

PURE EARTH INDIA

Building momentum on lead-safe spices

Strengthening enforcement, trader sensitization and consumer awareness

Lead poisoning is a preventable, but neglected public and environmental health challenge. Lead exposure is estimated to affect 23.26 crore children across India through multiple pathways— including spices contaminated with lead chromate, unsafe cookware, battery recycling, industrial emissions, cosmetics, paints, and consumer products. In children, lead exposure is linked to reduced IQ, impaired neurological development, cardiovascular disease, lower lifetime earnings, and diminished national economic growth. Lead accumulates in the brain, liver, kidneys, bones and teeth, and can be mobilized from bone stores into the bloodstream during pregnancy, posing risk to the developing fetus.

Lead in spices: What the evidence shows

Research shows that lead-adulterated spices are a significant and often overlooked source of lead exposure in South Asia. Turmeric, a staple in nearly every Indian kitchen, has emerged as a significant and often-overlooked source of that exposure, with some samples exceeding permissible limits by 400 times. A Stanford University survey of over 12,000 households across 10 states tested turmeric used in everyday cooking and found that whole dried turmeric roots and loose turmeric powder were more likely to be adulterated, with lead concentrations up to 800 times the FSSAI permissible limit in some samples.

Growing national momentum: The FSSAI consultation

On 27 July 2026, the Food Safety and Standards Authority of India (FSSAI) organised a Consultation on Food Integrity and Adulteration Prevention in New Delhi, bringing together Food Safety Commissioners and senior officials from nine states — Bihar, Jharkhand, Chhattisgarh, Karnataka, Madhya Pradesh, Maharashtra, Odisha, Uttar Pradesh and Tamil Nadu, with technical support from partners Pure Earth India and the Lead Exposure Elimination Project (LEEP). The consultation examined emerging evidence on lead contamination in food, particularly adulterated turmeric, and explored practical, state-level approaches to reduce exposure.

- **Shri Rajit Punhani, IAS, CEO, FSSAI,** chaired the session and called for a coordinated national response to food adulteration — beyond laboratory testing, to strengthening consumer awareness, supply chains and enforcement, in line with the Viksit Bharat 2047 vision.
- **Dr Indu Bhushan, IAS, Former CEO, Ayushman Bharat,** underscored the long-term health and economic costs of lead exposure, and the value of evidence-based decision-making.
- **Dr Satyen Kumar Panda, Advisor, FSSAI,** closed the discussion, encouraging states to replicate successful interventions, strengthen collaboration with FSSAI, and expand certification systems and inter-state coordination.





Pure Earth India and LEEP presented the current evidence on lead exposure and food adulteration across the selected states, and also focused on key approaches for mitigation including strengthening enforcement, providing safer alternatives, shifting consumer demand towards safer products and ensuring long-term sustainability of interventions
A live demonstration of the portable X-ray Fluorescence (XRF) analyser by the Pure Earth India team let delegates get a first-hand view of its application in rapid field screening for lead contamination. During the demonstration, both dried turmeric root samples and turmeric powder samples collected from markets were tested in real time.

What the FSSAI consultation acheived

• Strengthened awareness among Food Safety Commissioners of the sources, scale and health implications of lead adulteration in turmeric.
• Emerging consensus on priority actions for reducing lead adulteration in spices at the state level.
• A preliminary action plan to guide coordinated inter-state intervention.
• Identified priority next steps for states, laying the groundwork for action.

Recommended next steps

- Dual-state focus across both producer and consumer states to comprehensively address the issue of lead adulteration.
- In addition to enforcement measures such as drives and fines, states are encouraged to explore and develop innovative, sustainable solutions.
- Strengthening industry education and consumer awareness is a priority area, and identifying feasible interventions to achieve this will be important.
- Leveraging technology-based solutions, including portable XRF (pXRF) devices.
- Collaboration with research institutions and technical partners to address this critical issue and deliver state-specific solutions.







From dialogue to delivery: Lead-safe turmeric in Bihar

Building on the Bihar Department of Food Safety's early action on this issue, Pure Earth India is providing technical and programmatic support for a 9-month pilot (July 2026 – April 2027) across three districts — Gaya, Patna and Samastipur.

Turmeric is a daily staple in almost every Bihar household — used in sabzi, dal and pickles, consumed multiple times a day. The goal is to reduce lead chromate adulteration in Bihar's turmeric supply and reduce lead exposure, by strengthening surveillance and enforcement through on-the-spot market testing, trader engagement and consumer awareness and building the Department of Food Safety's capacity to sustain routine enforcement after the pilot ends.

Awareness drives are public, government-led checks held at wholesale markets and haats. Designated Officers and Food Safety Officers in Bihar, with support from Pure Earth India, visit market sites across the three districts, testing turmeric samples on the spot against the FSSAI safety limit of 10 ppm through the XRF analyser.
From August-October, drives were conducted across markets in **Patna, Gaya, and Samastipur**. Close to **80% of all shops** screened had **at least one adulterated turmeric sample**. Both turmeric roots and loose powder samples were tested – in most cases, **turmeric root samples showed higher adulteration** than powder. **55% of all turmeric roots** tested were above the limit. Average readings of lead in roots ranged from **514 ppm to 2683 ppm,** with **highest reading going up to 6932 ppm.** Food Safety Officers used the drives as a platform to sensitize traders on adulteration prevention. In cases where adulterated samples were found, a notice was issued to the trader; if all samples at a shop tested clean, the trader was publicly acknowledged.

IEC materials: Communicating the dangers of lead adulteration





Trader-facing IEC materials were developed in Hindi to translate evidence and testing data into everyday guidance. Pamphlets were distributed during the drives on the harmful health effects of lead, especially for children, and explaining what lead chromate is, what safe versus unsafe turmeric looks like, and how to read a drive result.

The materials emphasized the visual difference between clean single-polished roots and bright double-polished roots adulterated with lead chromate.







Initial response from the drives has been positive, and we hope to build on this through targeted trader sensitization workshops. The drives were also covered extensively in the local media, extending their reach and focusing attention on lead exposure through turmeric.

Bihar shows that a coordinated testing, trader-engagement and awareness model can move quickly and cost-effectively within a single state. The next steps are:

- **Trader Sensitisation Workshops:** District-level sessions for traders, commission agents and polishers, run in coordination with trader associations. The sessions will cover the harmful effects of lead adulteration in turmeric, explore practical clean-sourcing alternatives and potential market incentives for traders.
- **Consumer Awareness Campaign:** This will include community outreach through trained frontline workers across 100+ villages in the three pilot districts as well as a larger consumer awareness campaign, amplified through local and national media, social media channels, and community radio.
- **Strengthening Routine Inspection:** The program aims to build durable capacity within the Food Safety department to embed turmeric into routine inspections.



समस्तीपुर जिला

बिजली का करंट लगने से किशोर की मौत

तिरंगा लेकर निकले छात्र-छात्राएं, लगाए देशभक्ति के जयकारे



40 प्रतिशत हल्दी के नमूनों में मानक से अधिक लेड पाये जाने से बढ़ी चिंता

मिलावटी सामान नहीं बेचने का दिया आश्वासन

Collaborate with Pure Earth India

Pure Earth India looks forward to continuing to work with FSSAI and state food safety departments to build on this momentum.

Pure Earth India can provide research, technical and implementation support to strengthen enforcement, capacity-building and training, design market-based solutions, engage traders and manufacturers, expand consumer awareness and behaviour change initiatives, explore opportunities to scale up, and facilitate inter-state learning and sharing of best practices. Coordinated action and collaboration will help reduce lead exposure through spices, and protect our health and future generations.

Contact us:
2nd Floor, Desein House Building, Savitri Cinema Complex, Greater Kailash 2, New Delhi, 110048

Email Id
pe_india@pureearth.org

Website
pureearth.org