



INTERNATIONAL JOURNAL OF PURE AND APPLIED RESEARCH IN ENGINEERING AND TECHNOLOGY

A PATH FOR HORIZING YOUR INNOVATIVE WORK



SPECIAL ISSUE FOR INTERNATIONAL LEVEL CONFERENCE "ADVANCES IN SCIENCE, TECHNOLOGY & MANAGEMENT" (IC-ASTM)

DETECTION OF FOOD ADULTERANTS IN SELECTED FOOD ITEMS

SONALI C. KHANBARAD, ASHWINI B. GAWANDE

Department of Agricultural Process Engineering, Dr. PDKV, Akola

Accepted Date: 05/09/2017; Published Date: 10/10/2017

Abstract: Food adulteration is a growing menace that unscrupulous traders and manufacture all over the world indulge in to exploit gullible consumers to make quick and easy money. In all free market societies where legal control is poor or nonexistent with respect to monitoring of food quality by authorities, usage of adulterants is common and rampant. Every nation on earth has suffered cases of adulteration at one time or other. Government authorities with great efforts have succeeded in reducing the recurrent occurrences; but have not been able to eliminate it. Only an aware and an informed consumer will be able to eliminate it conclusively by continuous routine monitoring. The dictionary defines food adulteration as an act of intentionally debasing the quality of food offered for sale by either the admixture or substitution of inferior substances or by the removal of some valuable ingredient.

Keywords: Food Items, Food Adulterants

Corresponding Author: SONALI C. KHANBARAD

Co Author: - ASHWINI B. GAWANDE

Access Online On:

www.ijpret.com

How to Cite This Article:

Sonali C. Khanbarad, IJPRET, 2017; Volume 6 (2): 453-458



PAPER-QR CODE

INTRODUCTION

Food adulteration is a growing menace that unscrupulous traders and manufacture all over the world indulge in to exploit gullible consumers to make quick and easy money. In all free market societies where legal control is poor or nonexistent with respect to monitoring of food quality by authorities, usage of adulterants is common and rampant. Every nation on earth has suffered cases of adulteration at one time or other. Government authorities with great efforts have succeeded in reducing the recurrent occurrences; but have not been able to eliminate it. Only an aware and an informed consumer will be able to eliminate it conclusively by continuous routine monitoring. The dictionary defines food adulteration as an act of intentionally debasing the quality of food offered for sale by either the admixture or substitution of inferior substances or by the removal of some valuable ingredient.

Food is the basic necessity of life. One works hard and earns to satisfy our hunger and relax later. But at the end of the day, many of us are not sure of what we eat. We may be eating a dangerous dye, sawdust, soap stone, industrial starch and aluminum foil. Contaminated foods and drinks are common sources of infection (Dipak, 2011). Adulteration means the addition of ingredients which are not permitted in food. They are added because of business profit only. Adulterated foods are harmful for human health as they contain the unauthorized food ingredients. Adulteration in foods also decreases our moral and social value. (Chayan, 2014).

Among all foods, milk adulteration is the most common one, being very easy and lucrative. Simple addition of water to milk adulterates it. When water is added to pure milk, it undergoes a change in its physical and nutritional constituents. When inferior quality impure water is used to adulterate milk, chances of infection and disease due to microbial contamination is very high on its consumption. Impure water reduces the keeping quality of milk and so artificial harmful preservatives are added to improve the shelf life of the adulterated product. Pure milk is spoiled on keeping at room temperature within a day and an adulterated one stays fresh for a much longer time. Simple addition of water is also easily recognisable by users as the product becomes thin and watery. To prevent easy identification adulterators add various chemical agents to thicken the product so that adulterated milk closely resembles the consistency of pure milk.

MATERIALS AND METHOD

The study methods are given by the following procedures and the test was done in the Food Engineering laboratory, Dr PDKV, Akola with both the chemical and physical analysis. Each item in the food groups which are procured from local market of akola were analyzed for various adulterants. The below table shows the food items tested in each food group.

FOOD GROUPS	FOOD ITEMS
Cereals	Wheat flour, Refined wheat flour
Pulses	Besan flour
Fats and oils	Butter, Sunflower oil,
Milk and milk products	Milk, Paneer,
Spices and condiments powder	Asafeotidia, Corianderpowder, Turmeric powder, Red chilly powder,
Sugars	jaggery

RESULTS AND DISCUSSION

Test for adulteration in selected foods

Following are few tests that are done in our laboratory to find out the Food adulterants. Most of the food items procured locally found adulterated such as butter and paneer etc. whereas standard food items are found without adulteration. Some standards food items are also found with some adulterants as such Hing, Chilly powder etc.

<i>Food item</i>	<i>Adulterant</i>	<i>Brand tested</i>	<i>Rapid test</i>	<i>Inference</i>	<i>Result for Adulterant</i>	<i>Health hazards</i>
WHEAT FLOUR	Bran	i) Standard	Take a glass of water. Add 5grams of wheat flour to it.	If bran is present it floats in water.	i)Not found	Skin rashes (Sajid,2011)
	Chalk powder	i)Standard	In a test tube wheat flour is diluted and a few drops of dilute hydrochloric acid is added.	Effervescence indicates the presence of chalkpowder.	i) Not found	
	Boric acid	i)Standard	Take a small amount of sample in a test tube, add some water and shake. Add a few drops of Hydrochloric acid. Dip a turmeric paper strip.	If it turns red, boric acid is present.	i) Not found	Poisonous (Venkatesh,2013) Skin rashes (Sajid,2011)
REFINED WHEAT FLOUR	Chalk powder	i) Standard	In a test tube wheat flour is diluted and a few drops of dilute hydrochloric acid is added	Effervescence indicates the presence of chalk powder.	i) Not found	Poisonous (Venkatesh, 2013) Skin rashes (Sajid, 2011)
BESAN FLOUR	Khesari dhal	i)Standard	Add 50 ml of dilute Hydrochloric acid to 10 grams of the sampleand keep on simmering water for about 15 minutes.	The pink color developed indicates thepresence of khesari flour.	i)Not found	Stomach pain, ulcer, Lathyrism cancer (Venkatesh,2013) (Sajid,2011)
BUTTER	Vanaspati or Margrine	i)Standard ii) Local	Take about one teaspoon full of melted sample of Butter withequal quantity of concentrated Hydrochloric acid in a stoppered testtube and add to it a pinch of sugar. Shake well for one minute and letit stand for five minutes.	Appearance of crimson color in lower (acid) layershows presence of Vanaspati or Margarine.	i)Not found ii) Color appeared	
	Coalter Dye	i)Standard ii) Local	Dissolve 2gm of melted butter in ether. Then add 2ml of dilute Hydrochloric acid. Allow to settle.	Lower acid layer turning pink confirms the presence of coalter dye.	i)Not found ii)Not found	
SUNFLOWER OIL	Argemone oil	i)standard	Take a small quantity of oil in a test tube. Add equal quantity ofconcentrated Nitric acid and shake carefully.	Red to reddish brown color in lower (acid) layerwould indicate the presence of Argemone oil.	i) Not found	Loss of eye sight, heartdisease and tumors(Venkatesh,2013)
PANEER	Starch	i)Standard	Take a small portion of the product in a test tube add water andboil. Cool to room temperature. Add 1-2 drops Iodine solution.	Blue color indicates the presence of starch.	i) Not found	Less nutritive value (Venkatesh,2013)
MILK	Sodium Chloride	i)Standard ii)loose	Take 2 ml of milk in a test-tube and add 0.1ml of 5 percent potassiumchromate solution and 2 ml of 0.1 N silver nitrate to it.	Appearance of a yellow color indicates thepresence of added sodium chloride in milkwhile the appearance of a brick red precipitateindicates the absence of added sodium chloride inthe milk.	i) Not found	Stomach disorder. (Venkatesh,2013) (Sajid,2011)
	Starch	i)Standard ii) loose	Take a small portion of the product in a test tube add	Blue color indicates the presence of starch.	i)Not found	

			water and boil. Cool to room temperature. Add 1-2 drops Iodine solution.			
ASAFOETIDIA.	Other residue	i)standard	Take 2 grams of sample and Shake the powdered sample with water	Other residue will settle at the bottom.	i)Samolina appeared	Dysentry (Venkatesh,2013)
			Pure powdered asafoetida, taken in a spoon and burnt on a gas flame, will burn with a bright flame like camphor. Impure asafoetida will not burn smoothly.	Not burn	i) Was found	
CORIANDER POWDER	Dung powder	i)Standard	Take 5 gms of coriander powder and add it to water.	Dung will float and can be easily detected by its foul smell.	i) Not found	
TURMERIC POWDER	Metanil yellow	i)standard	Take a sample of turmeric powder. Add sulfuric acid to the extract.	Appearance of red color (which persists even upon adding little distilled water) indicates the presence of added colors. However, if the color disappears upon adding distilled water the sample is not adulterated	i) Not found	Carcinogenic, Brain tumour (Venkatesh,2013) (Sajid,2011)
	Yellow clay	i)standard	Take sample of turmeric powder with water and allow to stand for some time.	The yellow clay will settle down at the bottom leaving turmeric on the top.	i)Not found	
RED CHILLY POWDER	Water soluble coal tar color	i)standard	Take a glass full of water. Sprinkle the chilli powder to the glass tumbler.	The water soluble color will immediately start descending in color streaks.	i)Not found	Stomach problem (Venkatesh,2013)
	Oil soluble coal tar color	i)standard	Take 2 grams of the sample in a test tube, add few ml of solvent ether and shake. Decant ether layer into a test tube containing 2 ml of dilute Hydrochloric acid (1 ml HCL plus 1 ml of water). Shake it.	The lower acid layer will be colored distinct pink to red indicating presence of oil soluble color.	i)Not found	Cancer, Stomach disorder (Venkatesh,2013) (Sajid,2011)
JAGGERY	Chalk powder	i)loose	Take about half tea spoon of sugar in a test-tube and add few drops of 1:1 hydrochloric acid.	The immediate appearance of small bubbles (effervescence) indicates the presence of washing soda in sugar.	i)Not found	Vomiting and diarrhoea (Sajid,2011) Venkatesh,(2013)

CONCLUSION

Adulteration is commonly practiced in both branded and unbranded foods in daily life. From local market to the hypermarket adulteration is prevalent everywhere. But when compared to the previous days/years, today the

extent/percentage of adulteration has reduced. Majority of adulteration in India is Intentional adulteration and it affects the people of all the age group. Even today many people in India are unaware about adulteration and its harmful effects. Even if they know, they seldom take steps to stop adulteration. The carelessness of the buyers makes/encourages the traders to add unpermitted additives. And hence awareness/training was necessary as a part of the study and awareness recorded after the study revealed that it was effective.

REFERENCE

1. Annie S. LivingstoneJian, J., Feng; Nagappa, G. and Malleshi, 2007, Development and nutritional quality evaluation of weaning foods based on malted, popped and roller dried wheat and chickpea;; **International Journal of Food Science and Technology**, Vol. 28, Issue 1, 35–43.
2. Apetrei, I.M. and Apetrei, C., 2014, Detection of virgin olive oil adulteration using a voltammetric e-tongue, **Research on Computers and Electronics in Agriculture**; Vol.108, 148–154.
3. Ashish 2011, Adulterated Milk is what Indians are Drinking; Centre for safety and toxins; vol.32.
4. Chayan; 2014, All about food and Tea; formalin test; published by blogspot.
5. Dipak, K. and Dash, 2014, Nationwide survey to check food adulteration; Department of Food Adulteration.
6. Masarat Dar, M., Idress, W., 2012, Detection of Sudan dyes in red chilly powder, **Journal of Open Access Scientific report**.
7. Molan, P.C., 1996, Authenticity of honey, **Journal of Food and Technology**, 259-303.
8. Natcha, T., Panmanas, S., Detection of adulteration of soy sauce by brine using near infrared spectroscopy, **IOSR Journals**, Vol. 8, Issue 2, 78-83