

Rapid Marketplace Screening (RMS) in Bangladesh

BACKGROUND

Pure Earth has conducted Rapid Marketplace Screening (RMS) with support from GiveWell in 12 countries including Bangladesh.

Pure Earth developed and followed a sampling protocol based on a Desk Review Report (DRR) which summarized published literature on known lead exposure sources to inform initial sampling and analysis of products, commodities, and substances that may contain lead.

The trained investigators of Pure Earth conducted the formative research (FR) with the information presented in the DRR, visited the markets, and determined what lead-containing products to sample.



OBJECTIVE

To identify sources of lead exposure and prioritize countries for future interventions. This formative research is to guide a larger and more formal and comprehensive sampling and testing of selected 'lead-positive' products.

*The Rapid Marketplace Screening (RMS) was conducted in **Dhaka city** in the first phase in December 2021, and in three divisions: **Khulna, Rajshahi, and Barishal** in the second phase in July 2022.*

METHODOLOGY

Steps of RMS:

- Train the investigators on project goals, procedures, data entry process in SurveyCTO, and operating XRF instrument.
- Identify Markets
- During the market visit: Collect samples, fill out market-level questions, vendor-level questions, and product questions
- Level the samples with a Unique ID
- Level the sample photo and photo ID
- Analyze the samples via XRF
- Send selected samples for laboratory testing
- Upload the data using SurveyCTO

List of Markets Visited in Khulna Division

1. Boro Bazar
2. Prantik Market
3. New Market



XRF TESTING ON SAMPLES

The samples were tested with a ThermoFisher NITON hand-held portable X-ray Fluorescence Heavy Metal Analyzer (Olympus Vanta Model). Samples were purchased and tested off-site and at International Centre for Diarrhoeal Disease Research, Bangladesh (icddr,b) lab.

Implemented by

Funded by



REFERENCE LEVELS

- **Decorative Paint** - 90ppm (UNEP, Bangladesh)
- **Toys** - 100ppm (US Consumer Product Safety Commission)
- **Rice & cereals** - less than 0.1 mg/kg) as defined by WHO/FAO
- **Raw & processed turmeric** - 2.5 ppm (mg/kg). (BSTI)
- **Spices other than turmeric** - 2mg/kg (QCVN 8-2:2011/BYT)
- **Cosmetics & Vermilion (Sindoor)** - 10-20 ppm (US FDA)

STUDY SAMPLES FROM KHULNA

In the Khulna division, a total of 75 samples of 11 types of items were screened; lead is found in 15 samples.

Items	No. of samples
• Paint (Local paint - yellow, red, green, Plastic Paint, Paint distemper, Enamel paint)	• Paint - 10
• Ceramic (Cup, Bowl)	• Ceramic - 02
• Spices (Turmeric, Peeper, Coriander)	• Spices - 18
• Cosmetics (Nail polish, Lipstick, Mehedi, Eye shadow, Vermilion)	• Cosmetics - 14
• Aluminum cookware (Pan, Mug, Bowl, Pot)	• Aluminum - 07
• Steel (Cup, Bowl)	• Steel - 03
• Plastic (Cup, Bowl, Filter)	• Plastic - 04
• Melamine (Bowl)	• Melamine - 01
• Toy	• Toy - 10
• Starch	• Starch - 04
• Rice	• Rice - 02

XRF ANALYSIS SAMPLES WITH LEAD (Low to High)

Samples	Amount of lead
1. Peeper	3 ppm
2. Turmeric	4 ppm
3. Nail polish	186 ppm
4. Aluminum Pan	186 ppm
5. Aluminum Mug	240 ppm
6. Aluminum Mug	252 ppm
7. Aluminum bowl	260 ppm
8. Steel cup	319 ppm
9. Aluminum Mug	444 ppm
10. Local paint red	572 ppm
11. Toy	606 ppm
12. Ceramic cup	822 ppm
13. Aluminum Pan	1496 ppm
14. Local paint yellow	31300 ppm
15. Local paint yellow	31360 ppm

SAMPLES WITH HIGH LEVEL OF LEAD (Pb)

- **Local Paint (Yellow)** - 31360 ppm
- **Aluminum (Pan)** - 1496 ppm
- **Ceramic (Cup)** - 822 ppm
- **Toy** - 606 ppm
- **Cosmetics (Nail polish)** - 186 ppm



Paint

- Local paint red 572 ppm
- Local paint yellow 31300 ppm
- Local paint yellow 31360 ppm
- Local paint Not Detected (ND)
- Plastic Paint ND
- Paint distemper ND
- Enamel paint ND
- Enamel paint ND
- Local paint red ND
- Local paint green ND



Cosmetics

- Nail polish 186 ppm
- Nail polish ND
- Nail polish ND
- Nail polish ND
- Lipstick ND
- Lipstick ND
- Mehedi ND
- Mehedi ND
- Eye shadow ND
- Vermilion ND
- Lipstick ND
- Mehedi ND
- Lipstick ND
- Vermilion ND



Ceramics

- Ceramic cup 822 ppm
- Ceramic bowl ND



Aluminum Cookware

- Aluminum Pan 186 ppm
- Aluminum Mug 240 ppm
- Aluminum Mug 252 ppm
- Aluminum bowl 260 ppm
- Aluminum Mug 444 ppm
- Aluminum Pan 1496 ppm
- Aluminum Pot ND



Spices

- Peeper 3 ppm
- Turmeric 4 ppm
- Turmeric ND
- Peeper ND
- Turmeric ND
- Peeper ND
- Turmeric ND
- Peeper ND
- Turmeric ND
- Peeper ND
- Turmeric ND
- Peeper ND
- Coriander ND
- Coriander ND
- Turmeric ND
- Peeper ND
- Turmeric ND
- Peeper ND
- Peeper ND



Steel Materials

- Steel cup 319 ppm
- Steel bowl ND
- Steel cup ND



Plastic & Melamine

- Plastic Cup ND
- Plastic Cup ND
- Plastic filter ND
- Plastic bowl ND
- Melamine bowl ND



Toy

- Nail polish 186 ppm
- Nail polish ND
- Nail polish ND
- Nail polish ND
- Lipstick ND
- Lipstick ND
- Mehedi ND
- Mehedi ND
- Eye shadow ND
- Vermilion ND
- Lipstick ND



Rice & Starch

- Starch ND
- Starch ND
- Starch ND
- Starch ND
- Rice ND
- Rice ND

XRF ANALYSIS RESULT ALL THE SAMPLES



All the RMS Study Samples of Khulna Division

RECOMMENDATIONS

- Need to explore the exposure rout of the lead contamination through qualitative investigation
- Need to prioritize the lead exposure issue to conduct a national-level analysis of potential lead sources
- Many consumer and food products do not have reference values/standards for using lead in the products. Need to standardize the use of lead
- Strict monitoring and enforcement of the law and regulations are required to prevent using lead arbitrarily
- Public awareness raising and capacity building of the relevant authority on lead issue is crucial to prevent the sources of lead exposure