Chemistry Investigatory Project.

Adulteration Test On Food

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Class:- XII-C

Certificate

This is to certify that the ***"Chemistry Investigatory Project"*** on the Topic ***"Adulteration Test On Food"*** has been completed by ***Aman Kushwaha*** of class XII-C under the guidance of ***Mrs. Sasheela Jose*** in particular fulfillment of the curriculum of ***All India Senior School Certificate Examination (AISSCE***) Leading to the award of annual examination of the year ***2022-23***

Signature of the external examiner

Signature of the Chemistry teacher

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Objective

The objective of this project is to study some of the common food adulterants present in different foodstuffs.

Introduction

Food is one of the necessities for the sustenance of life. A pure, fresh, and healthy diet is essential for the health of people. It is no wonder to say that community health is a national wealth.

Adulteration of foodstuff was so rampant, widespread, and persistent that nothing short of a somewhat drastic remedy in the form of comprehensive legislation became the need of the fac hour.

1 To check this kind of anti-social evil a concerted and determined onslaught was launched by the Government by the introduction of the Prevention of Food Adulteration Bill in Parliament to herald an era of much-needed hope and relief for the consumers at large.

In the middle of the 19th cent. chemical and microscopal knowledge had reached the stage where food substances could be analyzed, and the subject of food adulteration began to be studied from the standpoint of the rights and welfare of the consumer.

In 1860 the first food law framed in the interest of the purchaser was passed. That law, lacking sufficient means of enforcement, remained largely ineffective until 1872 when administrative officials were appointed and penalties for violations provided. In the United States, the federal Food and Drug Act of 1906 was the result of a long and stormy campaign led by Dr. Harvey Washington Wiley.

This law defined food adulteration and the misbranding of products; it provided regulations covering the interstate movement of food and penalties for violations.

The 1906 act was superseded in 1938 by the more rigorous Food, Drug, and Cosmetic Act administered since 1940 by the Food and Drug Administration (now within the Dept. of Health and Human Services).

The FDA is charged with enforcing truthful and informative labeling of essential commodities, maintaining staff laboratories, and formulating definitions and standards promoting fair dealing in the interests of the consumer.

The 1938 act broadened the definitions of adulteration, misbranding, and lack of informative labeling; it provided for factory inspections, and it increased the penalties for violations. It was amended in 1958 and 1962 to define and regulate food additives and food coloring.

The federal law controls traffic from one state to another and is supplemented by local regulations that require food handlers to be licensed, thereby discouraging the spread of disease; it provides for the inspection by health officers of meat and other foods, restaurants, and dairies and cold storage methods. Imported goods that violate the provisions of the act may be denied admittance to the United States and if not removed within a given time may be destroyed.

Statement Of Objects And Reasons

Laws existed in several States in India for the prevention of adulteration of foodstuffs, but they lacked uniformity having been passed at different times without mutual consultation between States.

The need for Central legislation for the whole country in this matter has been felt since 1937 when a Committee appointed by the Central Advisory Board of Health recommended this step.

'Adulteration of foodstuff and other goods is now included in the Concurrent List (III) in the Constitution of India. It has, therefore, become possible for the Central Government to enact Indian legislation on this subject. The Bill replaces all local food adulteration laws where they exist and also applies to those States where there are no local laws on the subject. Among others, it provides for -

I. A Central Food Laboratory to which food samples can be referred for final opinion in disputed cases (clause 4),

II. A Central Committee for Food Standards consisting of representatives of Central and State Governments to advise on matters arising from the administration of the Act (clause 3), and
III. The vesting in the Central Government of the rule-making power regarding standards of quality for the articles of food and certain other matters (clause 22).

Act37 Of 1954

- The Prevention of Food Adulteration Bill was passed by both the House of Parliament and received the assent of the President on 29th September 1954. It came into force on Ist June 1955 as THE PREVENTION OF FOOD ADULTERATION ACT, 1954 (37 of 1954).

LIST OF ADAPTATION ORDER AND AMENDING ACTS

1. The Adaptation of Laws (No.3) Order, 1956.
2. The Prevention of Food Adulteration (Amendment) Act, 1964 (49 of 1964).
3. The Prevention of Food Adulteration (Amendment) Act, 1971 (41 of 1971).
4. The Prevention of Food Adulteration (Amendment) Act, 1976 (34 of 1976).
5. The Prevention of Food Adulteration (Amendment) Act, 1986 (70 of 1986).

GOVERNMENT MEASURES

To check the suppliers of food from doing so, the government has passed a stringent act which is known as the preservation of food Adulteration Act.

They have been implemented to provide safety to human beings in the supply of food. It covers safety from risks involved due to contamination of poisonous elements.

The specification laid down of various foods under the provisions of the PFA Act covers minimum basic characteristics Of the Products Below which it is deemed to be adulterated and also covers the maximum limit of contaminant not considered safe for human beings beyond a certain level.

Precaution

By taking a few precautions, we can escape from consuming adulterated products.

1. Take only packed items from well-known companies.
2. Buy items from reliable retail shops and recognized outlets.
3. Check the ISI mark or Agmark.
4. Buy products of only air-tight popular brands.
5. Avoid craziness with artificially colored sweets and buy only from reputed shops.
6. Do not buy sweets or snacks kept in open.
7. Avoid buying things from streetside vendors.

Theory

The increasing number of food producers and the outstanding amount of imported foodstuffs enables the producers to mislead and cheat consumers.

To differentiate those who take advantage of legal rules from the ones who commit food adulteration is very difficult. The consciousness of consumers would be crucial. Ignorance and unfair market behavior may endanger consumer health and misleading can lead to poisoning.

So we need simple screening tests for their detection. In the past few decades, adulteration of food has become a serious problem. Consumption of adulterated food causes serious diseases like cancer, diarrhea, asthma, ulcers, etc. The majority of fats, oils, and butter are paraffin wax, castor oil, and hydrocarbons. Red chili powder is mixed with brick powder and pepper is mixed with dried papaya seeds.

These adulterants can be easily identified by simple chemical tests.

Several agencies have been set up by the Government of India to remove adulterants from food stuff.

AGMARK - an acronym for agricultural marketing....this organization certifies food products for their quality. Its objective is to promote the Grading and Standardization of agricultural and allied commodes.

Experiment-01

Aim:-

To detect the presence of adulterants in fat, oil, and butter.

Apparatus Required:-

Test tube, acetic anhydride, conc. H2SO4, acetic acid, conc. HNO3.

Procedure:-

Common adulterants present in ghee and oil are paraffin wax, hydrocarbons, dyes, and argemone oil. These are detected as follows:

1. Adulteration of dyes in fat Heat 1mL of fat with a mixture of 1mL of conc. sulphuric acid and 4mL of acetic acid. The appearance of pink or red color indicates the presence of dye in fat.
2. Adulteration of argemone oil in edible oils To a small amount of oil in a test tube, add a few drops of conc. HNO3 and shake. The appearance of red color in the acid layer indicates the presence of argemone oil.

Experiment-02

Aim:-

To detect the presence of adulterants in sugar.

Apparatus Required:-

Test-tubes, dil. HCI.

Procedure:-

Sugar is usually contaminated with washing soda and other insoluble substances which are detected as follows:

1. Adulteration of various insoluble substances in sugar Take a small amount of sugar in a test tube and shake it with little water. Pure sugar dissolves in water but insoluble impurities do not dissolve.

2. Adulteration of chalk powder, washing soda in sugar. To a small amount of sugar in a test tube, add a few drops of

   HCI. The brisk effervescence of CO2 shows the presence of chalk powder or washing soda in the given sample of sugar.

Experiment-03

Aim:-

To detect the presence of adulterants in samples of chili powder, turmeric powder, and pepper.

Apparatus Required:-

Test-tubes, conc. HCl, dil. HNO_3, KI solution.

Procedure:-

Common adulterants present in chili powder, turmeric powder, and pepper are red-colored lead salts, yellow lead salts, and dried papaya seeds respectively. They are detected as follows:

1. Adulteration of red lead salts in chili powder To a sample of chilli powder, add dil. HNO_3. Filter the dil. solution and add 2 drops of potassium iodide solution to the filtrate. Yellow ppt. indicates the presence of lead salts in chili powder.
2. Adulteration of yellow lead salts to turmeric powder To a sample of turmeric powder add conc. HCl. The appearance of magenta color shows the presence of yellow oxides of lead in turmeric powder.

3. Adulteration of brick powder in red chili powder Adds a small amount of the given red chili powder in a beaker containing water. The brick powder settles at the bottom while pure chili powder floats over the water.

4. Adulteration of dried papaya seeds in pepper Add a small amount of sample of pepper to a beaker containing water and stir with a glass rod. Dried papaya seeds being lighter float over water while pure pepper settles at the bottom.

Observation

EXPT. NO.	EXPERIMENT	PROCEDURE	OBSERVATION
1.	Adulteration of paraffin wax and hydrocarbon in vegetable ghee.	Heat small amount of vegetable ghee with acetic anhydride. Droplets of oil floating on the surface of unused acetic anhydride indicate the presence of wax or hydrocarbon.	Appearance of oil floating on the surface.
2.	Adulteration of dyes in fat	Heat 1mL of fat with a mixture of 1mL of conc. H_2SO_4 and 4mL of acetic acid.	Appearance of pink colour.

3.	Adulteration of argemone oil in edible oils	To small amount of oil in a test tube, add few drops of conc. HNO_3 & shake.	No red colour observed
4.	Adulteration of various insoluble substances in sugar	Take small amount of sugar in a test tube and shake it with little water.	Pure sugar dissolves in water but insoluble impurities do not dissolve.
5.	Adulteration of chalk powder, washing soda in sugar	To small amount of sugar in a test tube, add a few drops of dil. HCl	No brisk effervescence observed.
6.	Adulteration of yellow lead salts to turmeric powder	To sample of turmeric powder, add conc. HCl.	Appearance of magenta colour
7.	Adulteration of red lead salts in chilli powder.	To a sample of chilli powder, add dil. HNO_3. Filter the	No yellow precipitate.

		solution and add 2 drops of KI solution to the filtrate.	
8.	Adulteration of brick powder in chilli powder	Add small amount of given red chilli powder in a beaker containing water	Brick powder settles at the bottom while pure chilli powder floats over water.
9.	Adulteration of dried papaya seeds in pepper	Add small amount of sample of pepper to beaker containing water and stir with a glass rod.	Dried papaya seeds being lighter float over water while pure pepper settles at the bottom.

Conclusion

The selection of wholesome and non-adulterated food is essential for daily life to make sure that such foods do not cause any health hazards. It is impossible to ensure wholesome food only on visual examination when the toxic contaminants are present at the ppm level. However, a visual examination of the food before purchase makes sure to ensure the absence of insects, visual fungi, foreign matter, etc. Therefore, due care taken by the consumer at the time of purchase of food after thoroughly examining can be of great help. Secondly, label declaration on packed food is very important for knowing the ingredients and nutritional value. It also helps in checking the freshness of the food and the period of best before use. The consumer should avoid taking food from an unhygienic place and food being prepared under unhygienic conditions. Such types of food may cause various diseases. Consumption of cut fruits being sold in unhygienic conditions should be avoided. It is always better to buy certified food from reputed shops.

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