IJETIR

ISSN (Online) 2583-0554

International Journal of Emerging Technologies and Innovative Research (IJETIR)

Volume 3, Issue 3, March 2023

Impact Factor: 5.731

The Review Study on Health Issues Due to Chemically Adulterated Food

Sajid F. Shaikh[1], Ayesha Z. Takey[2], Tasmeena S. Chougle[3], Bhagwan V. Jadhav[4], Jayashri S. Patil[5], Hrushikesh B. Jadhav[6]

Department of Chemistry, Anjuman Islam Janjira Degree College of Science, Murud-Janjira, Maharashtra, India[1,2,3]

Department of Chemistry, C. K. T. College, New Panvel, Raigad, Maharashtra, India[4]

Department of Chemistry, J. S. M. College, Alibag, Raigad, Maharashtra, India[5]

Department of Mechanical Engineering, Visvesvaraya National Institute of Technology, Nagpur[6]

Abstract: *Now-a-days adulteration of food is the major problem faced by world; hence it is important to ensure quality of food before it is used. This review paper mainly focuses on What actually mean by adultery? Any substance used to adulterate a certain food is called an adulterant and each added substance reduces the purity of the effectiveness of the product. The health of peoples is dependent on the nature of the food and its wholesomeness in terms of their nutritive value. An adulterant is found in the samples of the various products. So, it is recommended to opt standard products which have FSSAI certified mark along with the license number, ingredients list, date of manufacture and expiry date on it for safe and hygienic food. All are suggested to avoid dark, junk, and other processed foods. Clean and store all grains, legumes, and other foods. Always Wash fruits and vegetables thoroughly with water before consuming. Before purchasing food items such as milk, oil, or other bags, check to see if the seal is valid. By keeping these points into consideration one can remain safe from eating adulterated food.*

Keywords: FSSAI, adulteration, nutritive value, safe, hygienic food

I. INTRODUCTION

Food is the introductory need of all living beings for their growth. It composed of carbohydrates, fats, proteins, minerals and essential oils. It is a right of every human being to have healthy, safe and nutritious food which is essential for the growth, repair and maintenance of body tissues and for the regulation of vital processes. The health and the productivity of population these two are dependent on the nature of the food and its wholesomeness in terms of their nutritive value [1]

Food commodities, especially essential food commodities are becoming a target of Adulteration. Food adulteration has evolved from a simple scam to a highly developed and profitable business. Although simple methods of adulteration such as adding water to milk and adding coloured starch to turmeric or red chili powder are still common, but now new forms and types of adulteration are emerging. Pesticide residues in vegetables, fruits, grains, bottled water and antibiotic residues in milk and meat now have more evidence. The use of newer disintegrating agents such as ultramarine blue in dry ginger to cover holes and other insect damage, urea in puffed rice to improve its texture, and aluminium foil in betel nut or in supari was observed. What actually do we mean by adultery? Any substance used to adulterate a certain food is called a adulterant and each added substance reduces the purity of the effectiveness of the product[2].

Proper nourishment is a key to good health but when the food we are eating in order to gain health, gets adulterated; its beneficial effects are lowered, which leads to adverse effect on health and sometimes leads to and high mortality. Adulteration acne also be defined as “the process by which the quality or the nature of a given substance is reduced through the addition of a foreign or an inferior substance and the removal of vital vitamins [3].

Adulteration was first proposed by the German chemist Frederick Accum in 1820. The reason behind adulteration is increase the quantity, dishonesty of traders, to make easy money, ignorance towards consumers rights regarding food safety which ultimately results in buying unsafe and adulterated products [4].

IJETIR
ISSN (Online) 2583-0554
International Journal of Emerging Technologies and Innovative Research (IJETIR)
Volume 3, Issue 3, March 2023
Impact Factor: 5.731

Nidhi Gupta et.al mentioned in the Journal as there are three types of adulteration which are intentional adulterants, metallic contamination and incidental adulterants. Intentional adulterants include sand, marble chips, stone, mud, chalk powder, water, mineral oil and coal tar dyes Metallic Contamination includes arsenic from pesticides, lead from water, and mercury from effluent of chemical industries, etc. Incidental adulterants which include pesticides, D.D.T and marathon residue present on the plant body [5].

The growing trends in food impurity in urban areas are largely attributed to pollution in urban agriculture, defiled food transport and supply chains, poor market, aseptic conditions and the use of defiled or waste water for irrigation purposes. And therefore, Diarrhoea is most frequently found in school going children in the age group of 1- 5 years, 45 % of the total sample in urban area was affected by diarrhoea [6]. Just imagine! Buying Diseases by our own money... (Prevention of Food Adulteration Act) PFA act 1954 was legislated by Indian parliament and was amended time ago 1956, 1976 and recently in 1986 to make the act stricter [7]. Under this act government has set some food norms to check contamination and defaulters are assessed fine and life imprisonment depending on the nature and extent of regulation. norms are also set by AGMARK (Agricultural Marketing), FPO (Fruit Products Order), and ISI (Indian Standards Index) to ensure quality, hygiene, preservation, composition etc. Adulterated or unhygienic food causes an estimation of 2 million people along with children annually. Isn't it shocking? [8].

There are certain considerations that are essential to determine whether a food is adulterated or not. These points are summarised below[9].

1. A lower quality substance that decrease the quality of food or makes it hazardous is added to it.
2. Cheaper or inferior quality of substances are used as a substitute as a whole or a few ingredients.
3. Element of food is incompletely or wholly taken out, reducing the quality of food.
4. It's made decorative and mouth watering with harmful substances or its colour is changed to make it look presentable.
5. Anything that diminished the quality of food is added to or abstracted from it.

This review paper focus on adsorption technique to remove all the impurities present in the water hence making it suitable to reuse. The research paper has been designed by keeping in mind to purify wastewater generated by dairy industries and making it suitable for daily use by suggesting optimize technique with a simple and affordable.

Why is food adulterated?

Food contamination or adulteration is common in developing countries.

For example: milk can be diluted by adding water to increase its volume, and starch powder is often added to increase its solids content.

Listed below are the main reasons for food adulteration:

- Practiced as part of a business strategy.
- An imitation of some other food.
- Unawareness about the correct consumption of food.
- Increase food production and sales.
- Increase demand from fast growing population.
- To get maximum profit from food with smaller investments.

II. EXPERIMENTAL

2.1 Materials

Commonly used food products were selected for evaluating the food adulteration. Three of the available groups were selected. First is the FSSAI which is the standard, substandard (packed but not FSSAI) and loosely available sample. FSSAI stands for Food Safety and Standard Authority of India. 11 various samples were taken. The selected food products were turmeric powder, Asafoetida, salt, sugar, wheat, essential oil, coffee powder, honey, Pulses, Milk, Ghee, Jaggery and Maida.

IJETIR
ISSN (Online) 2583-0554
International Journal of Emerging Technologies and Innovative Research (IJETIR)
Volume 3, Issue 3, March 2023
Impact Factor: 5.731

2.2 Experimental Procedure

Method which are used in this review paper are listed below:

- Detection of Chalk in Sugar:Take a sample and dissolve 10 g in a glass of water, allow it to stand. The result will be chalk will settle down at the bottom.
- Detection of Urea in Sugar: When sugar is dissolved in water, smell of ammonia can be smelled out
- Detection of Soapstone or earthy material in Asafoetida: First shake little portion of the sample with water and stand it. Soap stone or earthy material will obtain at the bottom.
- Detection of coloured saw dust in turmeric powder: Take a full tea spoon of turmeric powder in a test tube. Add a few drops of concentrated HCl.
- Detection of adulterant in honey:Mix a few drops of honey into vinegar water, if the mixture starts to foam, then your honey is fake.
- Detection of tamarind in Coffee:Sprinkle a little coffee powder on a piece of bloating paper and spread a few drops of KOH solution on the paper. If brown colour appears around the coffee powder, then it is adulterated.
- Detection of Metanil Yellow in pulses:Shake 5 gm of the suspected pulses with 5 ml of water and add a drop of hydrochloric acid. An indication of pink colour shows the presence of Metanil yellow.
- Detection of Vanaspati in pure ghee:Take about one teaspoon of melted butter and an equal amount of concentrated hydrochloric acid in an airtight test tube and add a pinch of sugar to it. Shake for one minute and let stand for five minutes. The appearance of red colour in the bottom (acid) of Vanaspati or margarine.
- Detection of Formalin in Milk:Take 10 ml of milk in a test tube. Add 5 ml of sulphuric acid with a small amount of ferric chloride without shaking. The presence of purple or blue colour at the intersection of the two fluid layers indicates the presence of formalin.
- Detection of Argemone oil in Edible oils:In this test, 5 drops of oil is taken in a dry test tube and mixed successively with 0.5 ml of 2% salicylic acid in methanol, 2 ml of conc. nitric acid, then 2 drops of concentrated sulphuric acid and shake well. During adulteration of Argemone oil, a purplish-red or deep orange-red colour develops in 20-30 seconds.
- Detection of Washing soda in Jaggery:Add a few drops of hydrochloric acid solution. Emulsion oreffervescence shows presence of washing soda.
- Detection of Boric Acid in Maida:Take a small amount of sample in a test tube, add some water and shake. Add a few drops of HCl. Dip a strip of turmeric paper, when it turns red, it is boric acid

III. RESULTS AND DISCUSSION

Food adulteration has a significant negative impact on our health. Regardless of the type of adulterate, long-term use of fake food is extremely harmful to the human body. Eating adulterated food increases the number of toxic elements in the body. The nutritional value also decreases as more and more inferior quality substances are added to the food, leaving the body with the least amount of nutrients. Chemical degraders and dyes repeatedly added to food prove to be deadly because they present health risks or dangers due to the high percentage of carcinogenic substances they contain. Some adulterated products can directly affect organs without delay, causing damage or failure of the heart, kidneys, liver, and many other organs.

Let's look at our list of adulterants added in food items :

Food products	Adulterants	Harmful effect
Sugar	Chalk , urea	Highly toxin to human body
Turmeric powder	Coloured saw dust	Stomach disorder
Asafoetida	Soapstone, earthy matter	Dysentry
Honey	Water, sugar solution	Affect the quality of product
Coffee powder	Tamarind seeds	Causes diarrhoea, stomach disorder giddiness, severe joint pain
Pulses	Metanil yellow.	Highly carcinogenic, leads to

		stomach disorder if consumed continuously
Pure ghee	Vanaspati	Heart attack and stroke, very high in trans fats
Milk	Formalin, water	Highly toxic causes liver and kidney damage
Edible oils	Argemone oil	Loss of eyesight, heart disease, tumour
Jaggery	Washing soda	Vomiting, diarrhoea
Maida	Boric acid	Oral and skin irritation

IV. CONCLUSION

Adulterants are found in the samples of the various products. So, it is recommended to opt standard products which have FSSAI certified mark along with the license number, ingredients list, date of manufacture and expiration date on it for safe and hygienic food. Everyone should have to avoid dark, junk, and other processed foods. Clean and store all grains, legumes, and other foods. Always Wash fruits and vegetables thoroughly with water before consuming.Before purchasing food items such as milk, oil, or other bags, check to see if the seal is valid. By keeping these points into consideration, one can remain safe from eating adulterated food

REFERENCES

[1]. Abidfaheem T.K., Baby S. Nayak&Maxie Andrade. Food Adulteration and Family's Knowledge on Food Adulteration in selected Village of Udupi taluk, Karnataka.SS Nitte University Journal of Health Science. 2013; Vol. 3(2): page 33-37.

[2]. https://gcwgandhinagar.com/econte nt/document/1589361321 Unit V Food adulteration.pdf

[3]. Nidhi Gupta and Priti Panchal. Extent of awareness and food adulteration detection in selected food items purchased by home makers. Pakistan Journal of Nutrition.2009; 8(5): page 660-667.

[4]. Khapre MP, Mudey A, SonaliWagh V, Ajay Dawale. Buying Practices and Prevalence of Adulteration in Selected Food items in a Rural Area of Wardha District. Journal of Health and Allied Sciences. 2011;10 (3): page 1-3

[5]. Dr. S.M. Yamuna, K. Meenachi, S.Tharangini. A study on consumer awareness towards food adulteration of selected food products. Indian Journal of Applied Research. 2014; 4(4): page 101-102.

[6]. Gautam Anita & Singh Neetu. Hazards of New Technology in Promoting Food Adulteration. Journal of Environmental Science, Toxicology and Food Technology. 2013; 5(1): page 08-10.

[7]. Dr. Shafqat Alauddin. Food Adulteration and Society. Global Research Analysis2012; 1 (7): page 3-5. ISSN No 2277 –8160.

[8]. http://www.who.int/ campaigns/ worldhealth day/ 2015/ event/en.

[9]. https://www.vedantu.com/biology/food-adulteration

[10]. https://byjus.com/biology/food-adulteration/#:~:text=Non%2Dpermitted%20dyes%20including%20metanil,cause%20different%20types%20of%20cancer

[11]. Manual of methods of analysis of food. Instruction Manual part-I (Common Method for Detection at Households), Food Safety and Standards Authority of India, New Delhi, 2012

[12]. Quick test for some adulterants in food. Instruction Manual part-I (Common Method for Detection at Households), Food Safety and Standards Authority of India, New Delhi, 2012.