



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 achieved

- 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.

In August, drives were conducted across three wholesale markets across Patna, Gaya, and Samastipur.

In total, **26 traders** were visited, **57 samples** were tested and logged. In **Patna**, **all traders/retailers** tested had turmeric samples exceeding the FSSAI limit, while **66% of traders in Gaya** and **71% of traders in Samastipur** had turmeric samples exceeding the FSSAI limit.

Food Safety Officers used the drives as a platform to sensitize traders on adulteration prevention, the harmful effects of lead, and how to identify adulterated turmeric. Where samples tested higher than the FSSAI limit, a notice was issued to the trader, while if all samples at a shop tested clean, the trader was publicly acknowledged.

IEC materials: Communicating the dangers of lead adulteration

बिहार खाद्य सुरक्षा स्वास्थ्य अभियान 2026

शुद्ध, सीमा-मुक्त हल्दी को कहें हाँ, मिलावट को कहें ना

शुद्ध, सीमा-मुक्त हल्दी खरीदें और बेचें। अपने परिवार व बाजारों की सुरक्षा करें।

सूचना: लोग हल्दी की खद या पाउडर को अनधिक बचकियाँ पौष्टिक दिखाने तथा उनके कारण उनके शारीरिक स्वस्थ के लिए खतरा मानते हैं। यह खतरा वास्तविकता नहीं है। हल्दी के कई बजारों में जो 'सुरक्षित' के नाम से बिकता होता है। यह केवल मिलावट नहीं, बल्कि स्वास्थ्य के लिए खतरा होता है। वास्तविकता यह है कि हल्दी का उपयोग सुरक्षित है।

एकग्रामपंचायत के अनुसार हल्दी में सीसी की मात्रा 10 माइक्रोग्राम प्रति ग्राम से ज्यादा नहीं होनी चाहिए। यह सीमा बताता है:

- हल्दी में सीसी की मात्रा 10 माइक्रोग्राम प्रति ग्राम से ज्यादा नहीं होनी चाहिए।
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क्या आपकी हल्दी स्वास्थ्य के लिए हानिकारक है?

हल्दी में सीसी (Pb) की मात्रा के परिणाम को जानें

सीसी (Pb) की मात्रा (ppm)	हल्दी का रंग	हल्दी का स्वाद	हल्दी का उपयोग
1000-4000+ ppm	गहरा लाल	कड़वा	नहीं उपयोग करें
200-1000 ppm	गहरा लाल	कड़वा	नहीं उपयोग करें
10-200 ppm	गहरा लाल	कड़वा	नहीं उपयोग करें
1-10 ppm	गहरा लाल	कड़वा	नहीं उपयोग करें
0-1 ppm	गहरा लाल	कड़वा	नहीं उपयोग करें

हल्दी में सीसी (Pb) की मात्रा 10 माइक्रोग्राम प्रति ग्राम से ज्यादा नहीं होनी चाहिए।

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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 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.



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.

