



On-Site Adulteration Detection Technique

Technical Brief

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Technology Summary

This project introduces an on-site detection technique for identifying and quantifying adulteration in turmeric. Designed for real-time use in markets, farms, and supply chains, the system offers a portable, affordable, and user-friendly solution to detect common adulterants such as metanil yellow, lead chromate, and starch. The technique combines rapid chemical analysis with optical or sensor-based detection to ensure food safety and authenticity without the need for complex lab equipment.

Background

Turmeric adulteration is a widespread issue in India, affecting both domestic consumption and export quality. Current detection methods are laboratory-based, expensive, and inaccessible to small traders, farmers, and consumers. This project aims to bridge that gap by enabling fast, reliable, and cost-effective adulteration testing directly at the source—whether it be farms, markets, or processing units.

Technology Description

The proposed system uses a portable testing kit integrated with a detection unit capable of identifying and quantifying key adulterants in turmeric. Depending on the configuration, it may use colorimetric reagents, optical sensors, or smartphone-enabled image analysis to detect contamination. The system provides results within minutes and is designed for ease of use, even by non-experts. Its modular design allows it to be upgraded for other spices or food products in the future.

Market Potential / Proposed Deployment

- Rising concerns about food safety and quality are driving demand for rapid adulteration testing tools.
- Turmeric being a widely used spice in both domestic and export markets presents a high-impact opportunity.
- Can be deployed at:
- Local mandis and wholesale markets
- Farmer producer organizations (FPOs)
- Spice processing units and quality control checkpoints
- Government food safety programs

Applications

- On-site food adulteration detection in turmeric
- Quality assurance for spice traders and exporters
- Field testing in farm-to-market chains
- Consumer protection initiatives

Value Proposition

- Rapid, on-site detection eliminates need for lab testing and long delays.
- Low-cost and easy-to-use solution accessible to farmers, traders, and small businesses.
- Quantification of adulterants provides deeper insight beyond just detection.
- Modular platform can be adapted for other food products in the future.

Technology Status

- TRL 5–7 (Functional prototype developed, undergoing field validation)
- Outcome: Early testing shows high accuracy and usability; currently being refined for robustness in field conditions.

