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REVIEW OF DISCOVER ADULTERATION IN SOME COMMON FOODS ITEM BY BIOCHEMICAL QUALITATIVE ANALYSIS

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Abstract: Food is one most important basic need for all leaving organism, which useful for growth and maintnus. Now day's foods are contain by different adulterants. Adulteration is a substance which reduces the vital importance of foodstuff. Some of the common adulterants are sugar or jiggery in honey, Starch and melamine in milk, Red lead salts and brick powder in chilli powder, Metanil yellow colours in turmeric powder, Malachite green in vegetable, Mineral oil and castor oils in edible oils, Vanaspati ghee in butter, Lead chromate in pulse, Chalk powder in wheat flour, Prussian blue coloring substances in tea powder, Chicory in coffee powder, Papaya seed in black pepper etc. which is causes various diseases such as epidemic dropsy, glaucoma, cardiac arrest, paralysis, brain damage, anemia, abortion, cancer etc. The aim is to evaluate the presence of adulterant from daily uses food materials like honey, milk , sugar, chilli powder, turmeric powder, green vegetable, edible oil, butter, pulses, wheat flour, tea powder, coffee powder and black pepper which we collected from different local grocery stores and discover food adulterants by biochemical qualitative analysis. The colour change of the sample indicate the according to the reagents is indicates the presence of different adulterants. This information can help to grow the food safety and also people can be aware about the food brands for a healthy life which are very beneficial to our society and our future.

Keywords:-Foods, Adulterants, Diseases, Biochemical analysis, Food Safety, Healthy life

I. Introduction

Food, sleter and cloth are basic needs for every living being. Food is the very necessity needs of life because which are use for growth and various life processes. Food contains important nutritional constituent carbohydrates, vitamins and proteins [1]. Almost all foods are of plant or animal origin. Many plants or plant parts such as roots, leaf, flower and fruit are eaten as food. There are around more than 2,000 plant species which are cultivated for food, and many have several distinct cultivars. Maize, wheat, and rice together account for 87% of all grain production worldwide. Animals are also used as food which included such as meat, milk cheese, butter and honey [2].

Nowadays, Food can be contaminated by different adulterants. Food adulteration is the process in which the quality of food is lowered either by the addition of inferior quality material or by extraction of valuable ingredient [3]. There are four different types of food adulteration included intentional adulteration, incidental adulteration, metallic adulteration and packaging

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hazard [4]. In intentional adulteration substances that look similar to the constituents of the food are added to it, to increase its weight and gain more profit. Example- mixing of pebbles, stones, marbles, sand, mud, filth, chalk powder, contaminated water etc. Incidental adulteration occurs due to negligence while handling food. Example- residues of pesticides in grains, larvae growth, presence of droppings of rodents, etc [5,6]. In metallic adulteration addition of metallic materials into food like lead or mercury is metallic adulteration. It may happen accidentally or even intentionally. The packing materials in which the food is packed may also interfere and mix with the constituents of the food, leading to packaging hazards [7]. Various food adulteration methods included mixing, substituting, using decomposed food, additions of toxic substances, misbranding, and artificial ripening. Also important reason for food adulteration are overgrowing population, urbanization, industrialization, decrease the land of agriculture, environmental hazards, and depleting natural resources then decrease food production [8].

In India normally the adulteration in food is done either for financial gain or due to carelessness and lack in proper hygienic condition of processing, storing, transportation and marketing. Such types of adulteration are quite common in developing countries. Food adulteration has a great impact on our health. Be it any kind of adulteration, prolonged consumption of this type of food is very harmful to the body [9]. Consuming such food increases the toxicity in the body. As the nutritional value of the adulterated food goes down, such food is no longer nutritive for the body. The addition of chemical adulterants and colours many times proves to be fatal [10]. Adulterated food may also affect our internal organs directly leading to heart, kidney, liver, and many more organ disorders and failure. Which is causes various diseases such as epidemic dropsy, glaucoma, cardiac arrest, paralysis, brain damage, anemia, abortion, cancer etc. The Present research work to evaluate the presence of adulterant from daily uses food materials like honey, milk , chilli powder, turmeric powder, green vegetable, Edible oil, Butter, Pulses, wheat flour, tea powder, coffee powder and black pepper which we collected from different local grocery stores and discover food adulterants by biochemical qualitative analysis [11]. The colour change of the sample indicate the according to the reagents is indicates the presence of different types of adulterants. This information can help to grow the food safety and also people can be aware about the food brands for a healthy life which are very beneficial to our society and our future [12].

II. Materials & Methods

Food materials like honey, milk, sugar, chilli powder, turmeric powder, green vegetable, edible oil, butter, pulses, wheat flour, tea powder, coffee powder and black Pepper which we collected from different departmental and local grocery stores. Some reagents like Iodine reagent, Con. HCl, Sucrose, 0.5N ethanolic KOH, Con. HNO_3, Solvent ether, Resorcinol, Carbon tetra-chloride (CCl_4), Con. H_2SO_4, Chloroform, Aniline, some apparatus such as Test tube, Beaker, Conical flask, Watch glass, Glass rod, Funnel, Burette, Pipette, Wash bottle and some paper such Filter paper, Litmus Paper, Cotton plug, blotting paper, were collected which were used for chemical tests. Biochemical qualitative analyses are done for detecting presence of

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adulterants [13].

III. Result & Discussion

Biochemical qualitative analyses of some food are as follows.

1. Food:- Honey

Common adulterant: - Sugar

Biochemical qualitative analysis: - Take 5 ml of honey in a porcelain dish. Add aniline chloride solution (3 ml of aniline dissolved in 7 ml of HCL) and stir well. Orange red colour indicates presence of sugar[14].

2. Food:- Milk

a) Common adulterant:- Starch

Biochemical qualitative analysis: - Take a little amount 3ml of the sample in a test tube. Add a drop of 1% aqueous solution of iodine. Blue or deep blue colorations indicate starch in milk .

b) Common adulterant:- Melamine

Biochemical qualitative analysis: - Take a little amount 5 gm of the sample in a test tube. Add a little amount of soybean powder. After 5 minute, dip a red litmus paper that are change in colour from red to blue indicate the use of Melamine in milk [15].

3. Food:- Sugar

a) Common adulterant:- stone powder or white sand

Biochemical qualitative analysis :- A small amount of sugar was taken in a test tube and shaken with little water. Pure sugar dissolved in water but insoluble stone powder or white sand didn't dissolve.

b) Common adulterant:- washing soda

Biochemical qualitative analysis :-To a small amount of sugar in a test tube , few drops of diluted HCl were added. A brisk effervescence of carbon dioxide confirmed the presence of washing soda in the given sample of sugar[16].

4. Food:- Chili powder

a) Common adulterant:- red lead salts

Biochemical qualitative analysis:- To a sample of chili powder, dil. Nitric Acid was added. The solution was filtered and two drops of potassium iodide were added into it. Yellow ppt. obtained indicated the Presence lead salts in a chili powder.

b) Common adulterant:- brick powder

Biochemical qualitative analysis :- A small amount of given red chili powder was added in a beaker containing water. Settling of some powder at the bottom & floating pure chili powder over water indicates the presence of brick powder in a given sample[17].

5. Food:- Turmeric powder

Common adulterant:- Metanil Yellow colours

Biochemical qualitative analysis Add a few drops of HCl to turmeric in water. Instantly the solution will turn to violet colour [18].

6. Food:- Green vegetables.

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Common adulterant:- Malachite green

Biochemical qualitative analysis:- Take a vegetable and rubbing moistened white cotton plug. Green colour impressions on cotton plug indicates the presence of Malachite green[19].

7. Food:- Ice cream

Common adulterant:- Beaking Soda

Biochemical qualitative analysis Take small Sample of ice cream in beaker add drop of Hydrochloric acid or some lemon juice on this, bubbles are observed if Beaking Soda is present[20].

8. Food:- Edible oil

Common adulterant: - argemone oil

Biochemical qualitative analysis: - take 1 ml of the oil in test tube after add mixture of 1 ml of 2% salicylic acid in methanol and 2 ml of conc. HNO_3, followed by 0.5 ml of conc. H_2SO_4 this mix shake indicate crimson red or deep orange-red colour develops within 20-30 sec- which indicate argemone oil adulteration is present [21].

9. Food:- Butter

Common adulterant:- Starch and hydrogenated vegetable oils

Biochemical qualitative analysis: - Take 2 gm butter in test tube after add 2-3 drops of iodine solution appeared blue colours indicate presence adulterated in butter [22].

10. Food:- Pulses

Common adulterant:- Metanil Yellow and Lead Chromate

Biochemical qualitative analysis:- Take 5 gm of the pulses sample with 5 ml of water in a test tube and add a few drops of concentrated Hydrochloric Acid. A pink colour shows presence of adulterations metanil yellow and lead chromate [23].

11. Food:- Wheat Powder

Common adulterant:- chalk powder.

Biochemical qualitative analysis:- You can check for the presence of adulterant chalk powder by adding 2 to 3 ml dil. HCl to the wheat powder sample in a test tube. Chalk powder creats effervescence in test tube [24].

12. Food:- Tea powder

a) Common adulterant:- Cashew husk

Biochemical qualitative analysis:- Spread a few tea leaves sample on a blotting paper, sprinkle some water on them. Once done, remove the tea leaves and wash the blotting paper under tap water. Observe the colour stains on blotting paper indicate presence of Cashew husk adulterant in tea.

b) Common adulterant:- iron fillings

Biochemical qualitative analysis:- For this you will need a magnet. Spread out a small quantity of tea leaves on a glass plate and gently move the magnet above the tea leaves. If the tea leaves are pure then the magnet will be clean. However, adulteration will manifest when iron fillings get stuck to the magnet.

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c) Common adulterant:- some colorant

Biochemical qualitative analysis:- a glass of water. Ensure that the water is either cold or at room temperature but not hot. If the tea is pure then there will be no change in the water's colour. If the tea leaves have some colorant added to it, the colour will immediately change to red, so beware [25].

13. Food:- Coffee Powder

Common adulterant:- Chicory

Biochemical qualitative analysis:- Drop a pinch of coffee powder on it gently. If the powder floats for some time before sinking, it is coffee. If the powder sinks quickly, it is chicory or some other seed. If it readily diffuses brownish or yellowish colour, it contains Caramel or Chicory [26].

14. Food:- Black Pepper

Common adulterant:- papaya seeds

Biochemical qualitative analysis:- Add some amount of black pepper to a glass of water. Pure black pepper settles at the bottom. In the adulterated black pepper, papaya seeds float on the surface of water [27].

IV. Conclusion

From the above review and discussions adulteration present in some common foods such as honey, milk , sugar, chilli powder, turmeric powder, green vegetable, edible oil, butter, pulses, wheat flour, tea powder, coffee powder and black pepper which we collected from different local grocery stores. Also explain some biochemical method which discovered food adulteration in the food items. Food adulteration can cause tremendous affect on health without our knowledge. Adulteration can be prevented by few alerting steps of our society. Hike of price of food items should be checked by government. While purchasing food items, selection of wholesome and non-adulterated food is necessary to make sure that such food do not cause and health problems. Though presence of adulterants cannot be ensured by visual examination as toxic contaminants are present in very low level but visual examination before purchase can ensure absence of insects, fungus and other foreign materials. The consumer should avoid buying food from places which do not maintain proper hygiene conditions. Both local and branded food stores should be inspected by government bodies. The above general consciousness is simple and easy to initiate for our healthy life. If we tend to actively participate in these changes then we can bring about a healthy and non venturous future for the upcoming generations.

V. References

[1] Frazier, W.C. and Westthroff, W.C. (2006). Food microbiology 3rd Edition, McGraw Hill Publishing Company Limited New York. 163-165, 223-236, 419- 543.

[2] Ades G, Henry CW, Feldstein F. (2012). The Food Safety Challenge of the Global Food Supply Chain. WEBINARS, Food safety magazine.

[3] Abhirami, S. and Radha (2015). Detection of food adulteration in selected food items procured by homemaker. International Journal of Recent Scientific Research. 6 (8): pp 5938-

ISSN PRINT 2319 1775 Online 2320 7876

Research paper UGC CARE Listed (Group -I) Journal Volume 11, Iss 11, Dec 2022

5843.

[4]Awasthi S, Jain K, Das A, Alam R, Surti G, Kishan N. Analysis of Food quality and Food Adulterants from Different Departmental & Local Grocery Stores by Qualitative Analysis for Food Safety. IOSRJESTFT. 2014; 8(2):22-26.

[5] Alauddin S. Food adulteration and society. Global research analysis International. 2012; 1(7):3-5.

[6] Anita G, Neetu S. Hazards of new technologies in promoting food adulterateon. J EnvSci, Tox. F Sci. 2013; 5(1):08-10.

[7] Ankleshwaria, N. and Shah, S.R. (1999). A study on the awareness pertaining to the use of safe edible food colours amongst Indian Housewives. Applied Nutrition. 24 (2): 21-27.

[8] Beniwal, A. and Khetarpaul, N. (1999) Knowledge of consumers during regarding the nature and extent of adulteration of Indian foods. Nutr Health. 13(3) :153-160

[9] Dipak, K. and Dash (2011). National worldwide survey to check food adulteration; Department of food adulteration.

[10] Barro N, Bellow AR, Itsteimbou Y, Savadogo A, Ouattara CAT, Nikiema AP et al. Street-vended foods improvement- contamination mechanisms and application of food safety objective strategy: Critical review. Pakistan Journal of Nutrition. 2007; 6:1-10.

[11] Krishna B.S. (1997). An outbreak of food poisoning in Tamil Nadu associated with Yersenia enterocolytic. 106 : 465-468

[12] Nageswara Rao, R., Sudhakar, P. Ramesh V.Bhat and Gupta C.P. (1989). A study of recorded cases of Foodborne diseases at Hyderabad during 1984-1985. J.Trop Med Hyg.1989; 92:320- 324.

[13] Patel, J.D., Krishnaswamy, M.A. and Nair, K.K.S. (1976). Biochemical characteristics of some coliforms isolated from spices. Jounal of Food Science Technology, India 13; 37-40.

[14] . Pilizota V, Nedic NT. Advances in Honey Adulteration Detection. Food safety Magazine, The online marketplace for food safety solutions, 2009. ttp://www.foodsafetymagazine.com/ magazinearchive1 /a ugustseptember-2009/advances-in-honey-adulterationdetection/.

[15] Afzal A, Mahmood MS, Hussain L, Akhtar, Masood. Adulteration and Microbiological Quality of Milk (A Review). Pak J Nutrit. 2011; 10(12):1195.

[16] Sonika Sharma, Nikita Goel, Pratibha Paliwal (Bhatele); Evaluation of Adulterants in Food by Different Physico-Chemical Method; International Journal for Scientific Research and Development| Vol. 4, Issue 11, 2017:0613-2321

[17] Abhirami S. and R. Radha; Detection of food adulteration in selected food items procured by homemaker; International Journal of Recent Scientific Research. 6, , 8,.5; 2015:5938-5943.

[18] Sasikumar B, Syamkumar S, Remya R, John Zachariah T. PCR based detection of adulteration in the market samples of turmeric powder. Food Biotechnology. 2005; 18:299-306.

[19]. Acharya, M.R. and Shah, R.K. (1999). Some microbiological and chemical attributes of mango pulp samples. Journal of Food Science Technology. 36(4): pp 339-341.

[20]. The fight against food adulteration, Noel G Coley, RSC, Education in chemistry, Issues, Mar 2005

ISSN PRINT 2319 1775 Online 2320 7876

Research paper UGC CARE Listed (Group -I) Journal Volume 11, Iss 11, Dec 2022

[21]. Shelar MK, Bafna AR, Wahile AM, Suresh VT. Evaluation of edible oils for Argemone mexicana seed oil adulteration. Res. J Pharmaceutical, Biological and Chemical Sciences. 2011; 2(3):927-936.

[22] Babu, S. and Shenolikar, I.S. (1995). Health and nutritional implications of food colours. Indian J. of Medical Research. 102 : 245-249.

[23] Weise, Elizabeth (April 24, 2007). "Food tests promise tough task for FDA". USA Today. Retrieved 2007-04-29

[24] . Koppel E, Stadler M, Luthy J, Hubner P. Detection of wheat contamination in oats by polymerase chain reaction (PCR) and enzyme-linked immunosorbent assay ~ 2573 ~ International Journal of Chemical Studies http://www.chemijournal.com (ELISA). European Food Res. and Tech. 1998; 206:399- 403.

[25] Dhiman B, Singh M. Molecular detection of cashew husk (Anacardium occidentale) adulteration in market samples of dry tea (Camellia sinensis). Planta Medica. 2003; 69(9): 882-884.

[26] Patrizia T, Furlan M, Pallavicini A, Giorgio GN, Vignes Lebbe R. Coffee species and varietal identification. InTools for Identifying Biodiversity: Progress and Problems, 2010, 307-313.

[27] Dhanya K, Syamkumar S, Sasikumar B. Development and application of SCAR marker for the detection of papaya seed adulteration in traded black pepper powder. Food Biotechnology. 2009; 23:97-106.