Adulteration of Paneer: Types, Health Hazards, Detection Tests & Recent Incidents in India

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***Abstract*- Paneer, a widely consumed dairy product in India, is prone to adulteration due to high demand and economic incentives. This review explores the types of adulterants found in paneer, associated health hazards, recent detection methods, and significant incidents reported across India. It highlights the urgent need for regulatory enforcement, consumer awareness, and rapid testing protocols.**

***Index Terms*- Paneer, Adulteration, Synthetic Milk, Food Safety, FSSAI, Public Health, Detection Methods, Dairy Contamination, India**

I. INTRODUCTION

Paneer, or Indian cottage cheese, is a staple in the Indian diet due to its high protein content, affordability, and culinary versatility. However, its popularity and perishable nature make it a frequent target for adulteration, particularly in unregulated and small-scale production sectors. The rapid urbanization, increasing demand for milk-based products, and lack of stringent implementation of food safety laws contribute significantly to the adulteration crisis. Paneer is often adulterated using substances like starch, synthetic milk, detergents, urea, and formalin to increase volume, shelf life, or enhance its appearance. These practices compromise nutritional integrity and pose serious health risks ranging from gastrointestinal disorders to long-term organ toxicity and even carcinogenic effects. Public trust in dairy safety has been shaken due to multiple nationwide incidents, highlighting the need for scientific scrutiny, public education, and strict regulatory interventions.

Aim

To review types of paneer adulteration, health impacts, detection methods, and recent trends in India.

Objectives

1. To identify major adulterants used in paneer.
2. To assess their effects on human health.
3. To describe practical detection tests.
4. To compile recent nationwide cases.
5. To propose preventive and regulatory measures.

II. MATERIAL AND METHODS

This is a narrative review using secondary data sourced from:

- Peer-reviewed journals
- FSSAI and ICMR reports (2023–2025)
- National newspapers and news portals (e.g., Times of India, Hindustan Times)
- State-level food safety inspections and seizure reports

Search terms used: “paneer adulteration India,” “FSSAI paneer seizure,” “synthetic milk health risks,” and “dairy product contamination.”

III. REVIEW OF LITERATURE

Several studies and institutional reports have documented the prevalence and impact of paneer adulteration in India. According to the Indian Journal of Public Health (2024), nearly 30% of paneer samples collected across major cities were found to be adulterated. Common adulterants include starch, synthetic milk components, detergents, urea, and harmful preservatives like formalin. A study by the Indian Council of Medical Research (2023) outlines the toxicological implications of such substances, linking formalin to carcinogenic effects and urea to kidney dysfunction. The National Dairy Research Institute (2023) also emphasized that adulteration practices vary by region but share a common pattern of compromising nutritional quality and endangering health. Reports from the Ministry of Health and Family Welfare (2023) and WHO (2022) underline the gaps in surveillance and the poor compliance of vendors with food safety norms, particularly in informal markets. These findings are corroborated by recent food raids, lab tests, and public health alerts issued across various Indian states.

IV. DISCUSSION

The evidence from literature and recent surveillance clearly suggests that paneer adulteration is not only common but poses significant risks to public health. The widespread use of synthetic milk—a concoction of harmful chemicals such as urea, caustic soda, and detergent—has been highlighted as the most dangerous form of adulteration. Investigations during 2024–2025 by FSSAI and local food safety departments exposed several large-scale rackets manufacturing fake paneer using these substances. Urban centers like Noida, NCR, and Chandigarh witnessed seizure of thousands of kilograms of adulterated dairy products (The Hindu, 2025; Times of India, 2025). Children, pregnant women, and immunocompromised individuals are particularly susceptible to adverse effects, including digestive disturbances, nephrotoxicity, and immune suppression.

Lack of regulatory enforcement, insufficient food inspection staff, and poor infrastructure for testing are major contributing factors. Moreover, the general public remains largely unaware of detection methods or health hazards associated with adulterated paneer. Despite the availability of rapid detection kits developed by institutions like AIIHPH and CFL, their use at the consumer level remains negligible.

A multipronged approach is needed to tackle this issue:

- Strengthening of routine and surprise inspections with better-equipped testing labs.
- Launch of nationwide awareness campaigns using media and school curricula to educate consumers.
- Promotion of consumer-level detection kits through government subsidies.
- Stringent legal penalties and permanent bans for repeat offenders involved in adulteration.
- Better traceability in the dairy supply chain and encouragement of certified sources.

This review calls for collaborative action by policymakers, healthcare professionals, food safety authorities, and the general public to ensure the safety of one of India's most consumed protein sources.

V. CONCLUSION

Paneer adulteration represents a serious food safety threat. Despite existing standards, enforcement gaps enable illegal practices. A multipronged approach—enforcement, awareness, and technology—can mitigate risks and restore public confidence in dairy products.

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