Food Adulteration: Impact on Human Health and Hidden Loopholes in Implementation of the Laws

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ABSTRACT

Food is an important and a basic requirement in the lives of not only humans but also for animals, adulteration of same does not only constitutes a considerable economic problem it inflicts considerable harm to not only humans but also to the animals badly. Globally, it has been noted from a source that approximately 57 % of people have found to have developed various health related issues due to ingestion of adulterated and contaminated foods also, it is estimated that around 22 % of foods are adulterated every year.[1] Most instances of food fraud are found to go unreported and undetected since they do not result in an immediate food risk to the consumers.[2] This article focusses on the detrimental health effects of the food adulteration and how it can be prevented. The article primarily delves upon the authorities set up to curb the food fraud in India and role of the judiciary for acting as an eye opener several times.

Keywords: *Food, Adulteration, Fraud, Health, Authorities, Consumers*

INTRODUCTION

Food fraud is nothing but illegally deceiving or defrauding importers, retailers, or consumers through various means by sellers to gain undue advantage. It can be done by

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1 Mahendra Pal and Meenu Mahinder, "Food Adulteration a Global Public Health", Vol. *Food & Drink Industry*, p.38, (2020).

2 Renée Johnson, "Food Fraud and "Economically Motivated Adulteration" of Food and Food Ingredients", *Congressional Research Service*, p. 1, (2014).

adding, tampering, substituting, or diluting adulterants into naturally grown or made food[3]. It was found through a survey done by Michigan State University in 2016 confirmed that - the extent of food fraud especially the addition of adulterant substances, tampering, and theft went up to more than 50 percent[4]. Fraudsters generally don't aim to harm individuals through their fraud, but the motivation comes to gain illicit monetary gains. This, on the other hand, puts detrimental effects on consumers being misled, since consumers overpay for a product, which they assume to be genuine, but are bad and cheap in quality also they are put at high risk of serious health issues. Food fraud can be reduced by lowering the fraud opportunity.[5]

The Ireland 2013 horse meat scandal – it was revealed by Irish food inspectors that foods advertised about containing beef were found to contain undesired and improperly declared horse meat in it.[6]

FOOD ADULTERATION – WHAT AND WHY?

Adulteration can be defined as the addition or subtraction to or from any item which is to be consumed to modify the natural composition and quality of food by altering the natural ingredients of the food substance making it detrimental to public health.[7]

Adulterants are substances that are added or extracted from an item, these adulterants reduce the nutrient **level** in food, also contaminate them, which makes food not fit for consumption.

The reason behind food adulteration is, getting lured from the easy profits and getting ready to willingly exploit people. The other very prominent reason could be the limited availability of the particular resource so to provide it in abundance and to increase the quantity, fraudsters indulge in adulteration.[8]

Adulteration is present in society since a very long time but it is being unnoticed, it is necessary to understand its impacts on people's health and its deteriorating effect on their lives and personal well-being, this is due to a lack of proper checks or accidental quality

3 Ibid, p. 1.

4 J. Spink and D.C. Moyer, "Defining the Public Health Threat of Food Fraud", Volume76, *Journal of Food Science*, p. 347 (2011).

5 Maree Gallagher and Ian Thomas, "Food Fraud: The deliberate Adulteration and Misdescription of Foodstuffs" Volume. 5, *European Food, and Feed Law Review,* (2010).

6 Samiksha Sharma and Pragati Kaushal, "Food fraud: A menace to public health", Volume 12, *World Journal of Advanced Research and Reviews*, (2021).

7 Maree Gallagher and Ian Thomas, op. cit., p. 347.

8 Maree Gallagher and Ian Thomas, op. cit., p. 347.

assessment on products suspected.[9]

Globally, it has been noted from a source that approximately 57 % of people have been found to have developed various health-related issues due to the ingestion of adulterated and contaminated foods.[10]

TYPES OF ADULTERATION

Adulteration is done through various means and ways but majorly it is done in two ways that are intentional and incidental adulterations.

INTENTIONAL ADULTERATIONS

An adulteration is which food items are intentionally adulterated, diluted, or tampered with either to increase the quantity so as to meet the demand, to enhance the growth at a faster pace, or to give the desired colour or size. It is generally done by adding inferior items to the food with similar properties to that of the food to which they are added. These adulterants are difficult to get tracked or detected and are either biological in nature or physical depending on the food items they are mixed with. these are the most dangerous adulterants because of their extraneous properties. These adulterants include urea, melamine, starch, flour, vegetable oils, water, skim milk, sand, chalk powder, molasses, stone, brick powder, ergot, chicory, barley powder, grinded papaya seeds, etc.

According to the first U.S. public database formed for the reason of compiling information on risk factors due to food fraud published in the Journal of Food Science it was found that Olive oil, saffron, milk, coffee, honey, saffron juice are major contributors for deliberate, economically motivated adulteration of food or food fraud.[11]

INCIDENTAL ADULTERATION

Accidental adulteration, as the name suggests is adulteration that happens without any deliberations from the side of the supplier. It basically takes place due to unhygienic conditions of food and non-maintenance of proper cleanliness of food products and drinks

9 Ankita Choudhary, et al., "An overview of food adulteration: Concept, sources, impact, challenges and detection", Vol. 8, *Indian Journal for Chemical Studies*, (2020).

10 Mahendra Pal and Meenu Mahinder, "Food Adulteration: A Global Public Health Concern", VOL 1, *Food & Drink Industry*, p. 38, (2020).

11 Ibid, p. 2565.

throughout the production site to consumption table, because farm slopes are not thoroughly cleaned, certain adulterants penetrate through them, stones, leaves, soil, sand, and dust are obvious adulterants. This kind of adulteration can also be termed as accidental adulteration, some of the examples of accidental adulterations are pesticides residues and remains in the field, larvae in foods, dropping of rodents, metallic contamination, and arsenic lead with mercury.[12]

Rodents and insects which are pests, considered to be the main source of accidental adulteration they trespass the food products because of which dirt and impurity are produced in the form of excreta or bodily secretions leading to spoilage through micro-organisms.[13]

Generally, accidental adulterants are less harmful than intentional adulterants, The consumer can either remove them on their own and this makes it less injurious. On the other hand, due to invisibility of the chemicals by camouflaging the texture and colour to make them similar to the food item they are added into as adulterants, due to this reason these adulterants lead to serious health hazards.[14]

IMPORTANT LEGISLATIONS TO CURB FOOD ADULTERATION AND THEIR LOOPHOLES

Due to the long-standing prevalence of adulteration of food and numerous cases emerging from time to time, as well as the lack of adequate investigations and inspections, various laws have been developed to prevent the rise in food fraud. Some legislations came up before independence and some after independence.

Firstly, let us talk about the laws governing food adulteration presently in Indian penal code

Section 272 of Indian Penal Code 1860, reads Adulteration of food or drink intended for sale[15], "This provision makes adulteration of food items and drinks intended for selling purposes to be a punishable offense, it states that 'whoever adulterates any article of food or drink, so as to make such article noxious as food or drink, intending to sell such article as food or drink, or knowing it to be likely that the same will be sold as food or drink, shall be punished with imprisonment of either description for a term which may extend to six months,

12 Ibid, p. 2566.

13 Kannan K, et al., Organochlorine pesticides and polychlorinated biphenyls in foodstuffs from Asian and Oceanic countries. Rev. Environ. Contamin. Toxicology, (1997).

14 John Spink, "Food Fraud Prevention", *International Union of Food Science and Technology*, P. 2, (2016).

15 Indian Penal Code Act 1860, (Act 45 of 1860), Section 272.

or with fine which may extend to one thousand rupees, or with both.[16]"

There is another provision enshrined under Indian penal code, **section 273[17] Indian Penal Code, 1860** which reads sale of noxious food or drink and makes it a punishable offense, it states that "whoever sells, or offers or exposes for sale, as food or drink, any article which has been rendered or has become noxious, or is in a state unfit for food or drink, knowing or having reason to believe that the same is noxious as food or drink, shall be punished with imprisonment of either description for a term which may extend to six months, or with fine which may extend to one thousand rupees, or with both."[18]

Provisions under IPC was later found to be unimplemented or not implemented properly during pre – independence era also it was found to be of no use after enforcement of FSSAI

The food and drinks processing industries in India are generally governed by various laws which are accountable to licensing, authorisations, safety measures, investigation, inspection, quality checks etc, the very important role any food laws are expected to ensure that the food products present for sale in the markets are not made, packed, and kept in a condition which is unsanitary and can result to be hazardous for health due to adulteration being done, and going through such processes as to not endanger the health of those who consume it.[19]

It was found that there were different authorities working under different states and territories subject to different laws there was difficulty in implementing the laws throughout the country and following a uniform rule of law. Due to these loopholes and diversities, it was recommended for enforcement of prevention of food safety Act.[20]

The **prevention of food adulteration act** came into force during 1954 and was amended several times due to some drawbacks. This act basically aims to deal with providing protection against food adulteration. The rules mentioned under PFA can be analysed to have various loopholes not only in its implementation level but also at enforcement level.

16 Dnyaneshwari Patil, "Role of judiciary in the implementation of food adulteration laws in India", I blog pleaders, (2021).

17 Indian Penal Code Act 1860, (Act 45 of 1860), Section 273.

18 Dnyaneshwari Patil, "Role of judiciary in the implementation of food adulteration laws in India", I blog pleaders, op, cit.

19 Anvita Sinha and N. N. Mehrotra, "Prevention of Food Adulteration Ineffective Legislation", Vol. 22, *Economic and Political Weekly and Jstor*, p. 75, (1987).

20 Ibid, p. 19.

The foremost concern is the language of PFA rules which is too technical to be followed by a layman even if they are literate, which makes it difficult for not only general public but also for illiterate vendors and retailers who are prosecuted unknowingly what they have done, also according to Section 19(1)[21] of PFA rules states that 'ignorance of law is no excuse or defence' however, they mostly do not know how to defend themselves.

A suggestion that can be provided to make it readable is, by amending the language or by setting up an authority to for the spread of awareness of legal education about adulterated food items and their punishment involved, among people. Moving on to the enforcement and implementation of authorities we can look on to the absence of representation from food toxicologists, whether it be from non-governmental organisations (NGOs) or trade union representatives, is the very first problem with the constitution of the Central Committee for Food Standards (CCFS), which is the ultimate body responsible for working under PFA. Also, the list of food items does not cover instant foods, etc., this legislation does not consider the long-term potential issues.[22]

Not only these there were many other defects and drawbacks in the prevention of food safety act 1954[23], same with various other central Acts like Fruit Products Order, 1955[24], Meat Food Products Order, 1973[25], Vegetable Oil Products (Control) Order, 1947[26], Edible Oils Packaging (Regulation) Order 1988[27], Solvent Extracted Oil, De - Oiled Meal and Edible Flour (Control) Order, 1967[28], Milk and Milk Products Order, 1992[29] etc. These were formulated but none of them proved to be successful in addressing the prevalent food adulteration.[30]

The present legislations regarding prevention of food adulteration were unable to address the evil activities of adulteration and malpractices thoroughly because there are no better means of surveillance of programs being done.

21 Prevention of Food Adulteration Act, 1954, Sec. 19, Cl. (1).

22 Anvita Sinha N and N Mehrotra, op, cit., 76.

23 Prevention of Food Adulteration Act, 1954.

24 Fruit Products Order, 1955.

25 Meat Food Products Order, 1973.

26 Vegetable Oil Products (Control) Order, 1947.

27 Edible Oils Packaging (Regulation) Order 1988.

28 Solvent Extracted Oil, De - Oiled Meal and Edible Flour (Control) Order, 1967.

29 Milk and Milk Products Order, 1992.

30 Mangalsing Pawar, F L Pathan, Current Situation of Food Adulteration: Laws, policy and governance in India and remedies to the problems, International Journal of Science, Engineering and Management (IJSEM), 2017, p. 2

The food safety laws in India were conventional and do not meet the present needs. There was a persistent need for the laws pertaining to food safety and standards and also to remove the defects in the ongoing laws, there was a supreme need of another statute which can consolidate each diverse law related to food safety, thereafter FSSAI was enacted by parliament in 2006 that is Food Safety and Standards Act (FSSAI). After commencement of this act all other previous statutes and laws were held to be repealed. There was a major shift from multi-level, multi-departmental supervision to a single point of reference for all the issues connected with food safety and standards. Through this act a central and autonomous food safety and standard authority was also set up with its head office situated in Delhi it is given under **Section 4[31] of FSSAI**. Moreover, this authority can also establish offices in some other places. It is a body corporate having perpetual succession, common seal and the right to own and dispose of the property in its own name, it can sue and be sued.[32]

IMPORTANT PROVISIONS ENFORCED UNDER FSSAI TO CURB FOOD ADULTERATION

In this act **Section 2(a) of FSSAI** defines adulterant, it states that 'any substance that might be used to make the food dangerous, sub-standard, misbranded, or containing foreign objects.'[33]

Section 5 of FSSAI states that 'the Food Authority shall consist of a Chairperson and the following twenty-two members out of which one-third shall be women.'[34]

Chapter IX of FSSAI talks about offences and penalties, a very important provision needed to curb the problem of food adulteration. It starts with section 48 which talks about general provisions relating to offence. When determining whether a food is safe or harmful to health, consideration must be given to the following factors: production, processing, and distribution; information generally available to consumers about how to avoid specific adverse health effects from a particular food or category of foods; and not only the immediate, short-term, or long-term effects of that food on a person's health after consuming it.[35]

Section 49 of FSSAI talks about the role of adjudicating officer or the Tribunal that

31 Food Safety and Standards Act of India, 2006, Sec. 4

32 Ibid, p. 3

33 Food Safety and Standards Act of India, 2006, Sec. 2, Cl. A.

34 Food Safety and Standards Act of India, 2006, Sec. 5

35 Mangalsing Pawar and F L Pathan, Current Situation of Food Adulteration: Laws, policy and governance in India and remedies to the problems, International Journal of Science, Engineering and Management (IJSEM), 2017, p. 3

they must give appropriate consideration while determining the severity of the sentence.[36]

Following is the basis on which penalty is decided,

'The amount of gain or unfair advantage obtained, as a result of the violation, the amount of loss caused to any person as a result of that violation, also is there any repetition of that violation, whether he/she is aware of the violation etc.'[37]

Section 50 of FSSAI states that – 'Selling of food that is not of desired type, content, or quality shall be punishable. Any person who sells food that is not in conformity with this Act's requirements or its implementing rules, or that is not of the kind, content, or quality that the buyer has required, shall be punished.'[38]

Section 52 of FSSAI states that Penalty for misbranded food - 'Any individual or group of individuals whether by themselves or by someone else on their behalf, if found to manufacture any item for human consumption which is misbranded for the purpose of sale, storage, sells, distributes, imports, is subject to a fine that is extended up to three lakh rupees. The individual when found guilty under this section will be instructed by the adjudicating officer to rectify the food article destroyed.'[39]

Section 54 of FSSAI 'Penalty for food containing extraneous matter - This section states that Any individual who manufactures for sale, store, sell, distributes, imports any food article which is extraneous substance and not fit for human consumption, whether by himself or by any other person shall be liable to a penalty which may extend to one lakh rupees.'[40]

Section 57 of FSSAI 'Penalty for possessing adulterant. this section states that if an individual is found to possess, import, manufactures for sale and sells any kind of adulterant either himself or through someone else, shall be liable –

where such adulterant is not injurious to health, to a penalty not exceeding two lakh rupees;

where such adulterant is injurious to health, to a penalty not exceeding ten lakh rupees. In a proceeding under sub-section (1), it shall not be a defense that the accused was

36 Food Safety and Standards Act of India, 2006, Sec. 49
37 Mangalsing Pawar and F L Pathan, op. cit., 3
38 Food Safety and Standards Act of India, 2006, Sec. 50
39 Food Safety and Standards Act of India, 2006, Sec. 52.
40 Food Safety and Standards Act of India, 2006, Sec. 54.

holding such adulterant on behalf of any other person.'[41]

There is no defence available that the accused was holding the adulterant on behalf of someone else.[42]

Food safety and standard authority act is responsible to establish several authorities for the efficient implementation of the provisions under the act, also for steady disposal and inspection of the issues.

In the case of **M/S PepsiCo India Holdings private limited and another vs State of Uttar Pradesh (2010)[43]**, an FIR was filed against the PepsiCo company that the company is found to be involved in food fraud under Section 272/273 of IPC. The company reverted back contending that section 272/273 of IPC was shadowed after emergence of the Food Safety and Standards Act of India 2006. The High Court in this case observed that the charges and investigations done should be in accordance with the FSSAI 2006 and usage of these provisions would amount to be inappropriate. The High Court of Allahabad thus relied and applied a principal maxim of generalia specialibus non derogate according to them the provisions would be deemed to be inapplicable in this case.[44]

On the other hand, in the case of **State of Maharashtra Vs Sayyad Hassan Sayyed Shubham**[45] (2018) the judgement was passed by the Supreme Court. it was held by the apex court that if there is presence of two laws and provisions of the same subject at the same time, that specifically mentions about any act or omission prevalent as an offence and also talks about the appropriate punishment. The accused can be held liable and can be punished under either of them or both the laws, but the accused cannot be punished twice for the same offence. Double Jeopardy curtails the same. Therefore, if an offence is already covered and its penalties are also specified under Food Safety and Standards Act of India that does not mean that one cannot be prosecuted under IPC.[46]

41 Food Safety and Standards Act of India, 2006, Sec. 57.

42 Ibid.

43 M/S PepsiCo India Holdings private limited v. State of Uttar Pradesh, (2010).

44 Dnyaneshwari Patil, "Role of judiciary in the implementation of food adulteration laws in India", I blog pleaders, 2021

45 State of Maharashtra Vs Sayyad Hassan Sayyed Shubham, Criminal Appeal No.1207 of 2018, (2018).

46 Dnyaneshwari Patil, "Role of judiciary in the implementation of food adulteration laws in India", I blog pleaders, op, cit.

FOOD ADULTERATION AND ITS IMPACT ON THE HEALTH

Food adulteration does not just affect human health, it does affect the society as whole. The pace through which it is increasing is likely to cause a great ill effect to the society. Children being an integral part of the society and future of the growing nation are more prone of getting affected from this and indirectly the society will be affected. Adulteration tends to lower the quality of food and also is likely to cause health hazards. Humans are extremely susceptible to food tampering, and they end up having immediate detrimental effects such as diarrhoea, dysentery, and vomiting and long-term diseases such as stomach disorder, heart problem, brain damage, paralysis, anaemia, liver disorder, indigestion, nausea, vomiting, giddiness, diarrhoea, dysentery, acidity, ulcer, autism, cancer, kidney malfunction, joint pain, asthma, metabolic dysfunctions, food poisoning, eye sight problem, skin disorders etc. It is to be noted through sources that 57percent of people (32percent children and 25 percent adult) tend to develop health problems due to ingestion of adulterated and contaminated foods worldwide.[47]

As we are aware of the rampant use of Calcium carbide, formalin, textile colours, artificial sweeteners, DDT, urea etc a kind of chemical solution of formaldehyde and water is formed and sprayed over fishes, fruits and vegetables, so that the life span is increased. Formaldehyde and poisonous DDT (Dichloro Diphenyl Trichloroethane) has been found to cause human carcinogen which is known to be a cancer-causing agent.[48]

Consumption of foods prepared with added textile dyes can lead to hazards in life. Calcium carbide contains arsenic and phosphorous and when dissolved in water, the carbide produces acetylene gas which is responsible for headaches, dizziness, mood fluctuations and disturbances, renal and liver issues, especially in children, sleepiness, carcinoma, memory loss, basically, it causes neurological imbalances inducing prolonged hypoxia.[49]

It was found that due to use of melamine which causes urolithiasis and renal failure was used in China, which provoked the public and havoc was created since many children died pertaining to this Common. Symptoms are acute anuria, oliguria and dysuria etc.[50]

47 Dr. Mahendra Pal and Dr. Meenu Mahinder, "Food Adulteration a Global Public Health", Vol. 1, *Food & Drink Industry*, p. 40, (2020).

48 Khan MK, "Food Adulteration and its Effect on Health", Vol. 02, *Community Medical Based Journal*, p. 1, 2013.

49 Per H, Kurtoglu S, Yagmur F, Gumus H, Kumandas S, Poyrazoglu MH. "Calcium carbide poisoning via food in childhood", Vol. 32, *The Journal of Emergency Medicine*, (2007).

50 He J, Zheng W, et al., Diagnosis and therapy of acute urolithiasis caused by melamine contamination in infant formula milk. Exp Ther Med, (2013).

Small manufacturers who try to save the cost of manufacturing, prepares ice creams and street foods using unclean water and industrial dyes which are supposed to be used for dyeing clothes. These dyes consist of hepatotoxic, nephrotoxic and carcinogenic, also these dyes cause coronary artery disease (CAD).[51]

It is to be noted that pharmaceutical companies are found to dump and dispose of their waste products and water without prior treatment directly to either agricultural field or nearby surface water which eventually contaminates the surface water and agricultural product causing various health problems in addition to producing multi drug resistant microbes.[52]

In this prevalent adulteration of food adulteration, nothing can be trusted fully. Although herbal products are the most trusted medicinal alternative for most of the people in this country, but it is found through several studies that due to intentional or unintentional adulteration of the products leads to health issues of the people. Even herbal cosmetics cannot be trusted fully due to the contamination of products with several dangerous chemicals, they are found to cause allergic responses and complex dermatological disorders.[53]

To get high yield in agricultural products there is wide use of fertilizers and pesticides which also constitutes to a food adulteration and causes various health hazards.

Raw fruits and vegetables are frequently contaminated with oxytocin, wax, malachite green, copper sulphate, and other substances like Calcium carbide with saccharin. In a study conducted in India in 2006 revealed that 65 percent of alcohol samples tested found positive for methanol content. It is important to mention that 30 millilitres of methanol can result to very be fatal to consume. Abhirami and Radha (2015) established that it is found in Chennai, India that oil and ghee is being adulterated up to 70 percent.[54]

EYE OPENING FOOD ADULTERATION CASES

The 2016 Indian Maggi noodles controversy: This case involved the discovery of excessive levels of lead and MSG in Maggi noodles, a popular brand of instant noodles sold in India. The case resulted in a nationwide ban on Maggi noodles, and the company faced criminal charges.

51 Islam AK, Majumder AA. Coronary artery disease in Bangladesh: A review. Indian Heart J, (2013).

52 Rehman MS et al., "Global risk of pharmaceutical contamination from highly populated developing countries", *Chemosphere*, Vol. 138, (2013).

53 Mosihuzzaman M. "Herbal medicine in healthcare--an overview", *Sage Journals*, Vol. 7, (2012).

54 Dr. Mahendra Pal and Dr. Meenu Mahinder, "Food Adulteration a Global Public Health", Vol. 1, *Food & Drink Industry*, p. 40, (2020).

The 2018 vegetable oil adulteration case in Malaysia: This case involved the discovery of palm oil mixed with industrial oil in cooking oil sold in Malaysia. The scandal led to the arrest and prosecution of several individuals, and the Malaysian government implemented stricter food safety regulations.

The 2020 honey adulteration case in the United States: This case involved the discovery of honey adulterated with sugar syrups from China. The scandal led to criminal charges against several individuals, and the U.S. government implemented stricter regulations on honey imports.

ROLE OF INDIAN JUDICIARY IN CURBING FOOD ADULTERATION

Gomati Desai Onskar:[55] *"Striving to ensure that every child, woman and man enjoys adequate food on a regular basis is not only a moral imperative and an investment with enormous economic returns; it also signifies the realization of a basic human right."*

In a landmark case of **People's Union for Civil Liberties v. Union of India**[56]

Several writ petitions were filed by People's Union for Civil Liberties (PUCL) and one such writ petition was filed in the form of Public Interest Litigation (PIL) As a result, it was held in this case that right to food comes under **Article 21**[57] **of the constitution of India** which guarantees Right to life and personal liberty.

Another significant case which highlighted the issue of food adulteration being prevalent across the country is **Swami Achyut Anand Tirth and others Vs Union of India.**[58] Due to the growing concern regarding sale of synthetic or adulterated milk, a Public Interest Litigation was filed to put a halt on this issue. Basically, the PIL concentrated to give recommendations and seek directions from the Central and the State Government for better implementation of the authorities like FSSAI. The key role these authorities need to play is to do better inspection and quality control management, the same was reiterated in this case. this case also focused on the dairy retailers and manufacturers who were involved and found adding adulterant of chemical nature in edible items.[59]

55 *Gomati Desai Onskar.*

56 People's Union for Civil Liberties v. Union of India, AIR 1997 SC 568, (1996).

57 Constitution of India, 1950, Art. 21.

58 Swami Achyut Anand Tirth V Union of India, Writ Petition (c) No. 159 of 2012, (2012).

59 Dnyaneshwari Patil, "Role of judiciary in the implementation of food adulteration laws in India", I blog pleaders, (2021).

RECENT DEVELOPMENTS

Food adulteration is a serious problem that affects public health and consumer trust. Governments, industry organizations, and consumer advocacy groups are taking various steps to curb food adulteration. Here are some recent developments:

1. Stricter regulations: Governments around the world are tightening regulations to prevent food adulteration. For example, in the United States, the Food Safety Modernization Act (FSMA) has strengthened the Food and Drug Administration's (FDA) ability to prevent food adulteration. Similarly, the European Union has introduced the Food Fraud Network, which brings together experts from member states to share information and prevent food fraud.

2. Improved detection methods: Advances in technology have enabled better detection of food adulteration. For instance, techniques such as DNA barcoding, isotopic analysis, and spectroscopy can help identify adulterants in food products.

3. Increased transparency: Consumer demand for transparency and traceability has led to the development of various initiatives. For example, blockchain technology is being used to create a transparent and tamper-proof record of the food supply chain. Similarly, some food manufacturers are using QR codes or other methods to allow consumers to access information about the origin and production of the food they buy.

4. Collaboration and education: Industry organizations, governments, and consumer advocacy groups are working together to raise awareness about food adulteration and develop solutions. For example, the Global Food Safety Initiative (GFSI) brings together stakeholders from around the world to promote food safety and reduce food fraud. Similarly, the World Health Organization (WHO) and other organizations have developed educational materials to help consumers identify and avoid adulterated foods.

5. Enforcement and penalties: Governments are cracking down on food adulteration with more severe penalties for those found guilty. For example, in India, the government has introduced the Food Safety and Standards (Amendment) Bill, 2020, which provides for up to life imprisonment and a fine of up to Rs 10 lakh ($13,800) for those found guilty of food adulteration.

Overall, the fight against food adulteration is ongoing, and stakeholders are continuously developing new strategies to prevent and detect it.

CONCLUSION

Food adulteration is resulting as menace in a society and due to that it is causing food scarcity indirectly. since, people are seen to become avaricious to gain more profits and selfish without concerning about the health of people consuming the food, it is suggested to the food sellers and manufacturers to be faithful and diligent while selling and manufacturing the food, also to take measures to stop accidental adulteration too. Since food adulteration can be seen to be prevalent everywhere and is prone to cause serious health hazards, it is the role of the people to remain cautious while using food products. To establish consumer rights against food adulteration effectively the law makers, experts, government, promoters should indulge and take necessary actions to curb the problem from roots.

The State Food Safety Authority (SFSA) should get into identifying those areas through roots which are seen to be at higher risk of ingesting milk and milk products getting adulterated, also to collect the samples from those areas and other such adulteration prone areas. Short survey tests are needed to be conducted periodically at the state and national levels.

The State or food authority or Commissioner of Food safety should try to spread awareness an educate general public about its adulteration and the way it is done, its harmful effects of consuming adulterated food items on health and through conducting several workshops and seminars.[60]

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60 Dr. Mahendra Pal and Dr. Meenu Mahinder, "Food Adulteration a Global Public Health", Vol. 1, *Food & Drink Industry*, p. 41, (2020).

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