FOOD, QUALITY, ADULTERATION:
IDENTIFICATION AND DETECTION OF COMMON ADULTERANTS IN FOOD

M. A. K. K. P. Perera

Government Analyst's Department, Pelawatta, Battaramulla, Sri Lanka

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ABSTRACT

The food adulteration is a process of addition of anything or removing or reducing and substituting a fair part or ingredient of food item or false representation of a completely different item to be a food of specific kind that will decrease the quality of food[1,2,3].

The adulteration is done mainly to increase the bulk and reduce the production cost, to increase quantity and make more profit, to increase the shelf life of the food items, to attract the consumers and to the profit margin on the expense of the health of consumers etc.[4]

Selection of wholesome and non-adulterated food is essential for daily life to make sure that such foods do not cause any health hazard.

In this study, I introduced a range of simple physical and chemical experments availavle to detect these common food adulterants.

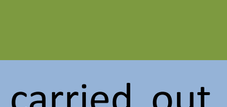
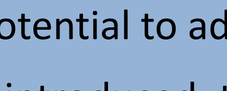
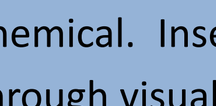
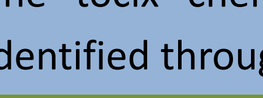
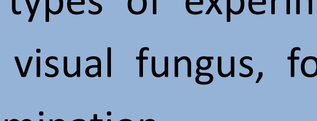
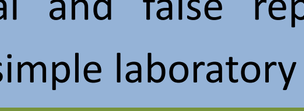
MATERIAL AND METHODS

I carried out a literature review to identify the food which have high potential to adulterate and the adulterants that used in these food.

I introduced two types of experiments such as physical and simple chemical. Insects, visual fungus, foreign matters etc. were identified through visual examination.

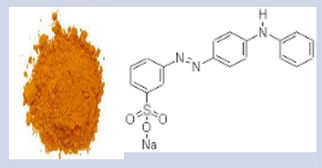
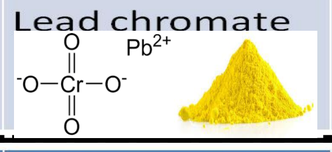
The tocix chemical and false representatives as food items were identified through simple laboratory experiments.

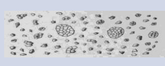
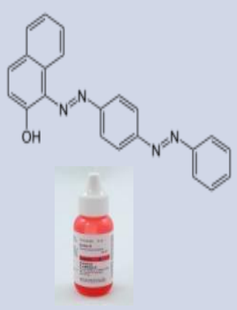
RESULTS

FOOD STUFF	ADULTERANTS	ANALYSIS
Edible Oil **Coconut oil**  **Sunflower oil**  **Olive oil**  **Mustard oil** 	**Castor oil**  **Linseed oil**  **Argemone oil** 	Take 1 mL of oil in a clean test tube. Add 10 mL of acidified petroleum ether. Shake vigorously for 2 minutes. Add 1 drp of ammonium molybdate reagent. The formation of **white turbidity** indicates presence of castor oil in the sample A small amount of sample is treated with the solution of bromine in CCl_4. A **yellow precipitate** indicates the presence of linseed oil in the sample. Add 5 mL of conc. HNO_3 to 5 mL of sample. Shake carefully. Allow for separate **yellow, orange, crimson color** in the lower acid layer indicates argemone oil.

FOOD STUFF	ADULTERANTS	ANALYSIS
Flour Wheat flour  Rice flour  Maize flour 	Boric acid   Chalk powder 	Take small amount of sample. Add some water and shake well. Add a few drops of conc. HCl acid. Dip a turmeric paper strip. If it turns **red color** it conforms the presence of boric acid. Shake a small amount of sample with Dil. HCl acid. **Effervescence** indicates chalk

FOOD STUFF	ADULTERANTS	ANALYSIS
Ghee 	Mashed potato, sweet potato  Vanaspati or margarine  Synthetic coloring matter 	Boil 5 mL of sample in a test tube. Cool and add a drop of iodine solution. The **blue color** indicates presence of starch. Color disappears on boiling and reappears on cooling Take 5 mL of the sample in a test tube. Add 5 mL of HCl acid and 0.4 mL of 2% furfural solution or sugar crystals. Insert the glass stopper and shake for 2 minutes. Development of a **pink color** or **red color** indicates presence of vanaspai in ghee. Pour 2 g of filtered fat dissolved in the ether. Divide into 2 portions. Add 1 mL of HCl to one tube. Add I mL of 10% NaOH to another tube. Shake well and allow to stand. Presence of **pink color** in acidic solution or **yellow color** in alkaline solution indicates added coloring matter.

FOOD STUFF	ADULTERANTS	ANALYSIS
Pulses 	Kesari dal/ Lathyrus sativus  Metanil yellow (dye)  Lead chromate 	Add 50 mL of dil. HCl to a small quantity of dal and keep on simmering water for about 15 minutes. The **pink color,** if developed indicates the presence of Kesari dal. Add conc. HC acid to a small quantity of dal in a little amount of water. Immediate development of **pink color** indicates the presence of metanil yellow and similar color dyes. Ash the sample. Dissolve it in 1:7 H_2SO_4 acid and filter. Add 1 or 2 drops of 0.1% dipenylcarbazide. A pink color indicates presence of lead chromate.

FOOD STUFF	ADULTERANTS	ANALYSIS
Ground spices **Turmeric powder** 	**Colored saw dust powder**  **Starch of maize, wheat, tapioca, rice**	Sprinkle on water surface. Powdered saw dust floated on the surface. A microscopic study reveals that only pure turmeric is **yellow colored, big in size and has an angular structure**. While foreign/added starches are colorless and small I size as compared to pure turmeric starch. Maize starch  wheat starch  rice starch  tapioca starch 
Chili powder 	**Sudan color III** 	Take 1 g of sample into a test tube. Add 2 mL of hexane and shake well. Transfer clear solution into another test tube.Add 2 ml of acetonitrile and shake well. The appearance of **red color** in the **lower acetonitrile layer** indicates the presence of Sudan III.

CONCLUSIONS

The selection of wholesome and non-adulterated food is essential for daily life to make sure that such foods do not cause any health hazard. Insects, visual fungus, foreign matters, etc. can be identified through visual examination of the food before purchasing. The toxic chemical and other false representatives as food items can identify only through laboratory experiments.

REFERENCES

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4. Sobhani, M.M. (2015) Food Adulteration: The Bangladesh Paradox, Law Journal Bangladesh, Vol (2)