



ELIMINATING MERCURY SKIN LIGHTENING PRODUCTS

Mercury-added Skin Lightening Products—A Global Issue

Mercury and mercury compounds can inhibit melanin production, which gives skin its pigment and as such, the topical application of skin lightening products with mercury has been found to be widespread in some communities (Eagles-Smith et al. 2018).

Skin lightening products have historically been used in response to cultural stigmas that associate lighter skin tones with higher societal benefits including, but not limited to, improving the likelihood for marriage, greater professional opportunities, and status.

Today, these products are still marketed for lightening overall skin complexions and removing age spots and freckles. While some legitimate uses of lightening products exist to treat dermatological disorders (e.g., hyperpigmentation),

medically prescribed lightening products do not typically use mercury as an active ingredient (Hamann et al. 2014).

A Global Campaign to Address the Issue

The project [*Eliminating Mercury Skin Lightening Products—Jamaica, Gabon, and Sri Lanka*](#), funded by the Global Environment Facility (GEF), aims to reduce the risk of exposure to mercury-added skin lightening products. This multipronged project is implemented by the United Nations Environment Programme (UNEP) and co-executed by The World Health Organization (WHO) and Biodiversity Research Institute (BRI) with technical support by the UNEP Global Mercury Partnership.

This publication provides an overview of the scope of this project and work done to date.

RISKS TO HUMAN HEALTH AND THE ENVIRONMENT

Mercury—A Toxic Global Pollutant

Mercury has been listed as a top ten global pollutant by the World Health Organization (WHO) due to its highly toxic nature.

Exposure to mercury or mercury compounds through direct or indirect pathways can cause environmental problems and have serious health impacts especially amongst sensitive populations, such as pregnant women and children.

Despite these well-documented issues, mercury has been used in several applications including in the manufacture of skin lightening products.

Mercury found in cosmetics can exist in two forms: inorganic and organic (Ladizinski et al. 2011).

Organic mercury compounds such as ethylmercury, methylmercury, and phenyl mercuric salts may be used as preservatives. Trace amounts of mercury are legally added to some cosmetics, such as mascara, for its properties in preventing the growth of microorganisms.

Inorganic mercury salts including mercurous chloride (or calomel), mercuric chloride, mercurous oxide, and ammoniated mercury are added to lightening products to inhibit melanin production.



Skin lightening products are used by both men and women across the globe. The mercury in these products is harmful to the person using them as well as to non-users who come in contact with the user.

Product Ingredient Lists Can be Misleading

Both organic and inorganic forms of mercury can be hidden in the manufacturer's ingredient list (e.g., "calomel" instead of mercurous chloride) or omitted completely.

Skin lightening products may also include other highly toxic ingredients including hydroquinone, corticosteroids, and trace amounts of harmful elements (e.g., arsenic; Figure 1).

Figure 1: Potentially harmful ingredients in skin lightening products (LINEP, 2024).



MERCURY EXPOSURE FROM SKIN LIGHTENING PRODUCTS

Skin

Both **men and women** use skin lightening products.

Product is absorbed and mercury travels into the bloodstream and reaches the **kidney and liver**.

Non-users can be exposed through skin-to-skin contact with users, or through contact with clothes or bedding that was handled by the users.

Environmental pathway

Release of mercury through **wastewater discharge** can further contaminate the surrounding environment.

Inhalation

Mercury in SLP can volatilize and **mercury vapors can be detected in the ambient air of the home**.

Inhaled mercury passes through brain and placenta barriers posing a **risk for pregnant women and developing fetuses**.

Ingestion

Exposure to mercury can occur through food prepared by the SLP users.

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Figure 2: Mercury exposure pathways from skin lightening products (UNEP, 2024).

Harmful Effects from Both Direct and Indirect Exposure

Exposure to mercury from skin lightening products can result in a number of health problems, ranging from skin irritations and allergic reactions to kidney damage and neurotoxicity. Symptoms include numbness in hands, feet and mouth, tremors, changes in vision or hearing, depression, and memory loss. Additionally, the potential maternal transfer of mercury to a fetus has implications for neurological development (Bastiansz et al. 2022).

Contamination of the Environment

In addition to human health, environmental health is also at risk. Through skin washing, mercury is eventually released into wastewater and, under certain environmental conditions, can be converted to methylmercury and absorbed into the food web exposing fish, wildlife and eventually humans to potential mercury contamination.

Under the Minamata Convention on Mercury (the global treaty aimed at protecting the environment and

human health from the negative impacts of mercury), the manufacture, import and export of cosmetics with mercury is banned by Parties to the Convention. Currently, the ban covers cosmetics with over 1 part per million (ppm) of mercury, however, as of 2025, the ban will be extended to all cosmetics with any mercury content (except for cosmetics applied to the eye area, where mercury is used as a preservative and no effective and safe substitute preservatives are available).

Due to a general lack of understanding on mercury content in skin lightening products available globally, further research is needed to assist countries in successfully implementing their obligations regarding these products.

GEF 10810 PROJECT:

ELIMINATING MERCURY SKIN LIGHTENING PRODUCTS—JAMAICA, GABON, AND SRI LANKA

Previous Analysis of Skin Lightening Products by BRI

In response to the requirements of the Minamata Convention to reduce mercury content in consumer products, BRI collaborated with the Zero Mercury Working Group and countries involved in projects such as Minamata Initial Assessments to investigate mercury content in skincare products and cosmetics.

BRI tested skin lightening products from 21 countries resulting in a total of 385 samples.

Sample Sources:

- African region – 131 samples, 8 countries
- Asian region – 62 samples, 4 countries
- Caribbean region – 152 samples, 7 countries
- Europe – 11 samples, 1 country
- North America – 29 samples, USA

Mercury content findings:

- Arithmetic Mean: 437.1 parts per million (ppm)
Geometric Mean: 0.0003 ppm
- Minimum: Below Limit of Detection (< LoD)
Maximum: 29,539 ppm

Results indicated a wide range in mercury concentrations across samples (Figure 3). The pilot study contributed to a more expansive study that we describe in this publication.

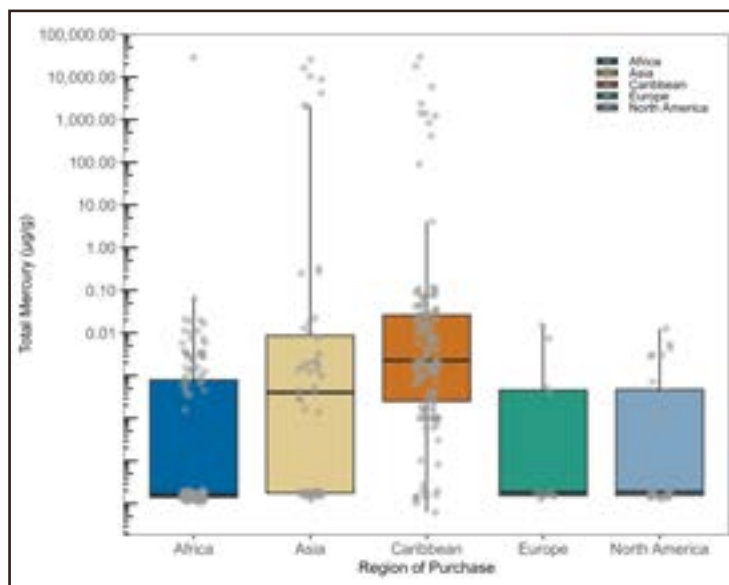


Figure 3: Boxplot of datasets analyzed by BRI based on region of purchase.

Project Implementation

The project *Eliminating Mercury Skin Lightening Products—Jamaica, Gabon, and Sri Lanka* was developed to reduce the risk of exposure to mercury-added skin lightening products through engagement with project countries to achieve the following outcomes:

- **Outcome 1.** Project countries regulate mercury skin lightening products in line with the Minamata Convention.
 - ◆ Output 1.1.1 Project countries have established or improved legislation based on developed model regulations.
 - ◆ Output 1.1.2 Project countries have strengthened capacity to develop enforcement and compliance strategies to support legislation on skin lightening products.
 - ◆ Output 1.1.3 Health professionals and general public in target countries have increased awareness of health risks associated with mercury skin lightening products.
- **Outcome 2.** Target countries have reduced local production, trade, and distribution of mercury SLPs.
 - ◆ Output 2.1.1 Ministries of Health in project countries demonstrate increased awareness of local markets for skin lightening products, including production, distribution and usage.
 - ◆ Output 2.1.2 Manufacturers, traders and distributors in target countries demonstrate increased awareness of the danger associated with mercury SLPs.
 - ◆ Output 2.1.3 Authorities in target countries have increased capacity to identify, monitor and report on the market for skin lightening products.
- **Outcome 3.** Global manufacturing and trade of mercury skin lightening products reduced.
 - ◆ Output 3.1.1 Global awareness increased through policy support.
 - ◆ Output 3.1.2 Global awareness increased through advocacy campaign and international meetings.

The project is implemented by the United Nations Environment Programme (UNEP), co-executed by the World Health Organization (WHO) and Biodiversity Research Institute (BRI), and led nationally by each project country's Ministry of Health in coordination with several national stakeholders.

The UNEP Global Mercury Partnership (GMP) provides technical assistance on the project overall. Funding for the project is provided by the Global Environment Facility (GEF) and several co-financing partners across governmental agencies, NGOs, and CSOs.

Project Country Background

The use of skin lightening products is widespread across the globe. To enable the engagement of each key region where skin lightening is more prevalent, Jamaica, Gabon, and Sri Lanka were engaged to provide insight into the prevalence of the issue in the Caribbean, African, and Asian regions respectively.



Jamaica—The Caribbean

In Jamaica, research has shown that SLPs have been promoted through advertisements, marketing strategies, and popular culture influencers, aimed particularly at African-Jamaican women. In 2004, it was reported that approximately 10–15% of patients seen by dermatologists locally had been using SLPs. This project aims to address the legislative, regulatory, and institutional needs to adequately manage SLPs in Jamaica as well as conduct public awareness activities.



Gabon—Africa

In Gabon, inventory assessments conducted under the Minamata Initial Assessments (MIAs) estimated that 4,385 kg of mercury per year were released due to cosmetics such as skin lightening products. The Government of Gabon has implemented several measures to address the issue of SLPs such as the development of a national strategy in 2017 by the Directorate of Medicines and Pharmacies in connection with the General Health Inspectorate to control the sale and distribution of SLPs nationally.



Sri Lanka—South Asia

Sri Lanka has 23 official local cosmetics and pharmaceutical manufacturing industries involved in the production of cosmetics and soaps. Research conducted by the Centre for Environmental Justice found high levels of mercury in many skin-whitening cream brands available in the local market in Sri Lanka. Of those assessed, 2 out of 5 locally manufactured skin whitening creams had concentrations higher than the permissible level.

Each project country is a Party to the Minamata Convention on Mercury and has begun taking active steps to implement its obligations. Preliminary assessments have indicated that the sale and use of skin lightening products is prevalent in each project country with its manufacture also confirmed in Jamaica and Sri Lanka.

Action Items to Achieve Component 2 Objectives

The following activities, led by BRI (in coordination with other project stakeholders), will help to understand the different types of skin lightening products and their mercury content. This information helps to monitor local and online markets to stop or reduce production, distribution, and usage of these products.

Increasing capacity to identify mercury skin lightening products involves:

1. Rapid sampling and analysis of skin lightening products within project countries (using a 2-step sampling protocol being tested as part of the project).
2. Conducting a literature review of existing verified data on mercury-added skin lightening products.
3. Developing a global database or repository of reputable mercury-added skin lightening product data compiled from available sources and samples analyzed under the project.



In addition to the scientific analysis, UNEP has created graphics such as this in a coordinated international effort to raise awareness of the dangers of mercury exposure from skin lightening products (UNEP, 2024). See page 8 for links to more information.

Rapid Sampling and Analysis to Identify Skin Lightening Products with Mercury—In Two Phases

Sampling Protocol

■ Phase 1: Screening

A random sampling of approximately 100 skin lightening products from each project country will be conducted to establish a baseline of the types of products present.

Skin lightening products that are manufactured locally and regionally will be prioritized, though products from other regions may also be purchased. Product selection will be largely based on products with images and wording that indicate lightening, brightening, fairness, 'no marks,' etc.

Products collected will be recorded with a unique sample label code and all available information from the product packaging will be logged such as:

- Name of Product
- Manufacturing Company stated
- Manufacturing Country stated
- Distributor
- Batch Number / Barcode
- Photos of product packaging

Products will then be sent for analysis at BRI's laboratory located in Maine, USA according to the testing protocol described further on. It is also recommended that, once available, aliquots of samples be collected for testing by national or regional laboratories for each project country to allow for quality control and quality assurance checks.

■ Phase 2: Targeted Sampling

After **Phase 1** sampling positively identify skin lightening products that contain mercury, 5-10 replicates of these products will be collected and analyzed to understand potential variation in mercury content across batches/containers.

Skin lightening products that contain mercury are readily available at local street markets such as this one in Sri Lanka.



Testing Protocol

■ Step 1: Screening

Handheld XRF Analyzers (X-ray fluorescence analyzers) will be used to detect samples with mercury concentrations over 10 parts per million (ppm). This will be done as a screening step as higher concentrations of mercury in samples can potentially damage more sensitive mercury analyzing equipment.

■ Step 2: Analysis

The Direct Mercury Analyzer (DMA) will be used to determine precise mercury concentrations for samples identified with less than 10 ppm mercury concentrations.

Samples with more than 10 ppm mercury content will be diluted for analysis on the DMA.

To strengthen national capacity, a subset of SLP samples can be analyzed by in-country labs (after an assessment of their current capabilities).



Through this standardized protocol testing, the overall sampling and analysis methodology may be further refined for recommended applications.

Sampling protocols can be found in BRI's publication *Cosmetic Sampling Methods*.

Download copies at:

briwildlife.org/sampling

Literature Review of Verified Data on Skin Lightening Products with Mercury*

BRI is comparing existing validated data from:

- ◆ More than 50 published journal articles (e.g., Bastiansz, A. et al. 2022. A Systematic Review of Mercury Exposures from Skin-Lightening Products. *Environ Health Perspect.* 2022 Nov; 130(11): 116002)
- ◆ Open databases/reports released by recognized entities (NGOs and monitoring agencies; e.g., ZMWG, BeautyWell, EU Safety Gate, US FDA, EcoWaste, NYC Health Department, Hong Kong Department of Health, etc.)

At this stage of the process, this literature review data is being used internally to identify: potential key hubs for

production; patterns of distribution; and products of interest for testing in project countries/regions. (Figures 4a and 4b show data as of May 2024.)

Measured mercury content was extracted from various sources including peer-reviewed literature as well as governmental and NGO databases. Samples were grouped by either the country in which they were collected or by the country of manufacture as reported by the label and calculated median mercury content by country.

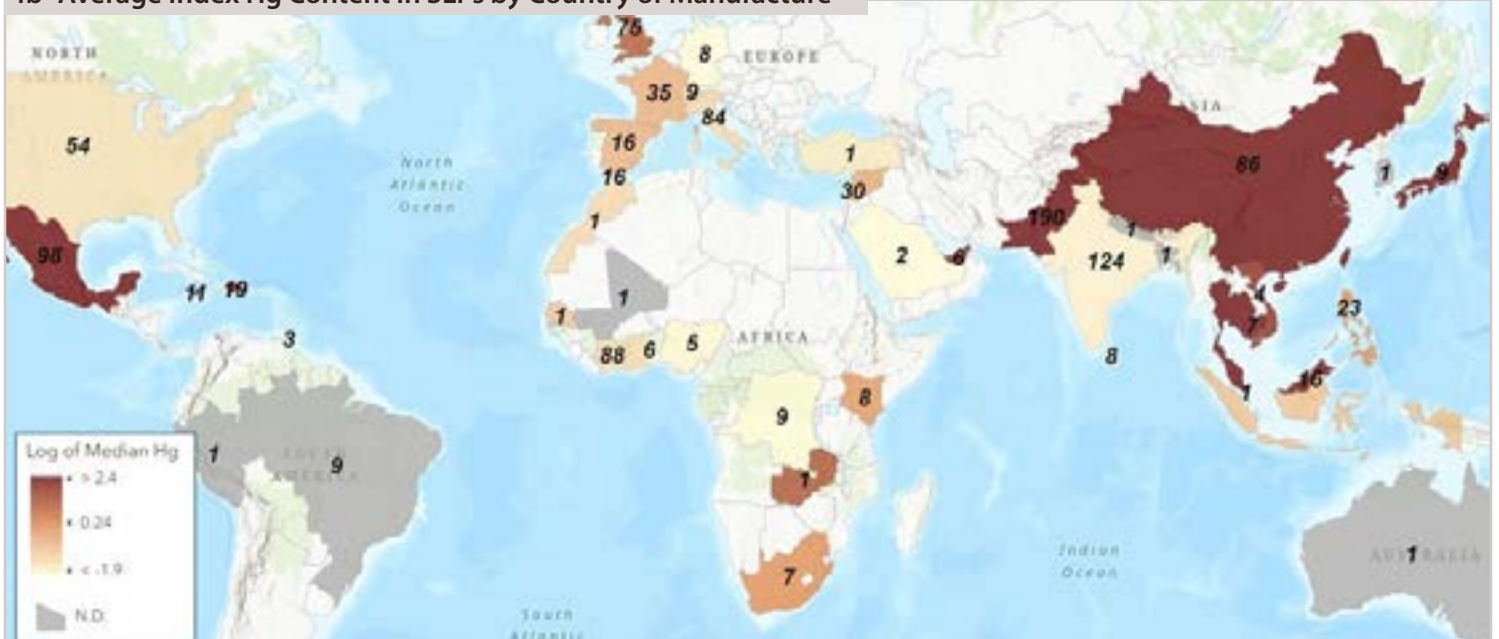
Results are shown on a log scale due to the extreme range in mercury content across samples.

*Reference list available upon request.

4a–Average Index Hg Content in SLPs by Country of Collection



4b–Average Index Hg Content in SLPs by Country of Manufacture



Figures 4a and 4b: Maps display the log of median mercury content in skin lightening product samples by country of collection (4a) and by country of manufacture (4b) based on the literature review conducted on existing verified datasets. Labels over each country show the number of samples analyzed. (Sources: Esri, TomTom, FAO, NOAA, USGS)

Development of a Global Database

All confirmed mercury skin lightening products will be documented in a centralized database developed in coordination with the UNEP Global Mercury Partnership (and key stakeholders such as Zero Mercury Working Group (ZMWG), BeautyWell, and members of the Project Stakeholder Group).

Goals for Database:

- ◆ To be used as a tool for Customs/border control monitoring by project countries (and other countries).
- ◆ To be a 'living' database with a mechanism for other researchers/monitoring entities to access/contribute to.
- ◆ More specific data on mercury concentrations can be made available for tracking of progress in phase out of skin lightening product availability/ mercury content in skin lightening products.

Updates on Other Project Activities:

Components 1 and 3 of the Project are led by WHO with support from UNEP, GMP, and BRI.

WHO has led the coordination of work with project countries and among other activities have:

- ◆ Hosted the Global Project Kick-Off Meeting and Stakeholder Consultations held in Geneva, Switzerland in February 2023
- ◆ Supported country inception workshops held as follows:
 - Jamaica National Project Meeting, June 2023
 - Gabon National Inception Workshop, June 2023 and Gabon Mid-term Mission, June 2024
 - Sri Lanka Inception Workshop, June 2024
- ◆ Outreach events and social media campaigns have been conducted to raise awareness (e.g., [Tackling Mercury Pollution and Racial Discrimination jointly](#) and [Mercury in cosmetics – more than what meets the eye](#))
- ◆ Activities to build national capacity on legislation, enforcement, compliance, and awareness raising strategies are also ongoing.

To further support global awareness raising, the UNEP GMP has established a Community of Practice with the formation of a Project Stakeholders Group to act as a platform for information and knowledge exchange between project countries and global stakeholders working on the issue. The community of practice is open to all relevant stakeholders and experts with knowledge and interest in the issue of eliminating mercury containing skin lightening products.



www.briwildlife.org

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Suggested Citation for this Publication

T. Ali Shah, M. Burton, D. Evers, M. Peterson. 2024. Eliminating Mercury Skin Lightening Products. *Biodiversity Research Institute, Portland, Maine. Science Communications Series BRI 2024-14*. 8 pages.

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