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ASSESSMENT OF FOOD ADULTERATION PRACTICES AND CONSUMER AWARENESS IN AKOT CITY, MAHARASHTRA: A MIXED-METHODS STUDY

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ABSTRACT Food adulteration remains a critical public health challenge in India, threatening nutritional security and consumer safety. This study evaluates adulteration practices in commonly consumed food items in Akot City, Maharashtra, and assesses women's awareness of adulteration. Using a mixed-methods approach, 60 food samples (spices, pulses, milk products, oils, etc.) were tested via household chemicals and laboratory methods to detect adulterants. Concurrently, 60 women across socio-economic strata were surveyed to gauge their knowledge of adulteration. Results revealed widespread adulteration in loose samples, including brick powder in chili powder (linked to cancer), argemone oil in coconut oil, and synthetic milk containing urea. Survey data indicated that 78% of women were aware of food adulteration, yet only 25% recognized low pricing as a potential indicator. Socio-economic status influenced awareness, with higher literacy correlating to better understanding. The study underscores the need for stringent enforcement of food safety regulations, consumer education, and accessible detection methods to mitigate health risks.

KEYWORDS :

INTRODUCTION

Food adulteration the deliberate addition of inferior or harmful substances to food is a pervasive issue in India, driven by economic gain and supply-demand imbalances. Adulterants such as metanil yellow, starch and synthetic chemicals compromise food quality, leading to acute and chronic health issues, including cancer, organ damage and metabolic disorders. Despite regulatory frameworks like the Food Safety and Standards Act (FSSAI, 2011), adulteration persists, particularly in milk, spices and oils. This study investigates adulteration patterns in Akot City and evaluates women's awareness, as primary household decision-makers, to identify gaps in consumer education and policy implementation.

Bhatt et al., (2012) and Kohda and Haque (2017) also studied on the basis of Types and Health Impacts of Adulteration, in which Adulteration is categorized as intentional (e.g., adding brick powder to spices), accidental (e.g., pesticide residues), or natural (e.g., microbial contamination). Studies highlight synthetic milk (urea, detergents) and turmeric adulterated with lead chromate as significant health hazards. While FSSAI mandates food safety standards, enforcement remains inconsistent. Economic incentives, lack of testing infrastructure and consumer illiteracy perpetuate adulteration (Afzal et al., 2011; Ayalew et al., 2013). Festive seasons see spikes in adulterated dairy products and sweets, exploiting high demand (Gahukar, 2014), on Regulatory and Socio-Economic Challenges studied. Prior research indicates low public awareness of detection methods, with only 30–40% of consumers recognizing common adulterants (Manasha and Janani, 2016). Socio-economic status (SES) influences access to safe food, with lower-income groups disproportionately affected (Rahman et al., 2015).

MATERIALS AND METHODS

Sample Collection And Testing

Food Samples: 60 samples (spices, pulses, milk, oils, etc.) were collected from retail and wholesale markets in Akot City.

Household Tests: Used toilet cleaner (HCl), turmeric, iodine, and magnets to detect adulterants like starch, metanil yellow, and iron filings.

Laboratory Tests: Conducted iodine-starch reactions, lactometer readings, and acid-based assays, List of chemicals that are available at home are listed AS, Toilet cleaner: Dil / Conc. HCl, Nail paint Remover, Acetone Washing soda: Na_2CO_3, Edible soda: $NaHCO_3$, Vinegar: CH_3COOH, Lemon Juice: Citric acid, Turmeric: Indicator, Tincture iodine: Iodine, Wax.

Survey Design

Participants: 60 women stratified by SES (low to upper income).

Tool: Structured questionnaire assessing awareness, purchasing behaviour and knowledge of FSSAI standards.

Data Analysis: Descriptive statistics and percentage comparisons.

RESULTS

Adulteration In Food Samples

Spices: 67% of loose chili powder samples contained brick powder; 40% of turmeric samples had lead chromate.

Milk: 75% of loose milk samples were diluted with water or synthetic additives.

Oils: 50% of coconut oil samples adulterated with argemone oil (Table 1–2).

Table 1: Result Of Samples Tested By Households' Chemicals

Sr. No.	Items	Samples Tested	Adulterant Present / Absent	Adulterant Used (If present)	Health Hazards
01	Chilli Powder	Loose sample	Present	Brick, Powder and colour	1)Stomach disorder, 2) Cancer 3) Respiratory disorder
		a) Tikhalal	Absent		
		b) Ambari	Absent		
		c)Ratan Mirch Powder	Present		
		d) Tejus	Present		
02	Turmeric Powder	a) Loose sample	Present	1) Chalk powder 2)Lead Chromate	Stomach disorder, Kidney stone, paralysis, brain damage,
		b) Everest	Absent		

		c)Organic India turmeric	Absent		anemia and carcinogenic
		d) Shree	Absent		
		d) Khalsag Turmeric Powder	Present		
03	Asafoetida (Hing)	a) Loose sample	Present	Soap stone	Abdominal pain
		b) Pushpshahi	Present		
		c) Ramdev hing	Absent		
		d) GPC hing	Absent		
04	Black Pepper	a) Everest black	Absent	Papaya Seeds	Liver problem, stomach disorder and economic loss
		b) loose sample	Present		
		c) Catch	Present		
		d) MTR	Absent		
05	Jeera	a) Loose sample	Present	1)Grass Seeds Coloured 2)Charcoal dust	Stomach disorder
		b) B.R.K.	Absent		
		c) Star	Present		
06	Coriander powder	a) Victory	Absent	Horse dung	Macro logical toxication and stomach disorder
		b) Loose sample	Present		
		c) BMC	Absent		
		d) Teju	Present		
		e) Giavi	Present		
07	Saffron	a) Golden	Absent	Colored dried tendrils of maize cob	Economic loss
		b) Baby Brand Saffron	Absent		
		c) Loose sample	Present		
08	Arhar (Pulses)	a) PKRJ	Absent	Kesari dal Metanil Yellow	Stomach disorder, paralysis, tumor, cancer and neurotoxin T
		b) Mangat Ram	Present		
		c) Dinesh	Present		
		d) Loose sample	Present		
09	Chana, Moong Dat	a) India Gold	Absent	Lead Chromate	Damage of all body organ
		b) CJH	Absent		
		c) Loose sample	Present		
10	Milk	a) Amul	Absent	Water	Kidney stone, renal failure in children and cancer
		b) Nanadini	Present		
		c) Tonect	Present		
		d) Loose sample	Present		
11	Ghee	a) Loose sample	Present	Mashed Potato Or Vanaspati	Cardiovascular disease, economic loss and cancer
		b) Guruji	Present		
		c) Amul	Absent		
		d) Anil	Absent		
		e) Gowardhan	Absent		
12	Coconut Oil	a) Organic Country	Present	Argemone Oil	Epidermic dropsy
		b) parachute	Absent		
		c) Loose sample	Present		
13	Honey	a) Natural Raw Hone	Absent	Sugar syrup, Glucose Solution	Harmful for diabetic Patients eye and nerve damage
		b) Dabur	Absent		
		c) Patanjali	Absent		
		d) Loose sample	Present		
14	Bura Sugar	a) Patanjali	Absent	Washing (Chalk) Powder	May cause Kidney stone
		b) 24 Mantra	Present		
		c) Loose sample	Present		
15)	Tea	a) Red Label	Absent	Iron Filling	Stomach disorder and small intestine problem
		b) Premium	Absent		
		c) Loose sample	Present		
		d) Taja	Absent		
		e) Assam Roya	Absent		
16	Jaggery	Loose sample	Present	Metanil yellow	Stomach Disorder and Abdominal Pain
		Prakash	Absent		

Table 2: Result Of Samples Tested By Chemical From Laboratory

Sr. No.	Items	Samples Tested	Adulterant Present / Absent	Adulterant Used (If present)	Health Hazards
1	Milk	a) Amul	Absent	Water Starch	Kidney stone, renal failure in children and cancer
		b) Nanadini	Absent		
		c) Tonect	Absent		
		d) Loose sample	Present		
2	Ghee	a) Aroma	Present	Margarine Or Vanaspati	Cardiovascular disease, economic loss and cancer
		b) Loose Sample	Present		
		c) Amul	Absent		
		d) Anil	Absent		
		e) Gowardhan	Absent		
		b) Loose sample	Present		
		c) MTR	Absent		

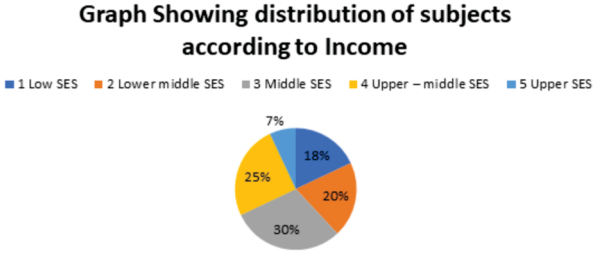
3	Ice Cream	a) Mother Dairy	Absent	Metanil Yellow	Stomach Disorders
		b) Amul	Absent		
		c) Loose sample	Present		
4	Pulses whole and split besan	a) Loose sample	present	a) Kesari dal b) Metanil Yellow	Stomach disorder
		b)Agro Pure Gold	Absent		
		c)Tohfa Pulses	Present		
5	Mustard Seeds	a) Issai Vanshai Kali Sarson	Absent	Argemone seeds.	Abdominal pain
		b) Rajlaxmi	Present		
		c) loose sample	Present		
6	Tea Leaves	a) Leafy	Absent	Iron Filling	Small intestine problems.
		b) Tata Tea Gold	Absent		
7	Silver Foil	Silver Foil	Present	Aluminium Foil	It affects the brain and tissue
8	Honey	a) Loose sample	Present	Sugar Solution	Obesity Diabetes, Eyes and nerve damages
		b) Patanjali	Absent		
		c) Dabur	Absent		
9	Coffee	a) Nescafe	Absent	Chicory	Economic loss
		b) Bru Instant	Absent		
10	Cardamom	a) Parampara Organic	Absent	Talc Powder	Economic loss and mouth infection
		b) A+ Plus	Absent		
		c) SEG	Absent		
11	Jalebi	Jalebi	Absent	Metanil Yellow	Stomach Disorder
12	Coffee power	Nescafe	Absent	Tamarind powder	Stomach Disorder
13	Chilly or Turmeric	a) loose sample	Present	Brick powder and colour	Stomach disorder Cancer Respiratory disorder
		b) Tikhalal	Absent		
		c) Ambari	Absent		

Survey Findings

- **Awareness:** 78% knew about adulteration, but only 35% linked health impacts to adulterated foods.
- **SES Influence:** Upper-middle SES women demonstrated higher awareness (44% recognized AGMARK certification) compared to low SES (18%).

DISCUSSION

The study confirms rampant adulteration in loose food products, aligning with prior findings (Gupta et al., 2009; Perdiselvam et al., 2019). Synthetic milk and argemone oil adulteration highlight gaps in regulatory oversight. Despite moderate awareness, practical knowledge of detection methods remains low, particularly among lower-income groups. Socio-economic disparities in awareness suggest targeted educational campaigns are crucial.



Graph Plate I: Showing Distribution Of Subjects According To Income.

CONCLUSION

Food adulteration in Akot City poses significant health risks, exacerbated by economic motives and lax enforcement.

Recommendations include:
1. Strengthening FSSAI monitoring and penalties for violations.
2. Community workshops on simple detection methods (e.g., iodine tests).
3. Digital platforms for real-time adulteration reporting.

Future research should explore technology-driven solutions, such as portable sensors, to empower consumers.

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