Absorption Spectroscopy (AAS) by Enthalpy Analytical, an accredited US-based lab, for the US samples, and
- Hydride Atomic Absorption Spectroscopy (AAS), by Quality Assurance & Control Systems (QACS laboratory), an accredited laboratory based in Greece, for the EU samples.

For further information about Atomic Absorption Spectroscopy, the test protocol used by the QACS Laboratory is presented in Annex E and the test protocol used by the Enthalpy lab in Annex F.

However, after some concerns had arisen with the samples coming from Asia and measured with XRF, it was decided to cross check these at a laboratory with Atomic Absorption Spectroscopy. The samples were tested in 2021, therefore 2 years after purchase. They have been opened and stored for a few months before being retested, which could have slightly reduced the content in mercury due to the volatility of the metal. Nonetheless the analysis confirmed the presence of mercury level above the limit of 1ppm, confirming the urgency of the problem.

^d Ban Toxics (BT), the Philippines; Bio Visio Africa (BIVA), Uganda; Centre Africain pour la Santé Environnementale (CASE), Côte d'Ivoire; Centre for Environment, Justice and Development (CEJAD), Kenya; European Environmental Bureau (EEB), the European Union; Environment and Social Development Organization (ESDO), Bangladesh; groundwork South Africa (gW), South Africa; Mercury Policy Project (MPP), USA; Sustainable Research And Action For Environmental Development (SRADev), Nigeria; Toxics Link (TL), India.

^e Bangladesh, Djibouti, European Union (EU) (the member states Belgium and UK), India, Côte d'Ivoire, Kenya, Nigeria, the Philippines, South Africa, the United States of America (USA) and Uganda).

2.2 Results of analysis

166 samples (mainly creams, but also including two serums and three soaps) were collected by NGOs in 12 countries: Bangladesh (17); Belgium (18); Djibouti (18), India (20); Côte d'Ivoire (5); Kenya (13); Nigeria (9); the Philippines (15); South Africa (11); Uganda (11); the United Kingdom (UK) (5) and the USA (24). These are listed in Annex E, in which Belgium and the UK are combined under the EU heading. The raw data (brand name and mercury concentration) are presented in Annex G.

Please note that for ease of reading and homogeneity of the data the results above 5ppm have been reported rounding the decimals to the nearest whole number. The results under 5ppm have been reported with two decimals to get a more precise figure. They represented the 9.5% of the samples containing mercury.

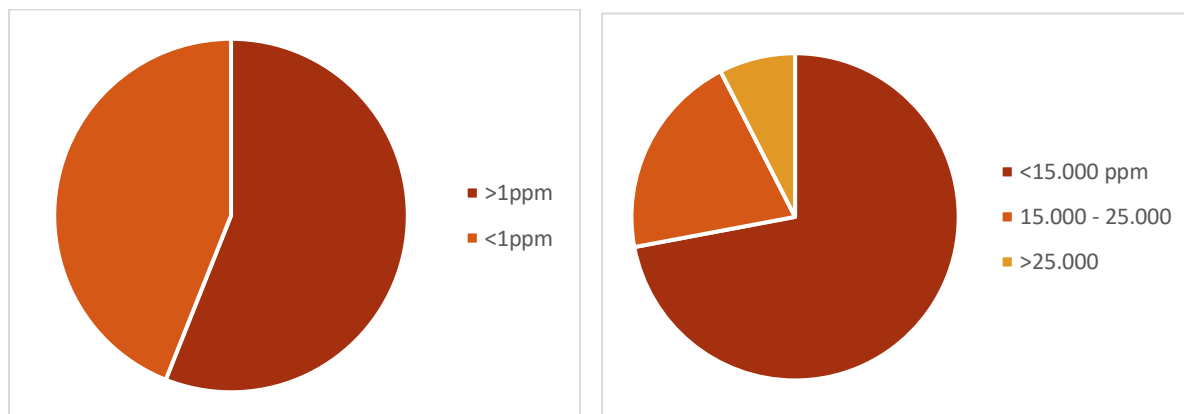
Please note that the results obtained by laboratory analysis performed with an Atomic Absorption Spectroscopy are reported in with an asterisk (*).

Some creams were of the same brand even though they were purchased in different countries and shops or purchased through different internet platforms.

2.2.1 Mercury content of creams

Analysis of these samples confirmed that 93 of the 166 products purchased (or ordered) from the 12 different countries contained more than 1 ppm mercury. This corresponds to 56% of the samples. Moreover, 64 of the 93 creams (69%) containing more than 1 ppm mercury were bought online, as summarized in Figure 1A and the table in Annex H.

In assessing the extent of the hazard presented by these creams, Annex H also shows that seven of the creams exceeding 1 ppm mercury had more than 25,000 ppm mercury, which corresponds to roughly 8% of the samples; nineteen had between 15,000 and 25,000 ppm mercury, which corresponds to roughly 20% of the samples; and 67 of these creams, or 72 % of the samples, had less than 15,000 ppm but more than 1 ppm mercury, as summarized in Figure 1 B.



Figures 1 A and B: Pie chart A shows the share of creams below (44%) and above 1 ppm mercury (56%) in the data set of 166 products. Pie chart B shows high-mercury creams (≥ 1 ppm) (in total 93). 8 % of the samples had a mercury content exceeding 25,000 ppm, 20% between 15,000 and 25,000 ppm, and 72 % less than 15,000 ppm but more than the Minamata Convention 1 ppm limit.

2.2.2 Sources of high-mercury creams

It is also evident from Annex H that the preponderance of the creams with excessive mercury appear to be manufactured in Pakistan and Thailand, followed by China. Based on information on the packaging, 50 of the high-mercury products were manufactured in Pakistan (54%); 17 in Thailand (18%); 15 in China (16 %); 3 in Malaysia (3 %); 1 in Indonesia (1%); 1 in the USA (1%); and 6 (6 %) had no indication of origin, as summarized in Figure 2.

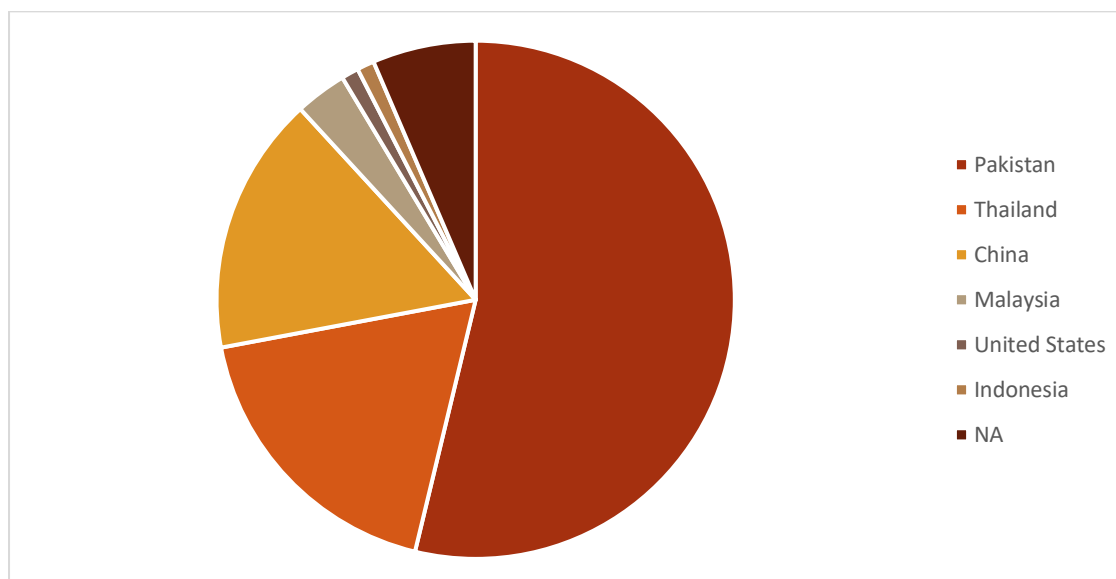


Figure 2: Countries apparently manufacturing high-mercury (above 1 ppm) skin-lightening creams, from indications on the packaging.

However, it's important to point out that the current study did not collect for testing skin lightening cream from Latin America.

2.2.3 Common brands of high-mercury creams

Annex H presents all products that were found to have a high mercury content, and their concentration. The more common high-mercury products, available in several countries, and the concentration ranges are shown in the table below.

Table 1: Product name, countries where available in physical shops or can be ordered online, and range of mercury concentration

Product name	Countries where purchased	Concentration range (ppm mercury)
Aneeza Gold Beauty Cream	Djibouti, India, Nigeria, Philippines	829 – 20,599
Chandni Whitening Cream	Bangladesh, Djibouti, EU, India, Kenya, South Africa, Uganda, USA	0 – 40,000*
Due Whitening Beauty Cream	Bangladesh, India, South Africa, USA	0.1* – 15,384
Face Fresh	Bangladesh, India, South Africa, USA	1.48* – 15,000*
Faiza Beauty Cream	Bangladesh, Djibouti, India, the Côte d'Ivoire, Kenya, South Africa, Uganda	0 – 17,970*
Golden Pearl Beauty Cream	Bangladesh, EU, India, Philippines, South Africa, USA	0 – 16,665
Goree Day and Night Whitening Cream	Bangladesh, India, Philippines, South Africa, USA	- – 29,686
Goree Whitening Beauty Anti-ageing spots pimples removing Cream	Bangladesh, EU, India, Philippines, South Africa, USA	0 – 33,083

JiaoBi Whitening set	EU	0 - 20,813*
Jiaoli Miraculous Cream set	Philippines	2,004* - 2,018*
Jiaoli HuiChunSu Face Cream 7 Days Specific Eliminating Freckle - Day and Night creams	EU, India, USA	3.61*-1800*
Jiaoli Ginseng Bright White	Bangladesh	224.3*-2133*
Kim Whitening Pearl and Snow Lotus Cream	Bangladesh, India, Nigeria; USA	623* - 19,000*
Parley Herbal Whitening Cream	Bangladesh, India	1,684* - 16,752*
POP Popular Facial Cream	Bangladesh, EU, India, Nigeria, Philippines, Uganda, USA	0.04* - 2.20*
Sandal Whitening Beauty Cream	Bangladesh, India, South Africa, USA	1,504* - 26,321
Temulawak Beauty Whitening Cream	Bangladesh, Nigeria, USA	0.52* - 626
White Rose Whitening Cream Placenta Sheep Cream	EU, India, USA	0 - 9,835*

2.2.4 E-platforms found to be selling high mercury creams

Online purchases were made from popular domestic and international e-commerce platforms. Beyond the well known Amazon and eBay, after our investigation, other frequently used platforms came to our attention.

The following table lists the countries in which the ZMWG NGO members^f purchased skin-lightening products for this study and provides the names and websites of the internet marketers from which the products were purchased.

Table 2: NGO, country of purchase internet platforms

Non-governmental Organization Purchasing Products	Country	Internet Platform Products Were Purchased from
Environment and Social Development Organization (ESDO)	Bangladesh	Daraz (www.daraz.com.bd)
European Environmental Bureau (EEB)	United Kingdom	Amazon UK (www.amazon.co.uk/)
	Belgium	e-bay Belgium (www.ebay.be/)
Toxics Link (TL)	India	Amazon, India (www.amazon.in)
Centre for Environment, Justice and Development (CEJAD)	Kenya	Jumia, Kenya (www.jumia.co.ke)
Sustainable Research And Action For Environmental Development (SRADev)	Nigeria	Jumia, Nigeria (https://www.jumia.com.ng)
		Nigeria - Jiji, (https://www.jiji.ng),
		Nigeria - Konga (www.konga.com)

^f See the full NGO names in footnote d.

Ban Toxics	Philippines	Lazada, Philippines (www.lazada.com.ph)
groundWork	South Africa	South Africa - BidorBuy (www.bidorbuy.co.za)
Mercury Policy Project (MPP)	United States	U.S.- e-Bay, USA (www.ebay.com)
		U.S. - Amazon (www.amazon.com/)

2.2.5 Key distributors of high-mercury creams

Apart from the sources of production, it is also useful for the authorities to know the identities of the key distributors or intermediaries (the companies that physically posted the products after the order was placed in the e-platform) of high-mercury creams. They either ignore or are simply ignorant of the relevant international health standards, or the standards of the internet platforms that have hazardous product policies in place.

An example of the key distributors/intermediators of such creams to buyers in the EU and the US are shown in Table 3, compiled as a result of this investigation.

Table 3: Product name, country of purchase, indicated country of origin, e-commerce platform, distributor and mercury content (ppm) for samples exceeding 1 ppm mercury, according to the postal packaging. Mercury content results were obtained with AAS.

Product name	Country of purchase	Country of origin*	E- commerce platform	Intermediator/Distributor	Mercury content (ppm)
Chandni Whitening Cream	EU	Pakistan	Amazon, UK	Pranjali Khanna – D/O Ravindra Khanna H. No – C- 239/4 Street NO-9, Bhjan Pura, North East Delhi, India 110053	11,928
Golden Pearl Whitening Beauty Cream	EU	Pakistan	Amazon, UK	Mariyam Usamni V-222, Gali No16, Vijay Park, Maujpur, Delhi, India - 110053	10,515
Golden Pearl Whitening Beauty Cream	EU	Pakistan	eBay, Belgium	Kapil Gulati B-6009, Gaur Green City, Plot No-8, Vaibhav Khadnd Indirapuram, Ghaziabad Uttar Pradesh 201014 India	10,338
Golden Pearl Whitening Beauty Cream	EU	Pakistan	eBay, Belgium	Mariyam Usamni V-222, Gali No16, Vijay Park, Maujpur, Delhi, India - 110053	5,266
Goree Whitening Beauty Anti-ageing spots pimples removing Cream	EU	Pakistan	eBay, Belgium	Not available	12,656
JiaoBi Whitening set, make up base	EU	China	eBay, Belgium	Geladi Jiaobao Cosmetics Co. Ltd, No69 Nanyuan Edao Street, Ha Erbin, Heitongjiang Province, China.	20,813
JiaoBi Whitening set, Night cream	EU	China	eBay, Belgium	Geladi Jiaobao Cosmetics Co. Ltd, No69 Nanyuan Edao Street,	15,404

				Ha Erbin, Heitongjiang Province, China.	
Jiaoli Miraculous Cream set, cream A	EU	China	eBay, Belgium	Geladi Jiaobao Cosmetics Co. Ltd, No69 Nanyuan Edao Street, Ha Erbin, Heitongjiang Province, China.	586
Jiaoli Miraculous Cream set, cream B	EU	China	eBay, Belgium	Geladi Jiaobao Cosmetics Co. Ltd, No69 Nanyuan Edao Street, Ha Erbin, Heitongjiang Province, China.	, 1544
Pop Popular Facial Cream Whitening Acne Pimple	EU	Thailand	eBay, Belgium	SUMALEE YAWICHAI, 16 M. 7 T.Huai-Krai A.Mae-sai CR57220 Thailand	2.20
Pop Popular Facial Cream Whitening Acne Pimple	EU	Thailand	eBay, Belgium	SUMALEE YAWICHAI, 16 M. 7 T.Huai-Krai A.Mae-sai CR57220 Thailand	1.91
White Rose Whitening Cream (super Gold Caviar)	EU	Thailand	eBay, Belgium	Onusa Kambuppha 429/28 Sukhumvit Road Seansuk, Mueang Chonburi 20130 Thailand	6,188
Jiaoli Cream Jaoc whitening Yan Ying, skin care set	USA	China	eBay, USA	Okeny's, HYT 208.246 Haneul- Gangseo,-GU, Seoul, Korea (HUBNET) www.alivava.com	1,800
Kim Whitening Pearl and Snow Lotus Cream	USA	Thailand	eBay, USA	Phimshop, Phimwalan Sutthakan, 46/1 soy22, T.C, ChangPhueak, A.Mung 50300, CM, Thailand	19,000
Chandni Whitening Cream	USA	Pakistan	eBay, USA	Indianport, Tauqueer Usmani, V- 22, Gali No 16, Near Shiv Sadhna Mandir, Vijay Park, Yamuna Vihar, Delhi, India	14,000
Sandal Whitening Beauty Cream	USA	Pakistan	eBay, USA	Indianport, Tauqueer Usmani, V- 22, Gali No 16, Near Shiv Sadhna Mandir, Vijay Park, Yamuna Vihar, Delhi, India	21,000
Face Fresh	USA	Pakistan	eBay, USA	Blackpanther0007, Indianport, Tauqueer Usmani, V-22, Gali No 16, Near Shiv Sadhna Mandir, Vijay Park, Yamuna Vihar, Delhi, India	15,000
Goree Day and Night Whitening Cream	USA	Pakistan	eBay, USA	Indianport, Tauqueer Usmani, V- 22, Gali No 16, Near Shiv Sadhna Mandir, Vijay Park, Yamuna Vihar, Delhi, India	23,000
Kim Whitening Pearl and Snow Lotus Cream	USA	Thailand	eBay, USA	Not indicated	14,000

Kim Whitening Pearl and Snow Lotus Cream	USA	Thailand	Amazon, USA	Kawaii-land, 10481 Scott Ave N, Brooklyn Park, MN 55443	16,000
Goree Whitening Beauty Anti-ageing spots pimples removing Cream	USA	Pakistan	Amazon, USA	AFA Concept Beauty, Indiglobalshop, C 03 Sanjay Mittal Estate, AK Road Marol Andheri East, Maharashtra, India	25,000
Chandni Whitening Cream	USA	Pakistan	Amazon, USA	Triple Trading, 7301 West Gunnison St. #56935, Harwood Heights, Illinois 60706 TripleTraders.com	40,000
Kim Whitening Ginseng and Pearl Cream	USA	Thailand	Amazon, USA	Oummshop Kunakorn, 200/156 Moo.4, T.Bangragum A.Nakornluag, Ayuthaya, Thailand 13260	8,700
Kim Whitening Ginseng and Pearl Cream	USA	Thailand	Amazon, USA	Oummshop Kunakorn, 200/156 Moo.4, T.Bangragum A.Nakornluag, Ayuthaya, Thailand 13260	8,600
Chandni Whitening Cream	USA	Pakistan	Amazon, USA (e-commerce platform)	Bombino Express, 17715 149th Rd, Jamaica, NY 11434m http://www.bombinoexp.com/	22,000
Goree Beauty Cream	USA	Pakistan	Amazon, USA	Bombino Express, 17715 149th Rd, Jamaica, NY 11434m http://www.bombinoexp.com/	26,000
Kim Whitening Pearl and Snow Lotus Cream	USA	Thailand	Amazon, USA	Kawaii-land, 10481 Scott Ave N, Brooklyn Park, MN 55443	13,000

2.3 Discussion and recommendations

2.3.1 Discussion

In this 2019 follow-up of the study done by ZMWG in 2017-18,⁸ it is once more demonstrated that mercury is still prevalent as an ingredient in many skin -lightening creams, despite the bans in several of the study countries. 166 skin-lightening creams, from 12 countries, were bought from physical stores or from e-commerce platforms and analyzed. 93 samples were found to contain more than 1 ppm mercury. Some of the creams were the same brands as in the 2017-18 study; others were identified from a compilation of national alerts or detention lists (see Annex A).

Continued availability of non-compliant creams previously identified

Eleven of the brands identified as high-mercury creams in the ZMWG 2017-2018 study were still available on the market in 2019. Furthermore, even though the production batches analyzed in this sampling round differed from those in 2017-18, these creams are still non-compliant with the 1 ppm limit for mercury. This clearly suggests that it is not a question of unwitting or haphazard contamination, but rather that mercury is still systematically used as an active ingredient in the formulation of these creams. In addition to the 11 “repeat” brands, 20 other brands were also found to be non-compliant. In total 56% of the samples were non-compliant, which raises serious concerns about health risks for the consumers and their families, as well as environmental risks in connection with manufacturing or discarding the creams.

Inconsistent mercury content in a single brand or batch

The mercury content of the high-mercury brands varied widely between samples, not just between different production batches but even within the same batch. This could be due to a number of factors:

1. The formulation of the products is not very precise, resulting in inconsistent formulations;
2. The mercury compound may not be evenly mixed into a batch of cream so, for example, if a jar is filled from the top of a batch, the mercury concentration could be different from that at the bottom of the batch;
3. the transport and storage conditions of the final product may result in varying rates of evaporation of mercury (being higher at higher temperatures, etc.).

No connection between the mercury content and the expiration date for a specific brand was observed. Sometimes samples with less remaining shelf life left had a higher mercury concentration than those of the same brand but with more remaining shelf life, and vice versa. This suggests that these manufacturers are making no effort to replace mercury as an active ingredient.

Annex H provides a number of examples of the observed variation in mercury content among creams of the same brand, and even from the same batch.

Mercury not listed among the contents

Mercury or mercury compounds were not listed in the ingredient lists of any of the high-mercury creams. This illustrates the serious problem that ingredient lists may not be reliable if no independent verification mechanism is in place, such as inspection measures and sanctions to discourage non-compliance. More information on this issue, and suggestions for addressing it, e.g. with a licensing system, can be found in the 2019 ZMWG companion report, "Enforcement measures to restrict high-mercury cosmetic products under the Minamata convention."¹⁰

Sources of skin-lightening products containing mercury

Based on the information from the packaging, most of the high-mercury products were manufactured in Asia, especially in Pakistan (54%), Thailand (18%) and China (16%). One claimed to be manufactured in the USA, but this seems less likely as it was the only one and may be counterfeit. It is known, for example, that China is a major producer of counterfeit products, including cosmetics, and that these products sometimes contain harmful chemicals.^{11, 12, 13} However, it's important to note that no samples were collected for testing from Latin America. Another observation along the same lines is that the White Express Cream (sold as a single product or in kits with several products) was labelled as manufactured in France for the single product (sold by eBay and Jumia), but as manufactured in India for the kits (sold by eBay and Jumia, and in shops). This again could indicate that some are counterfeit.

Greater efforts must be made to track and crack down on the manufacturers, including those that make counterfeit products. Parties to the Minamata Convention, are obliged to do what they can within their respective jurisdictions, and with international collaboration, to comply with the provisions of the convention.

Roughly 6% of the high-mercury products had no information about the country of origin on the packaging, and 35% had no batch number. Such missing information could also indicate that a product is counterfeit, as suggested by Cosmetics Europe.¹⁴

Transparency and compliance

Sixty-nine percent of the high-mercury creams detected in this study were bought from e-commerce platforms, but ordered from NGOs in countries that have already adopted the 1 ppm mercury limit in their national legislation. This illustrates the failure to ensure compliance of e-commerce products with national legislation, or with international agreements.

Apart from issues linked to bans and restrictions, like national laws and the Minamata Convention 1 ppm limit for mercury-added cosmetics starting at the end of 2020, there are also issues connected to information sharing and transparency for products bought online. For example, companies in the European Union (EU) are required to inform their customers and consumers (the latter on request) about the content of certain particularly hazardous chemicals, the so-called Substances of Very High Concern (SVHCs),⁸ in the products they manufacture. This requirement also applies to stakeholders importing products and placing them on the EU market. However, when purchases are made directly from companies based in countries outside the EU, this information obligation disappears, and there is a risk that consumers are not adequately informed about the existence of hazardous chemicals in the products.

A basic requirement for all products intended for export should be labeling on the packaging in English, at a minimum, or in the language of the importing country. However, some of the products investigated for this report lacked English information, notably Chinese and Thai products. This illustrates yet another potential issue connected to e-commerce: the lack of appropriate user information may lead to incorrect handling and use of the products, such as when dosing or discarding them, exposing consumers and the environment to unnecessary or unacceptable risks.

E-commerce, producer and distributor responsibility and liability

E-commerce is further complicated by the fact that e-commerce platforms offer and market products from many different companies from different countries without manufacturing, handling, or accepting some level of responsibility for the products themselves. A product is often not physically sourced or registered in the same country as the buyer and, consequently, may be beyond the purview of the compliance mechanism established by the national jurisdiction. Issues of unclear liability may then arise and tracking down the original manufacturer may be hard.

Online purchases were made from popular domestic and international e-commerce platforms (see Table 2 above). Twenty-one of the products found in this study to be non-compliant with the Minamata Convention 1 ppm mercury limit came from the US global e-commerce platform Amazon (amazon.com, amazon.co.uk, amazon.in), and seventeen from the U.S. global e-commerce platform eBay (ebay.com). In South Africa, the most popular e-commerce platform is the national BidorBuy, from which ten non-compliant products were bought. The largest e-commerce platform in Southeast Asia, based on monthly web visits, is Lazada, a Singapore-based company.¹⁵ Six non-compliant products were from Lazada. Daraz is a Chinese owned e-commerce platform that operates in South Asia.^{Error! Bookmark not defined.} Six of the non-compliant products in this study came from Daraz. Both Lazada and Daraz are affiliated with the Chinese global e-commerce platform Alibaba. Jumia and Jiji are Nigerian-owned e-commerce platforms of regional significance in Africa. One of the non-compliant creams has been found on Jiji, while 3 has been found on Jumia (1 in Nigeria and 2 in Kenya). In addition to e-commerce purchases, 31% of the high-mercury creams were bought from physical shops that should be

⁸ A substance may be proposed as a “substance of very high concern” if it meets one or more of the following criteria: carcinogenic; mutagenic; toxic for reproduction; persistent, bioaccumulative, and toxic according to the criteria set out in Annex XIII to the EU’s REACH Regulation; or of equivalent concern due to neurotoxicity, endocrine disruption, etc. (<https://www.echa.europa.eu/candidate-list-table>).

subject to local regulations. Importers and retailers are responsible for offering products in compliance with the law, yet a high number of non-compliant products were found in countries where the Minamata Convention 1 ppm limit for mercury-added cosmetics is already adopted into national legislation. A small retailer may not know what kind of verification they should request from their suppliers of cosmetics, and high-mercury creams may have passed into the country without customs inspection.

General

This study was not based on randomly selected product samples, so from a statistical point of view it may not give a representative picture of the entire skin-lightening cream market. Nevertheless, it clearly confirms that there is a large and ongoing problem with skin-lightening creams in non-compliance with the Minamata Convention 1 ppm limit for mercury-added cosmetics. Furthermore, the study clearly shows that certain brands have consistently violated the 1 ppm limit over the 2017-19 sampling period, which should certainly justify that they be placed on a global alert or detention list.

All countries investigated during this study have already adopted the 1 ppm mercury limit into their national legislation, which means that many of the tested creams are illegal. After 2020, all parties to the convention must adhere to the < 1 ppm limit. If not already, they must soon be prepared to enforce these laws not only on local markets selling cosmetics with high levels of mercury, but also the e-commerce platforms with unclear liability in international trade.

2.3.2 Recommendations

This investigation clearly demonstrates that high-mercury skin lightening creams (i.e., with more than 1 ppm mercury) are both widely and continuously available (i.e., the same brands found on several consecutive sampling occasions, in different countries, and in different years) in both physical shops and via e-commerce platforms. Meanwhile, the number of internet purchases continues to grow worldwide.¹⁶ In response to this situation, implementation and enforcement becomes of major importance.

Our companion report, **“Enforcement measures to restrict high mercury cosmetics under the Minamata Convention”**¹⁰ suggests elements for improving enforcement of the Minamata Convention provisions for banning cosmetic products with mercury levels over one ppm. It also presents a field survey of the systems and strategies in eight countries where the ZMWG has member organizations.

Combined, the two reports identified a number of key measures that are important for successful implementation of the Minamata Convention provisions for controlling cosmetics containing over 1 ppm mercury, including:

- **Laws, regulations and supporting tools.** Laws and supporting policies should be enacted in line with the Minamata Convention restrictions on cosmetics. Supporting measures could include such provisions as ingredient lists, licensing systems, detention lists,¹⁷ advisories and alert systems (e.g. EU RAPEX , ASEAN PMAS).
- **Division of responsibilities and mandates.** Roles, responsibilities, mandates and decision-making processes should be clearly defined in national law for all relevant stakeholders.
- **International collaboration.** Regional and international collaboration is essential for countries with limited resources to share costs and technical expertise, e.g., for market

surveillance and enforcement, information-sharing, product inspection and analysis, and training. A regional alert system, for example, can be used to rapidly share information about non-compliant products among collaborating countries. Joint units for monitoring and tracing dangerous and non-compliant products sold online can inform the customs service, as well as consumers, regarding products that may be non-compliant and take relevant measures.

- **Inspections, sanctions, penalties, voluntary agreements and screening tools.** For an enforcement scheme to be effective, there should be a system of regular inspections, sanctions and penalties for non-compliance. Customs services need access to basic monitoring equipment (e.g. XRF) and the training to effectively utilize them. Laboratory capacity for higher accuracy analytical work is also needed if legal measures are to be taken against importers.
- **Engagement with e-commerce platforms.** Channels of communication between governments and e-commerce platforms are key to inform sellers about national/regional labelling requirements, detention lists, communication means for posting alerts, etc. Effectively dealing with e-commerce, may require special measures such as voluntary agreements (e.g. EU Product Safety Pledge), or the ability to shut down web pages if other reasonable measures fail.
- **Consumer outreach and collaboration with civil society organizations (CSOs), market surveillance and testing mechanisms.** Well-informed consumers are key to combatting the marketing of toxic products. Information on the risks of certain product ingredients could be presented through health care providers, online advisories and national detention lists, along with information on how to submit complaints to the authorities. In particular, in low- and middle-income countries where scarce resources may limit the scope of the authorities, CSOs with access to reliable analytical instruments could support the authorities in the work of identifying non-compliant products.
- **Systems for sustainable financing.** Effective implementation of any international agreement requires dedicated funds. Many low- and middle-income countries still rely heavily on external funds to implement international agreements. In the long run, however, Parties will need to create conditions for raising the necessary funds in their own countries, to sustainably implement obligations required under the Minamata Convention. Industry is a potentially important partner in the “integrated approach,” and may help to unlock new funds.
- **Harmonization of implementation and enforcement mechanisms.** In the medium to long term, in support of the Minamata Convention, countries should strive for better regional and/or global harmonization of legislation, enforcement measures, standards and communication systems preventing the marketing of unsafe products. Such harmonization will simplify and facilitate enforcement, which helps to ensure a level playing field among companies acting in both the traditional and online supply chains, while at the same time reducing product related risks to consumers.

Further examples of policy instruments relevant to enforcement, inspections and sanctions may be found in the full report.

Annex A: Compilation from government or organization alert and detention lists

Table 1: Compilation of brand names for mercury-containing skin-lightening creams from various government and organization alert and detention lists.

Brunei Darussalam	
Brand names	List
Goree Beauty Cream	Brunei Darussalam list
Goree Day and Night Whitening Cream	Brunei Darussalam list
European Union	
Brand names	List
Goree Beauty Cream	RAPEX (2018)
Kenya	
Brand names	List
Pimplex Medicated Cream	Kenyan Bureau of Standards
New Shirley Medicated Cream	Kenyan Bureau of Standards
Cream preparations containing hydrogen peroxide	Kenyan Bureau of Standards
Jolen Cream	Kenyan Bureau of Standards
Movate Cream, skin success gel	Kenyan Bureau of Standards
Hot Movate Gel	Kenyan Bureau of Standards
Amira-C	Kenyan Bureau of Standards
Neu Clear Gel	Kenyan Bureau of Standards
Tenovate	Kenyan Bureau of Standards
Body Clear Cream Spot Remover	Kenyan Bureau of Standards
Top Gel Plus	Kenyan Bureau of Standards
Soft and Beautiful Cream	Kenyan Bureau of Standards
Lemonvate Cream, Secret Gel	Kenyan Bureau of Standards
TBC Gel Plus	Kenyan Bureau of Standards
Unic Clear Super Cream	Kenyan Bureau of Standards
Topifram Cream	Kenyan Bureau of Standards
Skin Balance Lemon Cream	Kenyan Bureau of Standards
Peau Claire Gel Plus	Kenyan Bureau of Standards
Fashion Fair Gel Plus	Kenyan Bureau of Standards
Visible Difference Gel	Kenyan Bureau of Standards
Sivocclair Cream	Kenyan Bureau of Standards
Action Demovate Cream	Kenyan Bureau of Standards
Regge Lemon Gel	Kenyan Bureau of Standards

Ultimate Lady Gel	Kenyan Bureau of Standards
Topifram Gel Plus	Kenyan Bureau of Standards
Age Renewal Cream	Kenyan Bureau of Standards
Fair & White Gel Plus	Kenyan Bureau of Standards
Peau Claire Cream	Kenyan Bureau of Standards
Fashion Fair Cream	Kenyan Bureau of Standards
First Class Lady Cream	Kenyan Bureau of Standards
Skin Success Cream	Kenyan Bureau of Standards
Neu Clear Cream Plus	Kenyan Bureau of Standards
Jaribu Beta-β Cream	Kenyan Bureau of Standards
Body Treat Cream Spot Remover	Kenyan Bureau of Standards
Clear & Lovely Gel, Peau Clair Cream	Kenyan Bureau of Standards
Soft & Beautiful Gel	Kenyan Bureau of Standards
Action Demovate Gel Plus	Kenyan Bureau of Standards
Posone Gel	Kenyan Bureau of Standards
Skin Balance Gel Wrinkle Remover	Kenyan Bureau of Standards
Ultra-Gel Plus	Kenyan Bureau of Standards
Pro-One Gel MCA	Kenyan Bureau of Standards
Betalemon Cream	Kenyan Bureau of Standards
Skin Blance Cream Wrinkle Remover	Kenyan Bureau of Standards
Dark & Lovely Cream	Kenyan Bureau of Standards
Dark & Lovely Gel	Kenyan Bureau of Standards
Dermo-Gel Plus	Kenyan Bureau of Standards
Pakistan	
Brand name	List
Faiza Beauty Cream	Pakistan stops production ^{18h} still sold on internet; possible case studies
Philippines	
Brand name	List
Goree Beauty Cream	Philippines Food and Drug Administration
Goree Day and Night Whitening Cream	Brunei Darussalam, Philippines Food and Drug Administration
Aneeza Gold Beauty Cream	Philippines Food and Drug Administration (unregistered product)

^h Pakistan Ministry of Science and Technology has issued Technical Regulation in the form of SRO 45 (KE)/2017 PS:3228/2017, dated May 19, 2017, to regulate "skin creams" all over Pakistan through PSQCA. See more below; also see: <https://profit.pakistantoday.com.pk/2018/12/31/psqca-issues-notice-to-beauty-cream-manufacturers-over-health-concerns/>; <https://www.incpak.com/health/faiza-beauty-cream-banned-in-pakistan/>; <https://en.dailypakistan.com.pk/pakistan/popular-beauty-cream-banned-in-pakistan-over-toxic-chemical-use/>

Golden Pearl Whitening Beauty Cream	Philippines Food and Drug Administration
Jiaoli	Philippines Food and Drug Administration
JJJ Magic Spot Removing Cream	Philippines Food and Drug Administration
Erna Whitening Cream	Philippines Food and Drug Administration
Jiaoli Miraculous Cream	Philippines Food and Drug Administration
S'Zitang	Philippine Food and Drug Administration
Deeja Cosmetic Sun Cream	Philippine Food and Drug Administration
Deeja Cosmetic Wrinkle Cream	Philippine Food and Drug Administration
RDL Babyface Whitening Cream, Night Cream 5 in 1	Philippine Food and Drug Administration
RDL Face Off Fade-Out Cream, Day Cream 5 in 1	Philippine Food and Drug Administration
B Plus Miracle Gold Cream	Philippine Food and Drug Administration
Madame Organic Withening Arbutin	Philippine Food and Drug Administration
Herbal Turmeric Herbal Cream	Philippine Food and Drug Administration
Melusma Melasma Brightening Cream	Philippine Food and Drug Administration
Beauty 3 Night Cream	Philippine Food and Drug Administration
BeQuala Beauty Quality Lab	Philippine Food and Drug Administration
Ozzy Mask	Philippine Food and Drug Administration
Polla Gold Super White Perfects	Philippine Food and Drug Administration
O-Ping Wink Winner Ping Whitening Cream	Philippine Food and Drug Administration
Myrina White Cream	Philippine Food and Drug Administration
Glow Skin White French Technology Smart Pack	Philippine Food and Drug Administration
Glow Skin White French Technology Smart Pack – SPF 50 Cream	Philippine Food and Drug Administration
Parley Beauty Cream	Philippine Food and Drug Administration
Parley Herbal Whitening Cream, Nourishing With Avocado	Philippine Food and Drug Administration
Special UV Whitening AAA Asli (SP)	Philippine Food and Drug Administration
SEERI Cosmetic Day Cream	Philippine Food and Drug Administration
SEERI Cosmetic Herbal Cream	Philippine Food and Drug Administration
Tati Ultra Night Cream	Philippine Food and Drug Administration
Deeja Wrinkle Cream	Philippine Food and Drug Administration
ROBISIS Anti-acne Whitening Day & Night Cream	Philippine Food and Drug Administration
Asdanne Whitening Freckle Day Cream	Philippine Food and Drug Administration
Fulenze Whitening Freckle Day Cream	Philippine Food and Drug Administration
Dnars Dinar Cream	Philippine Food and Drug Administration
Tati 5 in 1 Skincare New & Improved Glow of Lasting Beauty – Ultra Night Cream	Philippine Food and Drug Administration
Deeja Cosmetic Vouge Cream	Philippine Food and Drug Administration

Deeja Krim Nano Night	Philippine Food and Drug Administration
Miracle White Whitening Cream	Philippine Food and Drug Administration
Delux Beauty Ultra Lightening Cream	Philippine Food and Drug Administration
Singapore	
Brand name	List
Parley Herbal Whitening Cream	Singapore Health Science Authority (HSA)
Parley Cream	Singapore Health Science Authority (HSA)
RDL cream	Singapore Health Science Authority (HSA)
Royal Expert Whitening Cream	Singapore Health Science Authority (HSA)
Goree Beauty Cream	Singapore Health Science Authority (HSA)
Uganda	
Brand name	List
Pimplex Medicated Cream	Ugandan Bureau of Standards
New Shirley Medicated Cream	Ugandan Bureau of Standards
Maxi Claire	Ugandan Bureau of Standards
Shiny Beauty Cream	Ugandan Bureau of Standards
Top Clair Plus	Ugandan Bureau of Standards
Tamarin	Ugandan Bureau of Standards
Charms	Ugandan Bureau of Standards
Caroderm	Ugandan Bureau of Standards
Skin Light	Ugandan Bureau of Standards
Carro 7	Ugandan Bureau of Standards
L'abidjainaise	Ugandan Bureau of Standards
Rapid Clair	Ugandan Bureau of Standards
Beauty Lotion Shiny	Ugandan Bureau of Standards
Djarabi	Ugandan Bureau of Standards
Yes To	Ugandan Bureau of Standards
Bio 21 Jours	Ugandan Bureau of Standards
Bio Liss	Ugandan Bureau of Standards
Yes To Lotion	Ugandan Bureau of Standards
Caro Top Lotion	Ugandan Bureau of Standards
Top Lemon	Ugandan Bureau of Standards
Top Claire Plus	Ugandan Bureau of Standards
United Kingdom (member state of the European Union)	
Brand name	List
White Express cream	London Trading Standards
POP popular cream	London Trading Standards https://www.brandsynario.com/pakistani-

	beauty-brands-exposed-bbc-complete-list-toxic-fairness-creams/
United States of America	
Brand name	List
Face Fresh	New York City (2018)
Sandal Whitening Beauty Cream	New York (2018), [Manuf.- Cosmetics Pakistan]
Kim Whitening Ginseng and Pearl Cream	Minnesota, also purchased in Thailand, on internet
Kim Whitening Pearl & Snow Lotus Cream	Minnesota, also purchased in Thailand, on internet
White Rose Whitening Cream	Minnesota, also purchased in Thailand, on internet
Jiaoli	US Food and Drug Administration (?)
Zero mercury Working Group	
Brand name	List
Due Whitening Beauty Cream	On ZMWG list; purchased in Bangladesh
Temulawak Cream Beauty	ZMWG list https://www.ebay.com/itm/Temulawak-Cream-Beauty-Whitening-Cream/183677395824?hash=item2ac406a370:g:SS0AAOSwoF5cXpi9:rk:2:pf:0

Annex B: Instructions for sampling of “Terrible Twenty” skin-lightening creams (2019)



Building upon the 2017 and 2018 results in the skin-lightening project, this third round of sampling of skin lightening creams will focus on targeting skin lightening creams confirmed to contain high mercury levels, based on national alert or detention lists as well as our own results from 2017-2018.

The ultimate goal of our “Terrible Twenty” Campaign is to encourage governments to place these products on their “detention lists,” shut down any in-country production and to otherwise to end to the manufacturer, distribution and sale of these high mercury and often illegal skin lightening creams worldwide. We will do this by targeting these products for sampling and testing, and to alert governments worldwide regarding the profiteering in the toxic trade and the need for both national and global coordination to stop such illegal practices.

It is important to note that only the creams listed below in Annex A, should be purchased following the conditions below as per internet or market purchasing.

If you cannot find ANY of the listed creams, AND your country has a detention list developed by the government, please contact us, send us this list and we could check if we go after some of those ‘nationally’ identified products.

Purchases/sampling from internet

1. Check the on -line platforms that are most popular in your respective countries. They may include, but not be limited to, the large international eBay, Amazon or Alibaba.
2. If they include the large, international online platforms, look only on the relevant country page, where someone from your country would purchase from.
3. Take a screenshot of the product the day you looked for it on an e-commerce platform, so that we have definite proof that the company sold the cream/ the cream was available.
4. Proceed with purchasing, note the details of the cream (name, country of origin etc.), note the cost, product description, and send all this information to the regional hub so they know what they should expect.

Purchases /sampling from the market-place

1. Look only for the creams listed in Annex A and purchase them (even if the same brands were purchased/tested in 2017-2018; we could still check if formula/mercury content still stays the same).
2. Select creams that are not too close to their expiration dates, providing that the date is printed on the package. Old products exposed to heat may potentially have lost mercury.

Please carefully read and follow the below instructions for selecting, handling, packaging and shipping the products.

Handling and storing of the purchased products, instructions to sampling organizations and to the regional testing hubs

- 1) Do not store the purchased products in hot conditions, as this may enhance breakdown of some mercury compounds, with subsequent loss of the mercury. Try to find the coolest secure place outside the house or office, or if not possible find a secure place inside but do not store the product near food, e.g. in the fridge.
- 2) Do not remove the package materials around the products. Do not open the tube/box. They need to be delivered intact to the regional testing hubs.
- 3) Log the name of the product, the producer, the place where you bought the product (i.e. note the name of the store and address) and take photos of the product and its ingredient list (if it has a list). Please use the format of the matrix in the appendix B for logging the information.

After confirmation by the EEB, the samples are to be sent to our regional testing hubs:

Screening of mercury content is then to be done by XRF (and Lumex as relevant).

The results need to be communicated to the EEB. Creams with concentrations equaling or exceeding 1 part per million (PPM) will be sent most likely to an accredited lab for confirmatory analyses, to be confirmed later.

Appendix A:

“TERRIBLE TWENTY” TARGET LIST compiled by the ZMWG

Targeted Brands		Government detention lists	
1	Aneesa Gold Beauty Cream all type skins	Philippines FDA (unregistered product)	
2	Chandni Whitening Cream	NYC (2018),	
3	Due whitening Beauty Cream	On ZMWG list; purchased in Bangladesh,	
4	Erna Whitening Cream	Philippines FDA	
5	Face Fresh whitening cream age spots/freckles, scars	NYC (2018),	

6	Faiza Beauty Whitening Cream	Pakistan stops production ⁱ still sold on internet; possible case studies	 GENUINE FAIZA BEAUTY CREAM WORLDWIDE FREE SHIPPING.!
7	Golden Pearl Whitening Beauty Cream	Philippines FDA	
8	Goree Whitening Beauty Anti-ageing spots pimples removing Cream	RAPEX (2018), Brunei Darussalam. HSA (Singapore), Philippines FDA	
9	Goree Day and Night Skin Whitening Beauty Cream	Brunei Darussalam, Philippines FDA	
10	Jiaoli Cream Jaoe whitening Yan Ying 3 in 1 skin care set	Philippines FDA. US FDA (?)	
11	Jiaoli Miraculous Cream	Philippines FDA	
12	JJJ Magic Spot Removing Cream	Philippines FDA	
13	Kim Whitening Ginseng and Pearl pimple spot removing Cream (Kim Ginseng and Pearl Latina Smoother Face Cream)	MN, also purchased in Thailand, on internet	
14	Kim Whitening Pearl and Snow Lotus Latinal Smoother Face Cream (Whitening Pearl Cream with snow lotus natural herb reduce wrinkles dark spots)	MN, also purchased in Thailand, on internet	

ⁱ Pakistan Ministry of Science and Technology has issued Technical Regulation in the form of SRO 45 (KE)/2017 PS:3228/2017, dated May 19, 2017, to regulate "skin creams" all over Pakistan through PSQCA. See more below; also see: <https://profit.pakistantoday.com.pk/2018/12/31/psqca-issues-notice-to-beauty-cream-manufacturers-over-health-concerns/>; <https://www.incpak.com/health/faiza-beauty-cream-banned-in-pakistan/>; <https://en.dailypakistan.com.pk/pakistan/popular-beauty-cream-banned-in-pakistan-over-toxic-chemical-use/>

15	Parley no marks anit marks cream Herbal Whitening Cream	HSA (Singapore)	
16	Parley Cream	HSA (Singapore)	
17	POP popular facial cream whitening Acne pimple cream	London Trading Standards https://www.brandsynario.com/pakistani-beauty-brands-exposed-bbc-complete-list-toxic-fairness-creams/	
18	RDL Babyface whitening cream	HSA (Singapore),	
19	Royal Expert Whitening Cream	HSA (Singapore),	
20	Sandal Beauty Whitening Facial Cream	NYC (2018), [Manuf.- Cosmetics Pakistan]	
21	Stillman's Skin Bleach Cream	NYC (2018), US FDA,	
22	Temulawak Cream Beauty Whitening Cream	ZMWG list https://www.ebay.com/itm/Temulawak-Cream-Beauty-Whitening-Cream/183677395824?hash=item2ac406a370:g:SS0AAOSwoF5cXpi9:rk:2:pf:0	
23	White Express cream	London Trading Standards	
24	White Rose Whitening Cream	MN, also purchased in Thailand, on internet	

Appendix B:

Matrix for logging the skin-lightening cream samples

- Log the brand name.
- Log the date of expiration. If not on the package, put a minus sign in the matrix.
- Log the country of origin of the product. If unknown, put a minus sign in the matrix.
- Indicate if there is any indication that the product contains mercury. Log “ingred list” if it is from the ingredient list, log “instr” if it is from other instructions on the package, e.g. that the product should not be in touch with gold, silver or rubber (this may indicate mercury as an ingredient), or log “oral acc.” if it is from oral account.
- Log the name of the shop/e-commerce platform and the address.
- Log with an X if you have taken a photo of the product.
- Log with an X if you have taken a photo of the ingredient list.
- Log with an X if you have taken a screen short of the product in an e-commerce company.

Reference number (the initials of your country 1, 2 3. Etc. e.g. SA1,) the same reference should be on the outside/inside cream box before sending to the hubs for screening	Brand name	Date of expiration (month/year)	Batch Number	Country of origin	Indication of mercury	Shop/e-commerce platform name and address	Photo of the product taken	Photo of the ingredient list taken	Screen shot taken of the product from an e-commerce company

Please send the completed log and photos in an e mail with the topic “Log and photos, skin-lightening cream project” to: andreas.prevodnik@ssnc.se

Annex C: Purchased skin-bleaching products and raw data

Table C1: Brands, expiration dates, batch numbers, country of origin according to the packaging, shops, indication of mercury (Hg) content on the packaging, and mercury concentrations (ppm), determined by Hydride Atomic Absorption Spectroscopy for the products bought in **Bangladesh**.

Brand	Expir. date	Batch nb.	Country of origin	Web shop or physical shop	Indication of Hg content	Mercury concentration (ppm)
Chandni Whitening Cream	03/2021	-	Pakistan	S.D. Enterprise 451/452 New Supermarket, Dhaka	No	1844
Goree Beauty Cream	11/2021	GB114	Pakistan	S.D. Enterprise 451/452 New Supermarket, Dhaka	No	1134
Goree Day and Night Whitening Cream	08/2021	GDN131	Pakistan	S.D. Enterprise 451/452 New Supermarket, Dhaka	No	1153
Kim Whitening Ginseng and Pearl Cream	01/2021	-	Thailand	Daraz (www.daraz.com.bd)	No	407
Kim Whitening Pearl and Snow Lotus Cream	05/2023	-	Thailand	S.D. Enterprise 451/452 New Supermarket, Dhaka	No	623
Sandal Whitening Beauty Cream	01/2022	267	Pakistan	Daraz (www.daraz.com.bd)	No	1504
Parley Herbal Beauty Cream with Avocado	04/2020	1001	Pakistan	Daraz (www.daraz.com)	No	1684
Stillman's Skin Bleach Cream	04/2020	LOTST 0254	Pakistan	S.D. Enterprise 451/452 New Supermarket, Dhaka	No	0.44
Face Fresh	03/2021	N22980	Pakistan	New Variety House 248. New Dhaka Market	No	340
Jiaoli set A, Ginseng Bright White	-	-	China	Daraz (www.daraz.com)	No	224
Jiaoli set B, Ginseng Bright White	-	-	China	Daraz (www.daraz.com)	No	2133
Due Beauty Cream	-	-	-	S.D. Enterprise 451/452 New	No	969

				Supermarket, Dhaka		
Golden Pearl Beauty Cream	09/2021	199214	Pakistan	S.D. Enterprise 451/452 New Supermarket, Dhaka	No	882
POP Popular Facial Cream	01/2020	011	Thailand	S.D. Enterprise 451/452 New Supermarket, Dhaka	No	1.43
Temulawak New - Day & Night Cream - Beauty Whitening - Day Cream	05/2021	00512	Malaysia	S.D. Enterprise 451/452 New Supermarket, Dhaka	No	371
Faiza Beauty Cream	-	39194243	Pakistan	Daraz (www.daraz.com)	No	514

Table C2: Brands, expiration dates, batch numbers, country of origin according to the packaging, indication of mercury (Hg) content on the packaging, and shops, and mercury concentrations (ppm), determined by a Niton XL3t-970 GOLDD XRF, for the products bought in **Djibouti**. <LOD means under the detection limit.

Brand	Expir. date	Batch nb.	Country of origin	Web shop or physical shop	Indication of Hg content	Mercury concentration (ppm)
MELANOFREE	02/2020	180056	-	Rasasi Perfumes & Cosmetics, Hayabley, Dj.	No	<LOD
Gold Skin	-	L3 F12:18	Côte d'Ivoire	Rasasi Perfumes & Cosmetics, Hayabley, Dj	No	<LOD
Parley Goldie Pearl Shine	08/2021	0018	Pakistan	Rasasi Perfumes & Cosmetics, Hayabley, Dj	No	19,242
Jolié Beauty Cream	10/2021	-	Pakistan	Rasasi Perfumes & Cosmetics, Hayabley, Dj	No	9871
SEVEN HERBAL Beauty Cream	01/2022	190112SHBC4	India	Rasasi Perfumes & Cosmetics, Hayabley, Dj	No	<LOD
White Perfect Crème jour	05/2020	0P503	-	Supermarket Nougaprix, Rye de Genève, Dj	No	<LOD

Kanza Beauty Cream	08/2021	28415	-	Rasasi Perfumes & Cosmetics, Hayabley, Dj	No	<LOD
Dermovate Cream	08/2020	CS9E	United Kingdom	Perfumerie, Rue de Soleillet, Djibouti	No	<LOD
Faiza Beauty Cream	12/2020	18511517	Pakistan	Perfumerie, Rue de Soleillet, Djibouti	No	3450
Labell BB Cream		28415	Belgium	Supermarket Nougaprix, Rye de Genève, Djibouti	No	<LOD
PARIS Collection Fairness Cream	06/2020	C054897	-	Supermarket Nougaprix, Rue de Genève, Djibouti	No	<LOD
SNAIL WHITE	03/2021	C2/11322-B	Côte d'Ivoire	Perfumerie, Rue de Soleillet, Djibouti	No	<LOD
Aneeza Gold Beauty Cream with Avocado & Aloe Vera	02/2021	26959-62	Pakistan	Perfumerie, Rue de Soleillet, Djibouti	No	17,086
Chandni Whitening Cream	03/2021	-	Pakistan	Perfumerie, Rue de Soleillet, Djibouti	No	28,342
NOOR Herbal Beauty Cream	12/2020	-	-	Perfumerie, Rue de Soleillet, Djibouti	No	17,669
Light Natural Carotone	05/2021	D200611 B	Côte d'Ivoire	Rasasi Perfumes & Cosmetics, Hayabley, Dj	No	<LOD
Bronz Tone Cocoa Butter and Honey Extracts	09/2021	100646 K	Côte d'Ivoire	Supermarket Nougaprix, Rye de Genève, Djibouti	No	<LOD
Faiza Beauty Cream	02/2022	17LX10	Pakistan	Rasasi Perfumes & Cosmetics, Hayabley, Dj	No	6214

Table C3: Brands, expiration dates, batch numbers, country of origin according to the packaging, shops, indication of mercury (Hg) content on the packaging, and mercury concentrations (ppm), determined by Hydride Atomic Absorption Spectroscopy, for the products bought in **Europe**.

Brand	Expir. date	Batch nb.	Country of origin	Web shop or physical shop	Indication of Hg content	Mercury concentration (ppm)
Chandni Whitening Cream	07/2021	0102196013014	Pakistan	Amazon UK (www.amazon.co.uk/)	No	11,928
Golden Pearl Beauty Cream	09/2021	3006902822	Pakistan	Amazon UK (www.amazon.co.uk/)	No	10,515
Goree Whitening Soap Lycopene	11/2021	-	India	Amazon UK (www.amazon.co.uk/)	No	<0.1
White Express Extra Whitening Lotion	01/2021	9782061380017	France	Amazon UK (www.amazon.co.uk/)	No	<0.1
White Rose Whitening Cream - Placenta Sheep Cream	-	8850107485932 (bar code)	Thailand	Amazon UK (www.amazon.co.uk/)	No	<0.1
Golden Pearl Beauty Cream	09/2021	8964001078586 (Bar Code)	Pakistan	EBay Belgium (www.ebay.be/)	No	5266
Golden Pearl Beauty Cream	08/2021	03006902822	Pakistan	eBay Belgium (www.ebay.be/)	No	10,338
Goree Beauty Cream with Lycopene	01/2022	GB115	Pakistan	eBay Belgium (www.ebay.be/)	No	12,656
JiaoBi Whitening & Moisturizing set - Whitening Speckle-Eliminating Facial Cleanser	06/2022	4006378315	China	eBay Belgium (www.ebay.be/)	No	<0.1
JiaoBi Whitening & Moisturizing set - Whitening Make-up Base	07/2022	4006378316	China	eBay Belgium (www.ebay.be/)	No	20,813
JiaoBi Whitening & Moisturizing set - Whitening Day Cream	08/2022	4006378317	China	eBay Belgium (www.ebay.be/)	No	<0.1

JiaoBi Whitening & Moisturizing set - Whitening Night Cream	09/2022	4006378315	China	eBay Belgium (www.ebay.be/)	No	15,404
Jiaoli HuiChunSu Face Cream 7 Days Specific Eliminating Freckle - Day (Set C)	08/2022	QB/T1857-96	China	eBay Belgium (www.ebay.be/)	No	586
Jiaoli HuiChunSu Face Cream 7 Days Specific Eliminating Freckle - Night (Set C)	08/2022	QB/T1857-96	China	eBay Belgium (www.ebay.be/)	No	1544
Jiaoli HuiChunSu Face Cream 7 Days Specific Eliminating Freckle - Serum (tube) (Set C)	08/2022	QB/T1857-96	China	eBay Belgium (www.ebay.be/)	No	<0.1
Pop Popular Facial Cream	10/2021	8853318000741 (bar code)	Thailand	eBay Belgium (www.ebay.be/)	No	2.20
Pop Popular Facial Cream	10/2021	8853318000741 (bar code)	Thailand	eBay Belgium (www.ebay.be/)	No	1.91
Stillman's Fairness Cream	04/2022	LOT 141901	Pakistan	eBay Belgium (www.ebay.be/)	No	0.36
White Express Soap	03/2021	L170483	India	eBay Belgium (www.ebay.be/)	No	<0.1
White Express Extra Whitening Lotion	02/2022	U16/02-2019 (3700607904004)	India	eBay Belgium (www.ebay.be/)	No	<0.1
White Express Cream Skin Perfector Serum	08/2022	2321890126789000	India	eBay Belgium (www.ebay.be/)	No	<0.1
White Express y fast action cream	07/2021	OK10MNFA1024567NG6	India	eBay Belgium (www.ebay.be/)	No	<0.1
White Rose Whitening Cream (super Gold Caviar)	06/2020	8850107485291	Thailand	eBay Belgium (www.ebay.be/)	No	6188.00

Table C4: Brands, expiration dates, batch numbers, country of origin according to the packaging, shops, indication of mercury (Hg) content on the packaging, and mercury concentrations (ppm), determined by Hydride Atomic Absorption Spectroscopy , for the products bought **in India**.

Brand	Expir. date	Batch nb.	Country of origin	Web shop or physical shop	Indication of Hg content	Mercury concentration (ppm)
Aneesa Gold Beauty Cream with Avocado & Aloe Vera	03/2021	27645-56	Pakistan	Amazon, India (www.amazon.in)	No	11977
Chandni Whitening Cream	06/2020	-	Pakistan	Shop no. 14, Gaffar market, Delhi	No	0.14
Due Beauty Cream	-	-	-	Amazon, India (www.amazon.in)	-	13561
Face Fresh Gold, Beauty Cream	07/2021	N23168	Pakistan	Amazon, India (www.amazon.in)	No	1.48
Faiza Beauty Whitening Cream	04/2020	15LX08	Pakistan	Shop no. 14, Gaffar market, Delhi	No	17970
Golden Pearl Beauty Cream	09/2021	181222	Pakistan	Shop no. 14, Gaffar market, Delhi	No	0.32
Goree Beauty Cream with Lycopene	2021	GB114	Pakistan	Shop no. 14, Gaffar market, Delhi	No	1.15
Goree Day and Night Whitening Cream	04/2020	-	Pakistan	Amazon, India (www.amazon.in)	No	0.23
Jiaoli - HuiChunSu Face Cream 7 Days Specific Eliminating Freckle - Day (Set A)	- (language problem)	- language problem)	China	Amazon, India (www.amazon.in)	- (language problem)	1754
Jiaoli - HuiChunSu Face Cream 7 Days Specific Eliminating	- (language problem)	- language problem)	China	Amazon, India (www.amazon.in)	- (language problem)	260,9

Freckle - Night (Set A)						
Jiaoli - HuiChunSu Face Cream 7 Days Specific Eliminating Freckle - Serum (tube) (Set A)	- (language problem)	- language problem)	China	Amazon, India (www.amazon.in)	- (language problem)	0,08
Jiaoli - HuiChunSu Face Cream 7 Days Specific Eliminating Freckle - Day (Set B)	- (language problem)	- language problem)	China	Amazon, India (www.amazon.in)	- (language problem)	2119
Jiaoli - HuiChunSu Face Cream 7 Days Specific Eliminating Freckle - Night (Set B)	- (language problem)	- language problem)	China	Amazon, India (www.amazon.in)	- (language problem)	299,9
Jiaoli - HuiChunSu Face Cream 7 Days Specific Eliminating Freckle - Serum (tube) (Set B)	- (language problem)	- language problem)	China	Amazon, India (www.amazon.in)	- (language problem)	3,61
Kim Whitening Pearl and Snow Lotus Cream	- (language problem)	- language problem)	Thailand	Amazon, India (www.amazon.in)	- (language problem)	13890
Parley Herbal Beauty Cream with Avocado	10/2019	103	Pakistan	Amazon, India (www.amazon.in)	No	16752
POP Popular Facial Cream Whitening Acne Pimple	06/2020	-(language problem)	Thailand	Amazon, India (www.amazon.in)	- (language problem)	0.46

Sandal Whitening Beauty Cream	- (language problem)	-(language problem)	Pakistan	Maeena manzil micro factory back gate, Karnataka	- (language problem)	16769
Stillman's Skin Bleach Cream	10/2020	-	Pakistan	Flipkart (www.flipkart.com)	No	0.44
White Rose Whitening Cream Placenta Sheep Cream	-	-	Thailand	Amazon, India (www.amazon.in)	No	9835

Table C5: Brands, expiration dates, batch numbers, country of origin according to the packaging, shops, indication of mercury (Hg) content on the packaging, and mercury concentrations (ppm), determined by a Niton XL3t-970 GOLDD XRF, for the products bought in the **Côte d'Ivoire**. <LOD means under the detection limit.

Brand	Expir. date	Batch nb.	Country of origin	Web shop or physical shop	Indication of Hg content	Mercury concentration (ppm)
Palmer's Skin Success Complexion Toner	06/2021	8177C	USA	Kyad Cosmetic Adjame, Bvd. Nangui Abrogoua Forum des marches – Adjamé, Abijan	No	14,121
Palmer's Skin Success Fade Milk	12/2020	BB 800IU035	USA	Kyad Cosmetic Adjame, Bvd. Nangui Abrogoua Forum des marches – Adjamé Abijan	No	<LOD
Faiza Beauty Cream	05/2022	17NX12	Pakistan	Tapis rouge boutique, Bvd. Nangui Abrogoua Forum des marches – Adjamé, Abijan	No	<LOD
La "Fresh" Scrub	06/2020	MA1707014	United Arab Emirates	Salawu Rassaki, Bvd. Nangui Abrogoua Forum des marches – Adjamé, Abijan	No	<LOD

Harmony 55H+ Serum Eclaircissant	-	-	-	Kyad Cosmetic Adjame, Bvd. Nangui Abrogoua Forum des marches – Adjamé, Abijan	No	<LOD
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Table C6: Brands, expiration dates, batch numbers, country of origin according to the packaging, shops, indication of mercury (Hg) content on the packaging, and mercury concentrations (ppm), determined by a Niton XL3t-970 GOLDD XRF, for the products bought in **Kenya**. <LOD means under the detection limit.

Brand	Expir. date	Batch nb.	Country of origin	Web shop or physical shop	Indication of Hg content	Mercury concentration (ppm)
Age Renewal Gel	09/2019	64	Italy	4Ever Young Cosmetics	No	<LOD
Chandi Whitening Cream	10/2020	-	Pakistan	Jumia, Kenya (www.jumia.co.ke)	No	<LOD
Dermo Gel Plus	01/2024	1905-6	Switzerland	4Ever Young Cosmetics	No	<LOD
Faiza Beauty Cream	03/2022	17MX11	Pakistan	Jumia, Kenya (www.jumia.co.ke)	No	11,313
Hot Prosone Gel	11/2021	1693	Italy	Precious Cosmetics	No	<LOD
Lemonvate Cream	10/2021	1810218	Italy	Imani Beauty Shop	No	<LOD
Movate Cream	06/2020	1705096	Italy	Jumia, Kenya (www.jumia.co.ke)	No	<LOD
Peau Claire	07/2020	-	Côte d'Ivoire	Jumia, Kenya (www.jumia.co.ke)	No	<LOD
SivoClair Lightening Cream	07/2020	-	Côte d'Ivoire	Precious Cosmetics	No	<LOD
Palmer's Skin Success Fade Milk	-	J8319C	USA	Jumia, Kenya (www.jumia.co.ke)	No	<LOD
Soft & Beautiful Gel	07/2020	1572	Italy	Precious Cosmetics	No	<LOD
Skin Balance Gel	07/2026	16118	Italy	Imani Beauty Shop	No	<LOD

Wrinkle Remover						
White Express cream (package, cream, serum, soap, 10 day fast action cream.	04/2021	W01308	India	Precious Cosmetics	No	<LOD

Table C7: Brands, expiration dates, batch numbers, country of origin according to the packaging, shops, indication of mercury (Hg) content on the packaging, and mercury concentrations (ppm), determined by a Niton XL3t-970 GOLDD XRF, for the products bought in **Nigeria**. <LOD means under the detection limit.

Brand	Expir. date	Batch nb.	Country of origin	Web shop or physical shop	Indication of Hg content	Mercury concentration (ppm)
Temulawa k New - Day & Night Cream - Beauty Whitening Cream	-	00512	Malaysia	Dupe Cosmetics	No	626
Aneeza Gold Beauty Cream with Avocado & Aloe Vera	02/2021	26864	Pakistan	Jumia, Nigeria (https://www.jumia.com.ng)	No	20,599
White Express, Extra Whitening Lotion	01/2022	30L14	France	Jumia, Nigeria (https://www.jumia.com.ng)	No	<LOD
RDL Whitening Cream	03/2020	25WC0082-2	Philippines	Jiji (https://www.jiji.ng) , through Bishop Francis Cosmetics Nig. Ltd.	No	<LOD
Goree Whitening Body Lotion	09/2020	-	Pakistan	Jiji (https://www.jiji.ng) , through Bishop Francis Cosmetics Nig. Ltd.	No	<LOD

Kim Whitening Pearl and Snow louts Cream	05/2020	-	Thailand	Jiji (https://www.jiji.ng), through Humduke Nig. Ltd.	-	2584
POP Popular Facial Cream	07/2021	005	Thailand	Jumia, Nigeria (https://www.jumia.com.ng)	-	<LOD
Jiaoli Speckle Dispelling & Whitening Cream	02/2021	-	China	Jumia, Nigeria (https://www.jumia.com.ng)	-	1154
Parley Natural Fairness Cream	03/2020	1022	Pakistan	Konga (www.konga.com)	-	<LOD

Table C8: Brands, expiration dates, batch numbers, country of origin according to the packaging, shops, indication of mercury (Hg) content on the packaging, and mercury concentrations (ppm), determined by Hydride Atomic Absorption Spectroscopy, for the products bought in the Philippines.

Brand	Expir. date	Batch nb.	Country of origin	Web shop or physical shop	Indication of Hg content	Mercury concentration (ppm)
Goree Beauty Cream with Lycopene	01/2022	GB115	Pakistan	Korean Drugstore & General Merchandise	No	0.32
Goree Beauty Cream with Lycopene	01/2020	GB115	Pakistan	Lazada, Philippines (www.lazada.com.ph)	No	1543
Goree Day and Night Whitening Cream	08/2021	GDN131	Pakistan	Lazada, Philippines (www.lazada.com.ph)	No	1573
Aneesa Gold Beauty Cream with	01/2022	24720-31	Pakistan	Lazada, Philippines (www.lazada.com.ph)	No	829

Avocado & Aloe Vera						
Golden Pearl Beauty Cream	09/2021	18AE08	Pakistan	Lazada, Philippines (www.lazada.com.ph)	No	6922
POP Popular Facial Cream	03/2022	001	Thailand	999 Mall Divisoria, Manila	No	1.13
JJJ Magical Spot Removing Day Cream	08/2023	-	-	999 Mall Divisoria, Manila	No	1686
JJJ Magical Spot Removing Night Cream	08/2023	-	-	999 Mall Divisoria, Manila	No	1896
Erna Whitening Cream	-	-	-	999 Mall Divisoria, Manila	No	1080
Jiaoli Miraculous Cream set, Day cream	02/2022	-	China	Lazada, Philippines (www.lazada.com.ph)	No	2004
Jiaoli Miraculous Cream set, Night Cream						2018
RDL Cream	03/2025	12WC0090-4	Philippines	Lazada, Philippines (www.lazada.com.ph)	No	0.14

Table C9: Brands, expiration dates, batch numbers, country of origin according to the packaging, shops indication of mercury (Hg) content on the packaging, and mercury concentrations (ppm), determined by a Niton XL3t-970 GOLDD XRF, for the products bought in **South Africa**. <LOD means under the detection limit.

Brand	Expir. date	Batch nb.	Country of origin	Web shop or physical shop	Indication of Hg content	Mercury concentration (ppm)
Chandni Whitening Cream	07/2020	-	Pakistan	BidorBuy (www.bidorbuy.co.za)	No	28,289
Goree Whitening Beauty Cream	01/2021	GB111	Pakistan	BidorBuy (www.bidorbuy.co.za)	No	33,083

Goree Day and Night Whitening Cream	08/2021	GDN131	Pakistan	BidorBuy (www.bidorbuy.co.za)	No	29,686
Sandal Whitening Beauty Cream	02/2020	-	Pakistan	BidorBuy (www.bidorbuy.co.za)	No	26,321
Stillman's Skin Bleach Cream	11/2022	ST16117	Pakistan	BidorBuy (www.bidorbuy.co.za)	No	<LOD
Face Fresh	-	-	Pakistan	BidorBuy (www.bidorbuy.co.za)	No	9387
Due Beauty Cream	10/2021	2335	Pakistan	BidorBuy (www.bidorbuy.co.za)	No	15,384
Golden Pearl Beauty Cream	12/2020	4289	Pakistan	BidorBuy (www.bidorbuy.co.za)	No	16,665
Faiza Beauty Cream	11/2018	42546873	Pakistan	BidorBuy (www.bidorbuy.co.za)	No	4712
Goree Beauty Cream	01/2021	GB111	Pakistan	BidorBuy (www.bidorbuy.co.za)	No	5152
Goree Whitening Soap	11/2020	-	Pakistan	BidorBuy (www.bidorbuy.co.za)	No	4353

Table C10: Brands, expiration dates, batch numbers, country of origin according to the packaging, shops, indication of mercury (Hg) content on the packaging, and mercury concentrations (ppm), determined by a Niton XL3t-970 GOLDD XRF, for the products bought in **Uganda**. <LOD means under the detection limit.

Brand	Expir. date	Batch nb.	Country of origin	Web shop or physical shop	Indication of Hg content	Mercury concentration (ppm)
L'abidjanaise	08/2021	221-18/003 CABC/SS	Côte d'Ivoire	Hajat Nana Cosmetics Shop No. No. L 2 – 226, Kampala	No	<LOD
Chandni Whitening Cream	-	-	Pakistan	Beauty Dream, Shop no. 62, Pioneer Moll, Kampala	No	<LOD
Faiza Beauty Cream	-	12519972	Pakistan	Gazaland, Shop no. L1601, Kampala	-	6045

Parley Beauty Cream	09/2021	1037	Pakistan	Gazaland Shop no. L 14003, Kampala	No	15,985
POP Popular Facial Cream	08/2021	001	Thailand	Hajat Nana Cosmetics, Shop No. L 2 – 226, Kampala	No	<LOD
Rapid'clair	02/2021	T124	Cameroun	Gazaland, Shop no. L1601, Ground Floor, Kampala	No	<LOD
Rapid' White	12/2021	**PIC OS-0.1**_14:15	Côte d'Ivoire	Hajat Nana Cosmetics, Shop No. L 2 – 226, Kampala	No	<LOD
Sure Deal Ladies Herbal Lightening Cream	09/2021	-	Uganda	Senana Building, Tin no. 10273161, Kampala	No	<LOD
Top Lemon Plus	08/2021		Democratic Republic of Congo	Gazaland Shop no. L 14003, Kampala		<LOD
White Express	02/2021	T20	France	Beauty Dream, Shop no. 62, Pioneer Moll, Kampala	No	<LOD
Quick Z Action Zero, Pimples	03/2021	01741	Uganda	Gazaland, Shop no. L1601, Kampala	No	<LOD

Table C11: Brands, expiration dates, batch numbers, country of origin according to the packaging, shops, indication of mercury (Hg) content on the packaging, and mercury concentrations (ppm), determined by Cold Vapor Atomic Absorption Spectroscopy, for the products bought in the **United States of America**.

Brand	Expir. date	Batch nb.	Country of origin	Web shop or physical shop	Indication of Hg content	Mercury concentration (ppm)
Parley NoMarks Anti-Marks Cream with Fruit Extracts	-	-	Pakistan	eBay, USA (https://www.ebay.com/sch/i.html?_nkw=eBay+usa)	No	N.D.
Jiaoli HuiChuSu Face Cream 7 Days Specific Eliminating Freckle	-	-	China	eBay, USA (https://www.ebay.com/sch/i.html?_nkw=eBay+usa)	No	1,800

Kim Whitening Pearl and Snow Lotus Cream	-	549	Thailand	eBay, USA (https://www.ebay.ca/sch/i.html?_nkw=e_bay+usa)	No	19,000
White Rose Whitening cream - Placenta Sheep Cream	10/2018	229	Thailand	eBay, USA (https://www.ebay.ca/sch/i.html?_nkw=e_bay+usa)	No	N.D.
Temulawak Day & Night Cream - Beauty Whitening Cream	-	512	Indonesia, imported via Malaysia	eBay, USA (https://www.ebay.ca/sch/i.html?_nkw=e_bay+usa)	No	0.52
Chandni Whitening Cream	12/2020	T124	Pakistan	eBay, USA (https://www.ebay.ca/sch/i.html?_nkw=e_bay+usa)	No	14,000
Sandal Whitening Beauty Cream	01/2022	267	Pakistan	eBay, USA (https://www.ebay.ca/sch/i.html?_nkw=e_bay+usa)	No	21,000
Face Fresh Beauty Cream	-	-	Pakistan	eBay, USA (https://www.ebay.ca/sch/i.html?_nkw=e_bay+usa)	No	15,000
Goree Day and Night Whitening Cream	01/2022	GND140	Pakistan	eBay, USA (https://www.ebay.ca/sch/i.html?_nkw=e_bay+usa)	No	23,000
Due Beauty Cream	-	-	Pakistan	eBay, USA (https://www.ebay.ca/sch/i.html?_nkw=e_bay+usa)	No	0.10
Golden Pearl Beauty Cream	31/2019	-	Pakistan	eBay, USA (https://www.ebay.ca/sch/i.html?_nkw=e_bay+usa)	No	0.11
Kim Whitening Pearl and Snow Lotus Cream	-	549	Thailand	eBay, USA (https://www.ebay.ca/sch/i.html?_nkw=e_bay+usa)	No	14,000
POP Popular Facial Cream	10/2021	-	Thailand	eBay, USA (https://www.ebay.ca/sch/i.html?_nkw=e_bay+usa)	No	0.04
POP Popular Facial Cream	10/2021	-	Thailand	www.ebay.be/	No	0.69

Kim Whitening Pearl and Snow Lotus Cream	-	549	Thailand	Amazon USA (https://www.amazon.com/USA/s?k=USA)	No	16,000
Mekako Soap	10/2022	29217A	Italy	Amazon USA (https://www.amazon.com/USA/s?k=USA)		0.04
POP Popular Facial Cream	08/10/2021	-	Thailand	Amazon USA (https://www.amazon.com/USA/s?k=USA)	No	0.05
Goree Beauty Cream with Lycopene	11/2021	GB114	Pakistan	Amazon USA (https://www.amazon.com/USA/s?k=USA)	No	25,000
Chandni Whitening Cream	11/2019	-	Pakistan	Amazon USA (https://www.amazon.com/USA/s?k=USA)	No	40,000
Whitening Ginseng and Pearl Cream	-	888/32	Thailand	Amazon USA (https://www.amazon.com/USA/s?k=USA)	No	8700
Whitening Ginseng and Pearl Cream	-	888/32	Thailand	Amazon USA (https://www.amazon.com/USA/s?k=USA)	No	8600
Chandni Whitening Cream	-	-	Pakistan	Amazon USA (https://www.amazon.com/USA/s?k=USA)	No	22,000
Goree Beauty Cream with Lycopene	09/2020	GB113	Pakistan	Amazon USA (https://www.amazon.com/USA/s?k=USA)	No	26,000
Kim Whitening Pearl and Snow Lotus Cream	-	549	Thailand	Amazon USA (https://www.amazon.com/USA/s?k=USA)	No	13,000

Annex D: Sampling protocol for the Niton XL3t-970 GOLDD+ Olympus Innov-X Delta

1. Type of instrument:

Niton XL3t-970 GOLDD+

Olympus Innov-X Delta.

2. Preparation of analysis

- a. The sample preparation was done with sample cup with a film of polypropylene (TF 240 255).
- b. The sample cups were filled in half, to about 2 cm depth. The diameter of the cup was 3 cm, but window of analysis 8 mm.
- c. The creams depending on their consistency were stirred with a plastic spoon or shaken.
- d. While placed in the cup, the cup was tapped gently to ensure the cream is evenly distributed.

3. Analysis

- a. The analysis mode used is "cosmetics, semi solid" (which uses a combination of the algorithm of the soil and plastic mode)
- b. The time of analysis was 10 seconds and each sample was read once (Niton) . The samples analysed with the Olympus, were 'read' 3 times (pretesting) plus another time for testing.

Given the high readings we had with the Olympus instrument, the XRF results were verified by QES[1] (<https://www.qesnet.com/>), a trusted independent testing facility in the Philippines.

Annex E: QACS laboratory methodology

The determination of mercury was assessed with atomic absorption spectrometry.

The apparatus was a Perkin Elmer Model Analyst 800 Atomic Absorption Spectrophotometer; equipped with a 4-inch burner head, mercury electrodeless discharge lamp (EDL). FIAS 100 Flow Injection Analysis System for Hydride generation with a quartz cell.

Parameter settings Hg:

- I. Wavelength 253.7 nm
- II. Lamp current 185.0 mA
- III. Slit 0.7 nm High Slit

2. FIAS

- I. FIAS flow (Argon) 100 ml / min.
- II. Carrier solution 3 % (v/v) HCL
- III. Reducing agent 0.2 % NaBH₄ in 0.05% NaOH
- IV. Sample loop 500 µl
- V. Read time 20s

For the sample preparation

Accurately weigh, to the nearest mg, 0.35 – 0.50 g of sample into a high-pressure resistance PTFE-TFM microwave digestion vessel. Avoid contact with the side of the vessel. Add 8 ml trace grade nitric acid, 1ml of trace grade hydrogen peroxide by using a graduated pipette. If samples contain talcum or pigment add 1ml of trace grade hydrochloric acid.

Close the vessel lid. Leave for about 15 minutes to ensure complete reaction. Digest in microwave digestion system at the specified program (Organic B).

After the digestion procedure has completed, allow the vessel to cool to room temperature before opening and the sample is transferred into a 50 ml volumetric flask and dilute with distilled water. If necessary, additional dilutions can be performed after this step, to bring the concentration of Mercury within the calibration range. 10 ml of the sample solution is transferred into a 20 ml volumetric flask, 0.2 ml of HCl 37% for trace metal and one to two drops of a 5% solution of KMnO₄ are added and the sample is diluted to volume with water.

Standard preparation

Prepare a working stock solution by dissolving 1 ml of the Mercury standard solution 1000g/L 0.002 into a 100 ml volumetric flask. 0.1, 0.2, 1.0 and 2.0 ml of the working stock are transferred into 20 ml volumetric flasks. Then 10 ml water are added, followed by 0.2 ml HCl 37% for trace metal and one to two drops of a 5% solution of KMnO₄, the standards are diluted to volume with water.

Blank preparation

Into a 20 ml volumetric flask is placed 15 ml water, 0.5 ml of HCl 37% and one to two drops of 5 % KMnO₄ added and the blank is diluted to volume with water.

Annex F: Enthalpy laboratory methodology

Enthalpy analyzes cream samples for mercury according to the US Environmental Protection Agency (EPA) standard 7471.

METHOD 7471B

MERCURY IN SOLID OR SEMISOLID WASTE (MANUAL COLD-VAPOR TECHNIQUE)

SW-846 is not intended to be an analytical training manual. Therefore, method procedures are written based on the assumption that they will be performed by analysts who are formally trained in at least the basic principles of chemical analysis and in the use of the subject technology.

In addition, SW-846 methods, with the exception of required method use for the analysis of method-defined parameters, are intended to be guidance methods which contain general information on how to perform an analytical procedure or technique which a laboratory can use as a basic starting point for generating its own detailed Standard Operating Procedure (SOP), either for its own general use or for a specific project application. The performance data included in this method are for guidance purposes only, and are not intended to be and must not be used as absolute QC acceptance criteria for purposes of laboratory accreditation.

1.0 SCOPE AND APPLICATION

1.1 This method is a cold-vapor atomic absorption procedure for measuring the following RCRA analyte in soils, sediments, bottom deposits, and sludge-type materials:

Analyte	CAS Number*
Mercury, total (organic and inorganic)	7439-97-6

* Chemical Abstracts Service Registry Number

1.2 All samples must be subjected to an appropriate dissolution step prior to analysis. If this dissolution procedure is not sufficient to dissolve a specific matrix type or sample, then this method is not applicable for that matrix.

1.3 Prior to employing this method, analysts are advised to consult the disclaimer statement at the front of the manual and the information in Chapter Two for guidance on the intended flexibility in the choice of methods, apparatus, materials, reagents, and supplies, and on the responsibilities of the analyst for demonstrating that the techniques employed are appropriate for the analytes of interest, in the matrix of interest, and at the levels of concern.

In addition, analysts and data users are advised that, except where explicitly specified in a regulation, the use of SW-846 methods is *not* mandatory in response to Federal testing requirements. The information contained in this method is provided by EPA as guidance to be used by the analyst and the regulated community in making judgments necessary to generate results that meet the data quality objectives for the intended application.

1.4 Use of this method is restricted to use by, or under supervision of, properly experienced and trained personnel. Each analyst must demonstrate the ability to generate acceptable results with this method.

2.0 SUMMARY OF METHOD

2.1 Prior to analysis, the solid or semi-solid samples must be prepared according to the procedures discussed in this method.

2.2 This method uses cold-vapor atomic absorption and is based on the absorption of radiation at the 253.7-nm wavelength by mercury vapor. The mercury is reduced to the elemental state and aerated from solution in a closed system. The mercury vapor passes through a cell positioned in the light path of an atomic absorption spectrophotometer. Absorbance (peak height) is measured as a function of mercury concentration.

2.3 The typical instrument detection limit (IDL) for this method is 0.0002 mg/L.

3.0 DEFINITIONS

Refer to Chapter One, Chapter Three, and the manufacturer's instructions for definitions that may be relevant to this procedure.

4.0 INTERFERENCES

4.1 Solvents, reagents, glassware, and other sample processing hardware may yield artifacts and/or interferences to sample analysis. All of these materials must be demonstrated to be free from interferences under the conditions of the analysis by analyzing method blanks. Specific selection of reagents and purification of solvents by distillation in all-glass systems may be necessary. Refer to each method to be used for specific guidance on quality control procedures and to Chapter Three for general guidance on the cleaning of glassware. Also refer to Method 7000 for a discussion of interferences.

4.2 Potassium permanganate is added to eliminate possible interference from sulfide. Concentrations as high as 20 mg/Kg of sulfide, as sodium sulfide, do not interfere with the recovery of added inorganic mercury in reagent water.

4.3 Copper has also been reported to interfere; however, copper concentrations as high as 10 mg/Kg had no effect on recovery of mercury from spiked samples.

4.4 Samples high in chlorides require additional permanganate (as much as 25 mL) because, during the oxidation step, chlorides are converted to free chlorine, which also absorbs radiation of 254 nm. Care must therefore be taken to ensure that free chlorine is absent before the mercury is reduced and swept into the cell. This may be accomplished by using an excess of hydroxylamine sulfate reagent (25 mL). In addition, the dead air space in the BOD bottle must be purged before adding stannous sulfate. Alternatively, the sample may be allowed to stand for at least an hour under a hood (without active purging) to remove the chlorine.

4.5 Certain volatile organic materials that absorb at this wavelength may also cause interference. A preliminary run without reagents may be used to determine if this type of interference is present.

5.0 SAFETY

5.1 This method does not address all safety issues associated with its use. The laboratory is responsible for maintaining a safe work environment and a current awareness file of OSHA regulations regarding the safe handling of the chemicals listed in this method. A reference file of material safety data sheets (MSDSs) should be available to all personnel involved in these analyses.

5.2 Many mercury compounds are highly toxic if swallowed, inhaled, or absorbed through the skin. Extreme care must be exercised in the handling of concentrated mercury reagents. Concentrated mercury reagents should only be handled by analysts knowledgeable of their risks and of safe handling procedures.

6.0 EQUIPMENT AND SUPPLIES

The mention of trade names or commercial products in this manual is for illustrative purposes only, and does not constitute an EPA endorsement or exclusive recommendation for use. The products and instrument settings cited in SW-846 methods represent those products and settings used during method development or subsequently evaluated by the Agency. Glassware, reagents, supplies, equipment, and settings other than those listed in this manual may be employed provided that method performance appropriate for the intended application has been demonstrated and documented.

This section does not list common laboratory glassware (e.g., beakers and flasks).

6.1 Atomic absorption spectrophotometer or equivalent -- Any atomic absorption unit equipped with an open sample presentation area in which to mount the absorption cell is suitable. Instrument settings recommended by the particular manufacturer should be followed. Instruments designed specifically for the measurement of mercury using the cold-vapor technique are commercially available and may be substituted for the atomic absorption spectrophotometer.

6.2 Mercury hollow cathode lamp or electrodeless discharge lamp.

6.3 Recording device -- Any multirange variable-speed recorder compatible equipped with the UV detection system or any other compatible data collection device.

6.4 Absorption cell -- Standard spectrophotometer cells 10 cm long equipped with quartz end windows may be used. Suitable cells may be constructed from Plexiglas tubing, 1 in O.D. x 4.5 in. The ends are ground perpendicular to the longitudinal axis, and quartz windows (1 in diameter x 1/16 in thickness) are cemented in place. The cell is strapped to a burner for support and aligned in the light beam by use of two 2-in x 2-in cards. One inch diameter holes are cut in the middle of each card. The cards are then placed over each end of the cell. The cell is then positioned and adjusted vertically and horizontally to give the maximum transmittance.

6.5 Air pump -- Any peristaltic pump capable of delivering air at 1 L/min may be used. A Masterflex pump equipped with electronic speed control has been found to be satisfactory.

6.6 Flowmeter -- Capable of measuring an air flow of 1 L/min.

6.7 Aeration tubing -- A straight glass frit with a coarse porosity. Tygon tubing is used for passage of the mercury vapor from the sample bottle to the absorption cell and return.

6.8 Drying tube -- 6-in x 3/4-in diameter tube containing 20 g of magnesium perchlorate or a small reading lamp, equipped with a 60-W bulb, which may be used to prevent condensation of moisture inside the cell. The lamp should be positioned to shine on the absorption cell so that the air temperature in the cell is about 10 °C above ambient.

6.9 The cold-vapor generator is assembled as shown in Figure 1 of Ref. 1 or according to the instrument manufacturer's instructions. The apparatus shown in Figure 1 of Ref. 1 is a closed system. An open system, where the mercury vapor is passed through the absorption cell only once, may be used instead of the closed system. Because mercury vapor is toxic, precaution must be taken to avoid its inhalation. Therefore, a bypass was included in the system either to vent the mercury vapor into an exhaust hood or to pass the vapor through some absorbing medium, such as:

1. Equal volumes of 0.1 M KMnO_4 and 10% H_2SO_4 , or
2. Iodine 0.25% in a 3% KI solution.

A specially treated charcoal that will adsorb mercury vapor is also available from Barneby-Cheney, East 8th Avenue and North Cassidy Street, Columbus, Ohio 43219, Cat. #580-13 or #580-22.

6.10 Heating source -- Adjustable and capable of maintaining a temperature of 95 ± 3 °C. (e.g., hot plate, block digester, microwave, etc.)

7.0 REAGENTS AND STANDARDS

7.1 Reagent-grade chemicals must be used in all tests. Unless otherwise indicated, it is intended that all reagents conform to the specifications of the Committee on Analytical Reagents of the American Chemical Society, where such specifications are available. Other grades may be used, provided it is first ascertained that the reagent is of sufficiently high purity to permit its use without lessening the accuracy of the determination.

7.2 Reagent water -- Reagent water should be interference free. All references to water in this method refer to reagent water unless otherwise specified.

7.3 Aqua regia -- Prepare immediately before use by carefully adding three volumes of concentrated HCl to one volume of concentrated HNO_3 .

7.4 Sulfuric acid, 0.5 N -- Dilute 14.0 mL of concentrated sulfuric acid to 1 L.

7.5 Stannous sulfate -- Add 25 g of stannous sulfate to 250 mL of 0.5 N sulfuric acid. This mixture is a suspension and should be stirred continuously during use. A 10% solution of stannous chloride (in water) can be substituted for the acidic stannous sulfate solution.

NOTE: If line clogging occurs when using an automated system, use a less concentrated stannous chloride solution.

7.6 Sodium chloride-hydroxylamine sulfate solution -- Dissolve 12 g of sodium chloride and 12 g of hydroxylamine sulfate in reagent water and dilute to 100 mL. Hydroxylamine

hydrochloride may be used in place of hydroxylamine sulfate. In this case, dissolve 12 g of hydroxylamine hydrochloride in reagent water and dilute to 100 mL.

7.7 Potassium permanganate, mercury-free, 5% solution (w/v) – Dissolve 5 g of potassium permanganate in 100 mL of reagent water.

7.8 Mercury stock solution -- Dissolve 0.1354 g of mercuric chloride in 75 mL of reagent water. Add 10 mL of concentrated nitric acid and adjust the volume to 100.0 mL (1.0 mL = 1.0 mg Hg). Alternatively, a mercury stock solution may be purchased from a reputable source with a concentration of 1.0 mg Hg/mL. Verify the quality of the standard by checking it against a second source standard (see second paragraph of Sec. 9.4).

7.9 Mercury working standard -- Make successive dilutions of the stock mercury solution to obtain a working standard containing 0.1 µg/mL. This working standard and the dilution of the stock mercury solutions should be prepared fresh daily. Acidity of the working standard should be maintained at 0.15% nitric acid. This acid should be added to the flask, as needed, before adding the aliquot.

8.0 SAMPLE COLLECTION, PRESERVATION, AND STORAGE

8.1 See the introductory material to Chapter Three, "Inorganic Analytes."

8.2 All sample containers must be prewashed with detergents, acids, and reagent water. Glass, plastic, and polytetrafluoroethylene (PTFE) containers are suitable in most cases. Polymers are not suitable for samples containing metallic mercury.

8.3 Metallic mercury, some inorganic mercury compounds, and many organic mercury compounds are volatile and unstable. It is advantageous to analyze the samples as soon as possible to determine the total mercury in the sample but in no case exceed the 28-day limit as defined in Chapter Three of this manual. Non-aqueous samples must be analyzed as soon as possible. If solid samples are not analyzed immediately, refrigeration is necessary.

9.0 QUALITY CONTROL

9.1 Refer to Chapter One for additional guidance on quality assurance (QA) and quality control (QC) protocols. When inconsistencies exist between QC guidelines, method-specific QC criteria take precedence over both technique-specific criteria and those criteria given in Chapter One, and technique-specific QC criteria take precedence over the criteria in Chapter One. Any effort involving the collection of analytical data should include development of a structured and systematic planning document, such as a Quality Assurance Project Plan (QAPP) or a Sampling and Analysis Plan (SAP), which translates project objectives and specifications into directions for those that will implement the project and assess the results. Each laboratory should maintain a formal quality assurance program. The laboratory should also maintain records to document the quality of the data generated. All data sheets and quality control data should be maintained for reference or inspection.

9.2 Initial demonstration of proficiency

Each laboratory must demonstrate initial proficiency by following the sample preparation and analytical procedures described in this method and generating data of acceptable accuracy and precision for the target analyte (Mercury) in a clean matrix. The laboratory must also

repeat the demonstration of proficiency whenever new staff members are trained or significant changes in instrumentation are made.

9.3 For each batch of samples processed, at least one method blank must be carried throughout the entire sample preparation and analytical process. A method blank is prepared by using a volume or weight of reagent water at the volume or weight specified in the preparation method and then carried through the appropriate steps of the analytical process. These steps may include but are not limited to digestion, dilution, filtering, and analysis. If the method blank does not contain the target analyte at a level that interferes with the project-specific data quality objectives then the method blank would be considered acceptable. In the absence of project-specific data quality objectives, if the blank is less than the lower level of quantitation or less than 10% of the lowest sample concentration for the analyte, whichever is greater, then the method blank would be considered acceptable. If the method blank cannot be considered acceptable, the method blank should be re-run once and if still unacceptable then all samples after the last acceptable method blank must be re-prepped and reanalyzed along with the other appropriate batch QC samples. These blanks will be useful in determining if samples are being contaminated.

9.4 For each batch of samples processed, at least one laboratory control sample must be carried throughout the entire sample preparation and analytical process. The laboratory control samples should be spiked with each analyte of interest at the project-specific action level or, when lacking project-specific action levels, between the low and midlevel standards. Acceptance criteria should be set at a laboratory derived limit developed through the use of historical analyses. In the absence of historical data this limit should be set at $\pm 20\%$ of the spiked value. After the determination of historical data, $\pm 20\%$ should still be the limit of maximum deviation to express acceptability. If the laboratory control sample cannot be considered acceptable, the laboratory control sample should be re-run once and if still unacceptable then all samples after the last acceptable laboratory control sample must be re-prepped and reanalyzed. Refer to Chapter One for more information.

If more than 10 samples per day are analyzed, the working standard curve must be verified by measuring satisfactorily a LCS or mid-range standard or reference standard after every 10 samples. This sample value should be within 20% of the true value, or the previous 10 samples must be reanalyzed.

9.5 Matrix spike/matrix spike duplicates (MS/MSDs) -- MS/MSDs are intralaboratory split samples spiked with identical concentrations of each analyte of interest. The spiking occurs prior to sample preparation and analysis. An MS/MSD is used to document the bias and precision of a method in a given sample matrix. Based on the analyst's discretion, a separate spike sample and a separate duplicate sample may be analyzed in lieu of the MS/MSD. For each batch of sample processed, at least one MS/MSD sample must be carried throughout the entire sample preparation and analytical process. MS/MSD samples should be spiked at the same level as the corresponding laboratory control sample that is at the project-specific action level or, when lacking project-specific action levels, between the low and midlevel standards. Acceptance criteria should be set at a laboratory derived limit developed through the use of historical analyses. In the absence of historical data this limit should be set at $\pm 20\%$ of the spiked value for precision and ≤ 20 relative percent difference (RPD). After the determination of historical data, 20% should still be the limit of maximum deviation for both percent recovery and relative percent difference to express acceptability.

9.6 The method of standard additions can be used to verify linearity or if matrix interference is suspected. Refer to Method 7000 for standard addition procedures.

9.7 Refer to Method 7000 for additional QA and QC information that may be applicable.

10.0 CALIBRATION AND STANDARDIZATION

10.1 Standard preparation -- Transfer 0.0-, 0.5-, 1.0-, 2.0-, 5.0-, and 10-mL aliquots of the mercury working standard, containing 0-1.0 µg of mercury, to a series of 300-mL BOD bottles or equivalent. Add enough reagent water to each bottle to make a total volume of 10 mL. Add 5 mL of aqua regia and heat 2 min at 95 ± 3 °C. Allow the sample to cool; add 50 mL of reagent water and 15 mL of KMnO_4 solution to each bottle and heat again at 95 ± 3 °C for 30 min. Cool and add 6 mL of sodium chloride-hydroxylamine sulfate solution to reduce the excess permanganate. Add 50 mL of reagent water. Treating each bottle individually, add 5 mL of stannous sulfate solution, immediately attach the bottle to the aeration apparatus, and continue as described in Sec. 11.3.

10.2 Construct a calibration curve by plotting the absorbances of standards versus micrograms of mercury. Determine the peak height of the unknown from the chart or other recording device and read the mercury value from the standard curve.

11.0 PROCEDURE

11.1 Sample preparation

Weigh a 0.5 - 0.6 g-aliquot of a well homogenized sample and place in the bottom of a BOD bottle or other appropriate analysis vessel. Add 5 mL of reagent water and 5 mL of aqua regia. Heat 2 min at 95 ± 3 °C. Cool; then add 50 mL of reagent water and 15 mL of potassium permanganate solution to each sample and let stand at least 15 min. Add additional portions of permanganate solution, if needed, until the purple color persists for at least 15 min (see Sec. 4.4). Ensure that equal amounts of permanganate are added to standards and blanks. Mix thoroughly, then heat for 30 min at 95 ± 3 °C. Cool and add 6 mL of sodium chloride-hydroxylamine sulfate to reduce the excess permanganate.

CAUTION: Do this addition under a hood, because Cl_2 could evolve. Add 55 mL of reagent water. Treating each bottle individually, add 5 mL of stannous sulfate and immediately attach the bottle to the aeration apparatus. Continue as described under Sec. 11.3.

See Sec. 10.1 for directions regarding standard preparation.

11.2 Alternate digestion procedure

An alternate digestion procedure employing an autoclave may also be used. In this procedure, 5 mL of concentrated H_2SO_4 and 2 mL of concentrated HNO_3 are added to the 0.5 - 0.6 g of sample. Add 5 mL of saturated KMnO_4 solution and cover the bottle with a piece of aluminum foil. The samples are autoclaved at 121 ± 3 °C and 15 lb for 15 min. Cool, dilute to a volume of 100 mL with reagent water, and add 6 mL of sodium chloride-hydroxylamine sulfate solution to reduce the excess permanganate. Purge the dead air space and continue as described under Sec. 11.3. Refer to the caution statement in Sec. 11.1 for the proper protocol in reducing the excess permanganate solution and adding stannous sulfate.

11.3 Analysis

At this point, allow the sample to stand quietly without manual agitation. Allow the circulating pump, which was previously adjusted to a rate of 1 L/min, to run continuously. The absorbance, as exhibited either on the spectrophotometer or the recorder, will increase and reach maximum within 30 sec. As soon as the absorbance reading levels off (approximately 1 min), open the bypass valve and continue the aeration until the absorbance returns to its minimum value. Close the bypass valve, remove the fritted tubing from the BOD bottle, and continue the aeration. Because of instrument variation refer to the manufacturer's recommended operating conditions when using this method.

11.4 See Sec. 10.2 for directions regarding calibration curve construction.

12.0 DATA ANALYSIS AND CALCULATIONS

12.1 Results need to be reported in units commensurate with their intended use and all dilutions need to be taken into account when computing final results.

12.2 Calculate metal concentrations (1) by the method of standard additions, (2) from a calibration curve, or (3) directly from the instrument's concentration read-out. All dilution or concentration factors must be taken into account. Concentrations reported for multiphased or wet samples must be appropriately qualified (e.g., 5 µg/g dry weight).

13.0 METHOD PERFORMANCE

13.1 Performance data and related information are provided in SW-846 methods only as examples and guidance. The data do not represent required performance criteria for users of the methods. Instead, performance criteria should be developed on a project-specific basis, and the laboratory should establish in-house QC performance criteria for the application of this method. These performance data are not intended to be and must not be used as absolute QC acceptance criteria for purposes of laboratory accreditation.

13.2 Precision and accuracy data are available in Method 245.5 of Methods for Chemical Analysis of Water and Wastes. These data are provided for guidance purposes only.

13.2 The data shown in Table 1 were obtained from records of State and contractor laboratories. The data are intended to show the precision of the combined sample preparation and analysis method. These data are provided for guidance purposes only.

14.0 POLLUTION PREVENTION

14.1 Pollution prevention encompasses any technique that reduces or eliminates the quantity and/or toxicity of waste at the point of generation. Numerous opportunities for pollution prevention exist in laboratory operations. The EPA has established a preferred hierarchy of environmental management techniques that places pollution prevention as the management option of first choice. Whenever feasible, laboratory personnel should use pollution prevention techniques to address their waste generation. When wastes cannot be feasibly reduced at the source, the Agency recommends recycling as the next best option.

14.2 For information about pollution prevention that may be applicable to laboratories and research institutions consult *Less is Better: Laboratory Chemical Management for Waste Reduction* available from the American Chemical Society's Department of Government Relations and Science Policy, 1155 16th St., N.W. Washington, D.C. 20036, <http://www.acs.org>.

15.0 WASTE MANAGEMENT

The Environmental Protection Agency requires that laboratory waste management practices be conducted consistent with all applicable rules and regulations. The Agency urges laboratories to protect the air, water, and land by minimizing and controlling all releases from hoods and bench operations, complying with the letter and spirit of any sewer discharge permits and regulations, and by complying with all solid and hazardous waste regulations, particularly the hazardous waste identification rules and land disposal restrictions. For further information on waste management, consult *The Waste Management Manual for Laboratory Personnel* available from the American Chemical Society at the address listed in Sec. 14.2.

16.0 REFERENCES

1. U.S. EPA, "Method 245.5," Methods for Chemical Analysis of Water and Wastes, Pub. EPA-600/4-82-055, December 1982.
2. A. Gaskill, "Compilation and Evaluation of RCRA Method Performance Data," Work Assignment No. 2, EPA Contract No. 68-01-7075, September 1986.

17.0 TABLES, DIAGRAMS, FLOWCHARTS, AND VALIDATION DATA

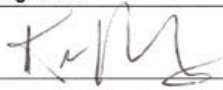


The following page contains the table referenced by this method.

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Digestion & Analysis of Solid Samples for
MERCURY

Cold Vapor Atomic Absorption (CVAA) Methods
EPA 7471A / 7471B

Approved by:	Signature:	Date:
Karla Rodriguez Group Leader		7-11-18
Teresa Morrison QA Director		7/11/18
Reapproved:		
Teresa Morrison QA Director		8/02/19

Annex G: Samples exceeding 1 ppm mercury

Table G1: Product name, country of purchase, indicated country of origin, physical shop or e-commerce platform, and mercury content (ppm) for samples exceeding 1 ppm mercury. Concentrations marked with an asterisk(*) were analysed with AAS.

Product name	Country of purchase	Country of origin*	Shop/e commerce platform	Mercury content (ppm)
Chandni Whitening Cream	Bangladesh	Pakistan	S.D. Enterprise 451/452, New Supermarket, Dhaka (physical shop)	1844*
Goree Beauty Cream	Bangladesh	Pakistan	S.D. Enterprise 451/452 New Supermarket, Dhaka (physical shop)	1134*
Goree Day and Night Whitening Cream	Bangladesh	Pakistan	S.D. Enterprise 451/452 New Supermarket, Dhaka (physical shop)	1153*
Kim Whitening Ginseng and Pearl Cream	Bangladesh	Thailand	Daraz (e-commerce platform)	407*
Kim Whitening Pearl and Snow Lotus Cream	Bangladesh	Thailand	S.D. Enterprise 451/452 New Supermarket, Dhaka (physical shop)	623*
Sandal Whitening Beauty Cream	Bangladesh	Pakistan	Daraz (e-commerce platform)	1504*
Parley Herbal Herbal Beauty Cream with Avocado	Bangladesh	Pakistan	Daraz (e-commerce platform)	1684*
Face Fresh Beauty Cream	Bangladesh	Pakistan	New Variety House 248. New Dhaka Market (physical shop)	340*
Jiaoli Set A - Ginseng Bright White	Bangladesh	China	Daraz (e-commerce platform)	224*
Jiaoli Set B - Ginseng Bright White	Bangladesh	China	Daraz (e-commerce platform)	2133*
Due Beauty Cream	Bangladesh		S.D. Enterprise 451/452 New Supermarket, Dhaka (physical shop)	969*
Golden Pearl Beauty Cream	Bangladesh	Pakistan	S.D. Enterprise 451/452 New Supermarket, Dhaka (physical shop)	882*
POP Popular Facial Cream	Bangladesh	Thailand	S.D. Enterprise 451/452 New Supermarket, Dhaka (physical shop)	1.43*
Temulawak New - Day & Night Cream - Beauty Whitening - Day Cream	Bangladesh	Malaysia	S.D. Enterprise 451/452 New Supermarket, Dhaka (physical shop)	371*
Faiza Beauty Cream	Bangladesh	Pakistan	Daraz (e-commerce platform)	514*
Parley Goldie Pearl Shine	Djibouti	Pakistan	Rasasi Perfumes & Cosmetics, Hayabley, Djibouti (physical shop)	19,242

Jolié Beauty Cream	Djibouti	Pakistan	Rasasi Perfumes & Cosmetics, Hayabley, Djibouti (physical shop)	9871
Faiza Beauty Cream	Djibouti	Pakistan	Perfumerie, Rue de Soleillet, Djibouti (physical shop)	3450
Aneeza Gold Beauty Cream with Avocado & Aloe Vera	Djibouti	Pakistan	Perfumerie, Rue de Soleillet, Djibouti (physical shop)	17,086
Chandni Whitening Cream	Djibouti	Pakistan	Perfumerie, Rue de Soleillet, Djibouti (physical shop)	28,342
NOOR Herbal Beauty Cream	Djibouti	Pakistan	Perfumerie, Rue de Soleillet, Djibouti (physical shop)	17,669
Faiza Beauty Cream	Djibouti	Pakistan	Rasasi Perfumes & Cosmetics, Hayabley, Djibouti (physical shop)	6214
Chandni Whitening Cream	United Kingdom	Pakistan	Amazon, UK (e-commerce platform)	11,928*
Golden Pearl Beauty Cream	United Kingdom	Pakistan	Amazon, UK (e-commerce platform)	10,515*
Golden Pearl Beauty Cream	Belgium	Pakistan	eBay, Belgium (e-commerce platform)	10,338*
Golden Pearl Beauty Cream	Belgium	Pakistan	eBay, Belgium (e-commerce platform)	5266*
Goree Beauty Cream with Lycopene	Belgium	Pakistan	eBay, Belgium (e-commerce platform)	12,656*
JiaoBi Whitening & Moisturizing set - Whitening Make-up Base	Belgium	China	eBay, Belgium (e-commerce)	20,813*
JiaoBi Whitening & Moisturizing set - Whitening Night Cream	Belgium	China	eBay, Belgium (e-commerce)	15,404*
Jiaoli HuiChunSu Face Cream 7 Days Specific Eliminating Freckle - Day (Set C)	Belgium	China	eBay, Belgium (e-commerce platform)	586*
Jiaoli HuiChunSu Face Cream 7 Days Specific Eliminating Freckle - Night (Set C)	Belgium	China	eBay, Belgium (e-commerce platform)	1544*
Pop Popular Facial Cream	Belgium	Thailand	eBay, Belgium (e-commerce platform)	2.20*
Pop Popular Facial Cream	Belgium	Thailand	eBay, Belgium (e-commerce platform)	1.91*
White Rose Whitening Cream (super Gold Caviar)	Belgium	Thailand	eBay, Belgium (e-commerce platform)	6188.00*
Aneeza Gold Beauty Cream with Avocado & Aloe Vera	India	Pakistan	Amazon, India (e-commerce platform)	11977*

Due Beauty Cream	India	Pakistan	Amazon, India (e-commerce platform)	1356*1
Face Fresh Gold, Beauty Cream	India	Pakistan	Amazon, India (e-commerce platform)	1.48*
Faiza Beauty Cream	India	Pakistan	Shop no. 14, Gaffar market, Delhi (physical shop)	17970*
Goree Beauty Cream with Lycopene	India	Pakistan	Shop no. 14, Gaffar market, Delhi (physical shop)	1.15*
Jiaoli HuiChunSu Face Cream 7 Days Specific Eliminating Freckle (Set A)	India	China	Amazon, India (e-commerce platform)	1754*
Jiaoli HuiChunSu Face Cream 7 Days Specific Eliminating Freckle - Day (Set B)	India	China	Amazon, India (e-commerce platform)	2119*
Kim Whitening Pearl and Snow Lotus Cream	India	Thailand	Amazon, India (e-commerce platform)	13890*
Parley Herbal Beauty Cream with Avocado	India	Pakistan	Amazon, India (e-commerce platform)	16752*
Sandal Whitening Beauty Cream	India	Pakistan	Maeena manzil micro factory back gate, Karnataka (physical shop)	16769*
White Rose Whitening Cream Placenta Sheep Cream	India	Thailand	Amazon, India (e-commerce platform)	9835*
Palmer's Skin Success Complexion Toner	Côte d'Ivoire	USA	Kyad Cosmetic Adjame, Bvd. Nangui Abrogoua Forum des marches – Adjamé Abijan (physical shop)	14,121
Faiza Beauty Cream	Kenya	Pakistan	Jumia, Kenya (e-commerce platform)	11,313
Temulawak New - Day & Night Cream - Beauty Whitening Cream	Nigeria	Malaysia	Dupe Cosmetics (physical shop)	626
Aneeza Gold Beauty Cream with Avocado & Aloe Vera	Nigeria	Pakistan	Jumia, Nigeria (e-commerce platform)	20,599
Kim Whitening Pearl and Snow Lotus Cream	Nigeria	Thailand	Jiji through Humduke Nig. Ltd. (e-commerce platform)	2584
Jiaoli Speckle Dispelling & Whitening Cream	Nigeria	China	Jumia, Nigeria (e-commerce platform)	1154

Goree Beauty Cream with Lycopene	Philippines	Pakistan	Lazada, Philippines (e-commerce platform)	1543*
Goree Day and Night Whitening Cream	Philippines	Pakistan	Lazada, Philippines (e-commerce platform)	1573*
Aneeza Gold Beauty Cream with Avocado & Aloe Vera	Philippines	Pakistan	Lazada, Philippines (e-commerce platform)	829*
Golden Pearl Beauty Cream	Philippines	Pakistan	Lazada, Philippines (e-commerce platform)	6922*
POP Popular Facial Cream	Philippines	Thailand	999 Mall Divisoria, Manila (physical shop)	1.13*
JJJ (Golden Package) Magical Spots Removing Day Cream	Philippines	-	999 Mall Divisoria, Manila (physical shop)	1686*
JJJ (Golden Package) Magical Spots Removing Night Cream	Philippines	-	999 Mall Divisoria, Manila (physical shop)	1896*
Erna Whitening Cream	Philippines	-	999 Mall Divisoria, Manila (physical shop)	1080*
Jiaoli Miraculous Cream set, Day cream	Philippines	China	Lazada, Philippines (e-commerce platform)	2004*
Jiaoli Miraculous Cream set, Night cream	Philippines	China	Lazada, Philippines (e-commerce platform)	2018*
Chandni Whitening Cream	South Africa	Pakistan	BidorBuy (e-commerce platform)	28,289
Goree Whitening Beauty Cream	South Africa	Pakistan	BidorBuy (e-commerce platform)	33,083
Goree Beauty Cream	South Africa	Pakistan	BidorBuy (e-commerce platform)	5152
Goree Day and Night Whitening Cream	South Africa	Pakistan	BidorBuy (e-commerce platform)	29,686
Goree Whitening Soap	South Africa	Pakistan	BidorBuy (e-commerce platform)	4353
Sandal Whitening Beauty Cream	South Africa	Pakistan	BidorBuy (e-commerce platform)	26,321
Face Fresh Beauty Cream	South Africa	Pakistan	BidorBuy (e-commerce platform)	9,387
Due Beauty Cream	South Africa	Pakistan	BidorBuy (e-commerce platform)	15,384
Golden Pearl Beauty Cream	South Africa	Pakistan	BidorBuy (e-commerce platform)	16.665
Faiza Beauty Cream	South Africa	Pakistan	BidorBuy (e-commerce platform)	4712
Faiza Beauty Cream	Uganda	Pakistan	Gazaland, Shop no. L1601, Kampala (physical shop)	6045
Parley Beauty Cream	Uganda	Thailand	Gazaland Shop no. L 14003, Kampala (physical shop)	15,985

Jiaoli HuiChuSu Face Cream 7 Days Specific Eliminating Freckle	USA	China	eBay, USA (e-commerce platform)	1800*
Kim Whitening Pearl and Snow Lotus Cream	USA	Thailand	eBay, USA (e-commerce platform)	19 000*
Chandni Whitening Cream	USA	Pakistan	eBay, USA (e-commerce platform)	14,000*
Sandal Whitening Beauty Cream	USA	Pakistan	eBay, USA (e-commerce platform)	21,000*
Face Fresh Beauty Cream	USA	Pakistan	eBay, USA (e-commerce platform)	15,000*
Goree Day and Night Whitening Cream	USA	Pakistan	eBay, USA (e-commerce platform)	23,000*
Kim Whitening Pearl and Snow Lotus Cream	USA	Thailand	eBay, USA (e-commerce platform)	14,000*
Kim Whitening Pearl and Snow Lotus Cream	USA	Thailand	Amazon, USA (e-commerce platform)	16,000*
Goree Beauty Cream with Lycopene	USA	Pakistan	Amazon, USA (e-commerce platform)	25,000*
Chandni Whitening Cream	USA	Pakistan	Amazon, USA (e-commerce platform)	40,000*
Kim Whitening Ginseng and Pearl Cream	USA	Thailand	Amazon, USA (e-commerce platform)	8,700*
Kim Whitening Ginseng and Pearl Cream	USA	Thailand	Amazon, USA (e-commerce platform)	8,600*
Chandni Whitening Cream	USA	Pakistan	Amazon, USA (e-commerce platform)	22,000*
Goree Beauty Cream with Lycopene	USA	Pakistan	Amazon, USA (e-commerce platform)	26,000*
Kim Whitening Pearl and Snow Lotus Cream	USA	Thailand	Amazon, USA (e-commerce platform)	13,000*

* According to the packaging

Average of the two readings in Table 9, Appendix G.

Annex H: Same brand but varying mercury content

This annex describes the significant variation in mercury content even among creams of the same brand, as discussed in the text.

The brand **Aneeza Gold Beauty Cream** was found both in local markets and online in the African countries Djibouti and Nigeria and the Asian countries India and the Philippines (see Table G1, Annex G). It was widely available online, but in Djibouti also locally in a physical shop. In the products in the African markets the concentrations of mercury were lower than in the corresponding for the Asian markets, and it was observed that the batch numbers for the samples in Africa were slightly differently composed than the batch numbers for Asia (see Table H1). This brand was not tested in the 2017-2018 study.

Table H1: Product, country of purchase, shop (physical or online), batch number, and mercury content. Concentrations marked with an asterisk(*) were analysed with AAS.

Product	Country of purchase	Shop	Batch no.	Mercury content (ppm)
Aneeza Gold Beauty Cream	Djibouti	Perfumerie, Rue de Soleillet, Djibouti	26959-62	17,086
Aneeza Gold Beauty Cream	India	Amazon, India (www.amazon.in)	27645-56	11977*
Aneeza Gold Beauty Cream	Nigeria	Jumia, Nigeria (https://www.jumia.com.ng)	26864	20,599
Aneeza Gold Beauty Cream	Philippines	Lazada, Philippines (www.lazada.com.ph)	24720-31	829*

Chandni Whitening Cream is a brand that was first tested by us in 2017⁸. It is still available in the markets, locally or online, in Bangladesh (also in 2017), Djibouti, EU, India, Kenya, South Africa and the USA (see Table G1, Annex G). It was found in physical shops in all countries/regions, except for the EU, South Africa, and the USA; where the product was bought via e-commerce platforms. Highly variable mercury concentrations were detected in this sampling round. While it was non-detectable in a Kenyan sample, and low in an Indian, it was very high in a sample from Bangladesh (see Table H2). The only sample with a batch number was the one available on eBay from the EU.

Table H2: Product, country of purchase, shop (physical or online), batch number, and mercury content. <LOD or N.D. implies below the detection limit. Concentrations marked with an asterisk(*) were analysed with AAS.

Product	Country of purchase	Shop	Batch no.	Mercury content (ppm)
Chandni Whitening Cream	Bangladesh	S.D. Enterprise 451/452 New Supermarket, Dhaka	-	1844*
Chandni Whitening Cream	Djibouti	Perfumerie, Rue de Soleillet, Djibouti	-	28,342

Chandni Whitening Cream	United Kingdom	Amazon UK (www.amazon.co.uk/)	0102196013014	11,928*
Chandni Whitening Cream	India	Shop no. 14, Gaffar market, Delhi	-	0.14*
Chandni Whitening Cream	Kenya	Jumia, Kenya (www.jumia.co.ke)	-	<LOD
Chandni Whitening Cream	South Africa	BidorBuy (www.bidorbuy.co.za)	-	28,289
Chandni Whitening Cream	USA	eBay, USA (https://www.ebay.ca/sch/i.html?_nkw=ebay+usa)	-	14000*

The **Due Whitening Beauty Cream** was available in Bangladesh, India, South Africa, and the USA, and also tested by us in 2018⁸ in a sample from Bangladesh (see Table 2). In Bangladesh it was bought locally in a physical shop; in India, South Africa and the USA online (see Table G1, Annex G). High, but also highly variable, mercury concentrations were found in all tested samples, except for the USA sample that had a very low mercury concentration (see Table H3).

Table H3: Product, country of purchase, shop (physical or online), batch number, and mercury content. <LOD or N.D. implies below the detection limit. Concentrations marked with an asterisk(*) were analysed with AAS.

Product	Country of purchase	Shop	Batch no.	Mercury content (ppm)
Due Whitening Beauty Cream	Bangladesh	S.D. Enterprise 451/452 New Supermarket, Dhaka	B3033	969*
Due Whitening Beauty Cream	India	Amazon, India (www.amazon.in)	-	13561*
Due Whitening Beauty Cream	South Africa	BidorBuy (www.bidorbuy.co.za)	2335	15,384
Due Whitening Beauty Cream	USA	eBay, USA (https://www.ebay.ca/sch/i.html?_nkw=ebay+usa)	-	0.10*

In Bangladesh, the brand **Face Fresh** was available in a local store, and online in South Africa, and the USA (see Table G1, Annex G). Also for this brand, highly variable mercury concentrations were detected (see Table 1 and H4). The sample bought locally had a batch number; not the ones brought online. The mercury concentration was highest in the samples with no batch no. Sometimes a lack of batch number could indicate that it is a counterfeit product (read more below).

Table H4: Product, country of purchase, shop (physical or online), batch number, and mercury content. <LOD or N.D. implies below the detection limit. Concentrations marked with an asterisk(*) were analysed with AAS.

Product	Country of purchase	Shop	Batch no.	Mercury content (ppm)
Face Fresh	Bangladesh	New Variety House 248. New Dhaka Market	N22980	340*
Face Fresh	South Africa	BidorBuy (www.bidorbuy.co.za)	-	9,387*
Face Fresh	USA	eBay, USA (https://www.ebay.ca/sch/i.html?_nkw=ebay+usa)	-	15,000*

Faiza Beauty Cream is brand that is widely available. It was tested by us in 2018⁸ and in this sampling round it was found in Bangladesh, Djibouti, India, Kenya, South Africa, and Uganda, both locally and via e-commerce platforms. In the EU and Kenya, the samples were bought online; in the other countries locally in physical shops. The detected mercury concentrations were highly variable, but generally high (see Tables G1, Annex G, and H5). Only the sample from the Côte d'Ivoire had no detectable mercury (see Table H5). All samples had batch numbers, composed in different ways, sometimes with only numbers; sometimes with a combination of numbers and letters.

Table H5: Product, country of purchase, shop (physical or online), batch number, and mercury content. <LOD or N.D. implies below the detection limit. Concentrations marked with an asterisk(*) were analysed with AAS.

Product	Country of purchase	Shop	Batch no.	Mercury content (ppm)
Faiza Beauty Cream	Bangladesh	Daraz (www.daraz.com)	39194243	514*
Faiza Beauty Cream	Djibouti	Rasasi Perfumes & Cosmetics, Hayabley, Djibouti	18511517	3450
Faiza Beauty Cream	India	Shop no. 14, Gaffar market, Delhi	15XL08	17970*
Faiza Beauty Cream	Côte d'Ivoire	Tapis rouge boutique, Bvd. Nangui Abrogoua Forum des marches – Adjamé, Abijan	17NX12	<LOD
Faiza Beauty Cream	Kenya	Jumia, Kenya (www.jumia.co.ke)	17MX11	11,313
Faiza Beauty Cream	South Africa	BidorBuy (www.bidorbuy.co.za)	42546873	4711.69
Faiza Beauty Cream	Uganda	Gazaland, Shop no. L1601, Kampala	12519972	6045

The **Golden Pearl Beauty Cream** is a brand that we tested in 2018⁸ and it is still widely available, and high in mercury (see Table 1). In this sampling round, it was found Bangladesh, EU, India, South Africa, and the USA, locally (in the Asian countries) or via e-commerce platforms (in the EU, South Africa, and the USA) (see Table G1, Annex G). It is still available in the market in Bangladesh, where it was also found in 2018. All tested samples, except from the USA, had batch numbers on the packaging, and the concentrations ranged from below the 1 ppm limit to very high values (see Table 1 and H6).

Table H6: Product, country of purchase, shop (physical or online), batch number, and mercury content. <LOD or N.D. implies below the detection limit. Concentrations marked with an asterisk(*) were analysed with AAS.

Product	Country of purchase	Shop	Batch no.	Mercury content (ppm)
Golden Pearl Beauty Cream	Bangladesh	S.D. Enterprise 451/452 New Supermarket, Dhaka	19 9214	882*
Golden Pearl Beauty Cream	United Kingdom	Amazon UK (www.amazon.co.uk/)	3006902822	10,515*
Golden Pearl Beauty Cream	EU (Belgium)	EBay Belgium (www.ebay.be/)	3006902822	10,338*
Golden Pearl Beauty Cream	EU (Belgium)	EBay Belgium (www.ebay.be/)	8964001078 586 (Bar Code)	5266*
Golden Pearl Beauty Cream	India	Shop no. 14, Gaffar market, Delhi	181222	0.32*
Golden Pearl Beauty Cream	South Africa	BidorBuy (www.bidorbuy.co.za)	4289	16,664.79
Golden Pearl Beauty Cream	USA	eBay, USA (https://www.ebay.ca/sch/i.html?_nkw=ebay+usa)	-	0.11*

Goree is a brand with three different products tested by us in the 2018⁸ and in this sampling round (see Table 1). They are available locally in physical shops in Bangladesh and the Philippines, and online in the EU India, the Philippines, South Africa, and the USA. Consistently they turned out to violate the Minamata Convention 1 ppm limit, although the concentrations varied widely (see Tables G1, Annex G, and H7). All but two samples, from India and South Africa and bought online, had batch numbers on the packaging.

Table H7: Product, country of purchase, shop (physical or online), batch number, and mercury content. <LOD or N.D. implies below the detection limit. Concentrations marked with an asterisk(*) were analysed with AAS.

Product	Country of purchase	Shop	Batch no.	Mercury content (ppm)
Goree Beauty Cream	Bangladesh	S.D. Enterprise 451/452 New Supermarket, Dhaka	GB114	1134*
Goree Beauty Cream with Lycopene	EU (Belgium)	eBay Belgium (www.ebay.be/)	GB115	12,656*

Goree Beauty Cream with Lycopene	India	Shop no. 14, Gaffar market, Delhi	GB114	1.15*
Goree Day and Night Whitening Cream	India	Amazon, India (www.amazon.in)	-	0.23*
Goree Beauty Cream with Lycopene	Philippines	Korean Drugstore & General Merchandise	GB115	0.32*
Goree Beauty Cream with Lycopene	Philippines	Lazada, Philippines (www.lazada.com.ph)	GB115	1543*
Goree Day and Night Whitening Cream	Philippines	Lazada, Philippines (www.lazada.com.ph)	GDN131	1573*
Goree Whitening Beauty Cream	South Africa	BidorBuy (www.bidorbuy.co.za)	GB111	33,083
Goree Whitening Soap	South Africa	BidorBuy (www.bidorbuy.co.za)		4353
Goree Day and Night Whitening Cream	South Africa	BidorBuy (www.bidorbuy.co.za)	GDN131	29,686
Goree Day and Night Whitening Cream	USA	eBay, USA (https://www.ebay.ca/sch/i.html?_nkw=ebay+usa)	GND140	23,000*
Goree Beauty Cream with Lycopene	USA	Amazon USA (https://www.amazon.com/USA/s?k=USA)	GB114	25,000*
Goree Beauty Cream with Lycopene	USA	Amazon USA (https://www.amazon.com/USA/s?k=USA)	GB113	26,000*

The brand **Jiaoli Miraculous Cream** set was tested by us in 2017⁸ and in this sampling round (see Table 1). It was found via e-commerce platforms this time, in the EU, India and the Philippines (where sample from 2017 also came) (see Table G1, Annex G). The set contains two creams (day and night), both consistently high in mercury, but with a large concentration span (see Tables 1 and H8). The samples bought in Asia had no batch no. on the packaging, but those bought in the EU had,

Table I8: Product, country of purchase, shop (physical or online), batch number, and mercury content. <LOD or N.D. implies below the detection limit. Concentrations marked with an asterisk(*) were analysed with AAS.

Product	Country of purchase	Shop	Batch no.	Mercury content (ppm)
Jiaoli HuiChunSu Face Cream 7 Days Specific Eliminating Freckle - Day (Set C)	EU (Belgium)	eBay Belgium (www.ebay.be/)	QB/T1857-96	586*
Jiaoli HuiChunSu Face Cream 7 Days Specific Eliminating	EU (Belgium)	eBay Belgium (www.ebay.be/)	QB/T1857-96	1544*

Freckle - Night (Set C)				
Jiaoli HuiChunSu Face Cream 7 Days Specific Eliminating Freckle - (Set A)	India	Amazon, India (www.amazon.in)	-	1754*
Jiaoli HuiChunSu Face Cream 7 Days Specific Eliminating Freckle - (Set B)	India	Amazon, India (www.amazon.in)	-	2119*
Jiaoli Miraculous Cream Day cream	Philippines	Lazada, Philippines (www.lazada.com.ph)	-	2004*
Jiaoli Miraculous Cream Night cream	Philippines	Lazada, Philippines (www.lazada.com.ph)	-	2018*

Kim Whitening Ginseng and Pearl Cream is a brand that in this sampling round was purchased in Bangladesh and the USA, in the first case in a physical shop; in the second online (see Table G1, Annex G). The tested creams were all high in mercury, and the Bangladeshi sample had no batch no., whereas the USA samples had (see Tables 1 and H9).

Table H9: Product, country of purchase, shop (physical or online), batch number, and mercury content. <LOD or N.D. implies below the detection limit. Concentrations marked with an asterisk(*) were analysed with AAS.

Product	Country of purchase	Shop	Batch no.	Mercury content (ppm)
Kim Whitening Ginseng and Pearl Cream	Bangladesh	Daraz (www.daraz.com.bd)	-	407*
Kim Whitening Ginseng and Pearl Cream	USA	Amazon USA (https://www.amazon.com/US/A/s?k=USA)	888/32	8700*
Kim Whitening Ginseng and Pearl Cream	USA	Amazon USA (https://www.amazon.com/US/A/s?k=USA)	888/32	8600*

In Bangladesh, India, Nigeria and the USA, the brand **Kim Whitening Pearl and Snow Lotus Cream** was found in this sampling round, locally in physical shops (Bangladesh) and online (in the rest of the countries) (see Table G1, Annex G). In 2018, it was also tested by us in samples from Thailand⁸. All samples tested so far were still high in mercury, but with a large concentration span (see Tables 1 and H10). None of the packages from Asia and Africa had batch numbers, while those from the US had.

Table H10: Product, country of purchase, shop (physical or online), batch number, and mercury content. <LOD or N.D. implies below the detection limit. Concentrations marked with an asterisk(*) were analysed with AAS.

Product	Country of purchase	Shop	Batch no.	Mercury content (ppm)
Kim Whitening Pearl and Snow Lotus Cream	Bangladesh	S.D. Enterprise 451/452 New Supermarket, Dhaka	-	623*
Kim Whitening Pearl and Snow Lotus Cream	India	Amazon, India (www.amazon.in)	-	13890*
Kim Whitening Pearl and Snow Lotus Cream	Nigeria	Jiji (https://www.jiji.ng), through Humduke Nig. Ltd.	-	2584
Kim Whitening Pearl and Snow Lotus Cream	USA	e-Bay, USA (https://www.ebay.ca/sch/i.html?_nkw=ebay+usa)	549	14,000*
Kim Whitening Pearl and Snow Lotus Cream	USA	Amazon USA (https://www.amazon.com/USA/s?k=USA)	549	16,000*
Kim Whitening Pearl and Snow Lotus Cream	USA	Amazon USA (https://www.amazon.com/USA/s?k=USA)	549	13,000*

The brand **Parley Herbal Whitening Cream** is available from e-commerce platforms in Bangladesh and India (see Table G1, Annex G). The samples had very high mercury contents; the packaging with batch numbers (see Table H11).

Table H11: Product, country of purchase, shop (physical or online), batch number, and mercury content. <LOD or N.D. implies below the detection limit. Concentrations marked with an asterisk(*) were analysed with AAS.

Product	Country of purchase	Shop	Batch no.	Mercury content (ppm)
Parley Herbal Beauty Cream with Avocado	Bangladesh	Daraz (www.daraz.com)	1001	1684*
Parley Herbal Beauty Cream with Avocado	India	Amazon, India (www.amazon.in)	103	16752*

POP Popular Facial Cream Whitening Acne Pimple is a brand widely available (see Table 1). In Bangladesh, the Philippines and Uganda, the brand could be bought locally in physical shops, while in the EU, India, and the USA, it could be ordered online (see Table G1, Annex G). The sample from Uganda had no detectable mercury, and the three USA samples were low in mercury, while the remaining samples were high (see Table H12). Batch no. were missing in the packaging of the samples from India, and the USA (see Table H12).

Table H12: Product, country of purchase, shop (physical or online), batch number, and mercury content. <LOD or N.D. implies below the detection limit. Concentrations marked with an asterisk(*) were analysed with AAS.

Product	Country of purchase	Shop	Batch no.	Mercury content (ppm)
POP Popular Facial Cream	Bangladesh	S.D. Enterprise 451/452 New Supermarket, Dhaka	011	1.43*
POP Popular Facial Cream	EU (Belgium)	e-bay Belgium (www.ebay.be/)	8853318000 741 (bar code)	2.20*
POP Popular Facial Cream	EU (Belgium)	e-bay Belgium (www.ebay.be/)	8853318000 741 (bar code)	1.91*
POP Popular Facial Cream	India	Amazon, India (www.amazon.in)	-	0.46*
POP Popular Facial Cream	Philippines	999 Mall Divisoria, Manila	001	1.13*
POP Popular Facial Cream	Uganda	Hajat Nana Cosmetics, Shop No. L 2 – 226, Kampala	001	<LOD
POP Popular Facial Cream	USA	e-Bay, USA (https://www.ebay.ca/sch/i.html?_nkw=ebay+usa)	-	0.04*
POP Popular Facial Cream	USA	e-Bay, USA (https://www.ebay.ca/sch/i.html?_nkw=ebay+usa)	-	0.69*
POP Popular Facial Cream	USA	Amazon USA (https://www.amazon.com/US/A/s?k=USA)		0,05*

The brand **Sandal Whitening Beauty Cream** is available in Bangladesh, India, South Africa and the USA. In India and the USA, it was bought in a physical shop; in the other two countries from e-commerce platforms (see Table G1, Annex G). The samples were all high in mercury, and varied from the same batch (see Table H13). Batch numbers were on all packaging (see Table H13).

Table I13: Product, country of purchase, batch number, and mercury content. <LOD or N.D. implies below the detection limit. Concentrations marked with an asterisk(*) were analysed with AAS.

Product	Country of purchase	Shop	Batch no.	Mercury content (ppm)
Sandal Whitening Beauty Cream	Bangladesh	Daraz (www.daraz.com.bd)	267	1504*
Sandal Whitening Beauty Cream	India	Maeena manzil micro factory back gate, Karnataka	-	16769*
Sandal Whitening Beauty Cream	South Africa	BidorBuy (www.bidorbuy.co.za)	-	26,321
Sandal Whitening Beauty Cream	USA	e-Bay, USA (https://www.ebay.ca/sch/i.html?_nkw=ebay+usa)	267	21,000*

Stillman's Skin Bleach Cream is a brand that was bought in Bangladesh, India, and South Africa. In Bangladesh the cream is available locally in physical shops, while it was bought online in India and South Africa (see Table G1, Annex G). All Asian samples were high in mercury, but no detectable mercury was found in the South African sample (see Table H14). Only the Indian sample had no batch number (see Table I14).

Table H14: Product, country of purchase, shop (physical or online), batch number, and mercury content. <LOD or N.D. implies below the detection limit. Concentrations marked with an asterisk(*) were analysed with AAS.

Product	Country of purchase	Shop	Batch no.	Mercury content (ppm)
Stillman's Skin Bleach Cream	Bangladesh	S.D. Enterprise 451/452 New Supermarket, Dhaka	LOTST0254	0.44*
Stillman's Skin Bleach Cream	India	Flipkart	-	0.44*
Stillman's Skin Bleach Cream	South Africa	BidorBuy (www.bidorbuy.co.za)	ST16117	<LOD

The **Temulawak Beauty Whitening Cream** brand was first tested by us in 2018, when a sample of this brand from Bangladesh was analyzed⁸ This sampling round showed that it is still available locally in physical shops in Bangladesh, and can be ordered online in Nigeria, as well as in the USA (see Table G1, Annex G). The Asian samples are all high in mercury, both in the present and the 2018 sampling round, while low in the USA sample (see Table H15). The intra-batch variation in the mercury concentration was very large (see Table H15). Batch numbers were found on all sample packages (see Table G1).

Table H15: Product, country of purchase, shop (physical or online), batch number, and mercury content. <LOD or N.D. implies below the detection limit. Concentrations marked with an asterisk(*) were analysed with AAS.

Product	Country of purchase	Shop	Batch no.	Mercury content (ppm)
Temulawak Beauty Whitening Cream	Bangladesh	S.D. Enterprise 451/452 New Supermarket, Dhaka	00512	371*
Temulawak Beauty Whitening Cream	Nigeria	Dupe Cosmetics	00512	626
Temulawak Beauty Whitening Cream	USA	e-Bay, USA (https://www.ebay.ca/sch/i.html?_nkw=ebay+usa)	00512	0.52*

In 2018, a Thai sample of the brand **White Rose Whitening Cream** was tested by us and found to be very high in mercury, and so also in the Indian sample from this sampling round (see Table G1, Annex G). A sample was also bought online from the EU and the US, respectively, but tested negative (see Tables G1, Annex G, and H16) Batch numbers were found on all sample packages.

Table H16: Product, country of purchase, shop (physical or online), batch number, and mercury content. <LOD or N.D. implies below the detection limit. Concentrations marked with an asterisk(*) were analysed with AAS.

Product	Country of purchase	Shop	Batch no.	Mercury content (ppm)
White Rose Whitening Cream	EU (Belgium)	e-bay Belgium (www.ebay.be/)	8850107485291	6188.00
White Rose Whitening Cream	India	Amazon, India (www.amazon.in)	-	9835*
White Rose Whitening Cream	USA	e-Bay, USA (https://www.ebay.ca/sch/i.html?_nkw=ebay+usa)	299	N.D.

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- ⁹ Vrdoljak, G. et al, Comparison of XRF, TXRF, and ICP-MS Methods for Determination of Mercury in Face Creams, *Journal of Regulatory Science* 9(2) (2021) 1–8
- ¹⁰ Report can be found at [Enforcement-measures-to-restrict-high-mercury-cosmetic-products-under-the-Minamata-Convention.pdf](https://www.zeromercury.org/enforcement-measures-to-restrict-high-mercury-cosmetic-products-under-the-minamata-convention.pdf) (zeromercury.org)
- ¹¹ Fake make up can be an easy buy – and a health hazard (<https://www.cbsnews.com/news/fake-makeup-health-hazard-us-customs-and-border-protection/>).
- ¹² More than 90 000 fake cosmetic products seized at Chinese port (<https://www.scmp.com/news/china/society/article/2108787/more-90000-fake-cosmetic-products-seized-chinese-port>).
- ¹³ The very real danger of fake cosmetics from China (<https://mashable.com/2015/11/10/fake-makeup-china/?europa=true>).
- ¹⁴ Counterfeit (<https://cosmeticseurope.eu/cosmetic-products/counterfeit/>), accessed 25/10/2019.
- ¹⁵ Sea's loss widens on investment in Shopee e-commerce platform (<https://www.businesstimes.com.sg/companies-markets/seas-loss-widens-on-investment-in-shopee-e-commerce-platform>).
- ¹⁶ Global e commerce 2019 (<https://www.emarketer.com/content/global-ecommerce-2019>).
- ¹⁷ A “detention list” is a list of products that have been found to be non-compliant with national or international legislation. It could be used by the national customs service to stop the import of a listed product until the importer or supplier verifies that the product is in compliance.