Chemistry Project

Study of Adulterants in food
CONTENTS

- Aim
- Introduction
- Theoretical Background
- Procedure
- Observations & Result
- Adulterants & Diseases
- Some Common Ways Of Detecting Adulteration
- Precautions Against Food Adulteration
- Conclusion

AIM

To study some of the common food adulterants in different food stuffs

INTRODUCTION

Adulteration is the act of intentionally debasing the quality of food offered for sale either by mixture or substitution of inferior substances or by the removal of some valuable ingredient.

In the past few decades adulteration of food has become one of the most serious problems. Consumption of adulterated food causes diseases like cancer, asthma, ulcer, etc. Majority of adulterants used by the shopkeepers are cheap substitutes which are easily available.

In order to prevent adulteration of food products by dishonest traders, the government has issued ‘The Prevention of Food Adulteration Act’. The Bureau of Indian Standards is the agency in India that provides the certificate of reliability to food manufacturers in India.

THEORETICAL BACKGROUND

We are very fortunate to be born a country which is blessed with rich soil, diversified climate, many rivers and the great Himalayas where almost all varieties of fruits, vegetables and cereals, etc. can be grown. In ancient times, the land was in abundance, the supply of food was more than the demand and people used fresh food materials in most natural form.

The population spurt in our country has given rise to unemployment and poverty. The demand for food has increased & our country has to import food grains, oil etc. from other countries. This shortage of food and ignorance of consumers is the main cause for adulteration of foodstuffs by the unscrupulous traders. It has become so common that the consumers have to run from pillars to pillars to get a foodstuff which is not adulterated.

The consumers are not aware of hazards of adulteration and pay heavily for consuming adulterated food. If the consumer knows the ways and means to check the commodities of daily use, they can save themselves and there families from this mind-boggling problem.
Experiment 1
To detect the presence of adulterants in sugar.

**Requirements:** Test tubes, conc. Sulphuric acid, diluted hydro chloric acid.

**Procedure:**

1. **Adulteration of various insoluble substances in sugar**
   A small amount of sugar was taken in a test tube and shaken with little water. Pure sugar dissolved in water but insoluble impurities didn’t dissolve.

2. **Adulteration of chalk powder, washing soda in sugar.**
   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 chalk powder or washing soda in the given sample of sugar.

Experiment 2
To test the presence of the vanaspati ghee in a given sample of ghee and butter.

**Requirements:** Test tubes, desi-ghee, diluted HCl, butter, water, and little sugar.

**Procedure**

1. **Detection of Vanaspati:**
   A small amount {0.5gm} of ghee was taken in a test tube. The tube was heated gently and a little sugar and HCl was added to it. The test tube was shaken well for five min. Presence of pink colour showed the presence of vanaspati ghee.

Experiment 3
To detect the presence of adulterants in oil and butter.

**Requirements:** Test tube, conc. HCl, acetic anhydride, nitric acid.

**Procedure:**

1. **Adulteration of paraffin wax and hydro carbon in vegetable ghee.**
   A small amount of unsaponifiable matter of oil was heated with acetic anhydride in a test tube. Small droplets of oil observed on the surface of unused acetic anhydride indicate the adulteration of oil with paraffin wax or hydrocarbon.

2. **Detection of Argemone oil**
   About 5ml of oil was taken in a test tube. Few drops of conc. Nitric acid was added into it and contents were shaken well. Presence of orange colour indicated the presence of argemone oil.

Experiment 4
To detect the presence of adulterants in a given sample of chilly powder.
Requirements: A glass, water, dil. Nitric acid.

Procedure:
1. Adulteration of red lead salts
To a sample of chilly powder, dil. Nitric Acid was added. The solution was filtered and two drops of potassium iodide were added into it.
   No yellow ppt. indicated the absence of lead salts in a chilly powder.

1. Adulteration of brick powder
A small amount of given red chilly powder was added in a beaker containing water.
   Settling of some powder at the bottom & floating pure chilly powder over water indicates the presence of brick powder in a given sample.

**Experiment 5**

To Detect the presence of given sample of turmeric powder.

Requirements: Test tube, dil. HCl, turmeric powder, dil. nitric acid, Potassium iodide solution.

Procedure:
1. Detection of chalk powder
A small amount of given sample was taken in a test tube & about ml of dil. HCl was added to it.
   No effervescence indicates the absence of chalk powder in the sample.

**Experiment 6**

To test the adulteration of dyes in fats.

Requirements: A sample of fat, conc. Sulphuric acid, acetic acid, test tube.

Procedure: 1ml of fat was heated with as mixture of 1ml of conc. Sulphuric acid &4ml of acetic acid. Appearance of red color indicated the presence of dye in fat.

**ADULTERANTS & DISEASES**

<table>
<thead>
<tr>
<th>S.NO.</th>
<th>Name of the food product</th>
<th>Common Adulterants</th>
<th>Diseases caused</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Black pepper</td>
<td>Dried papaya seeds</td>
<td>Stomach irritation, liver damage, cancer</td>
</tr>
<tr>
<td>2.</td>
<td>Arahar dal</td>
<td>Yellow dye, kesari dal</td>
<td>Leprosy, paralysis</td>
</tr>
<tr>
<td>3.</td>
<td>Coffee powder</td>
<td>chicory</td>
<td>Deprived from nutrition value</td>
</tr>
<tr>
<td>4.</td>
<td>Gram dal</td>
<td>Kesari dal, clay, stone</td>
<td>Stomach disorder, lathyrism</td>
</tr>
<tr>
<td>5.</td>
<td>Butter and pure desi ghee</td>
<td>Starch, vanaspati ghee</td>
<td>Food poisoning</td>
</tr>
</tbody>
</table>
SOME COMMON WAYS OF DETECTING FOOD DULTERATION

1. Papaya seeds are used to adulterate black pepper seeds. Add some of the adulterated sample to glass water. Papaya seeds float while pepper seeds do not.
2. Kesari dal is an adulterant in arahar dal and chana dal. Kesari dal pointed and wedge shaped. chana dal/ arahar dal is smooth and round.
3. Starch is used as an adulterant in milk. put few drops of iodine solution in milk. a blue or black colour indicates starch.
4. Old used spices are often mix with spices sold as fresh. Smell the spice. no or less smell indicates the adulteration
5. Cheap edible oil in vanaspati. Add a solution of washing soda to vanaspati and shake well. If froth appears on top, cheap oil has been added to vanaspati.
6. Artificial dye in tea leaves. Put tea leaves or moistened blotting paper. Artificial colour leaves will impart colour to blotting paper.

PRECAUTIONS

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

1. Take only packed items of 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 for artificially coloured sweets and buy only from reputed shops.
6. Do not buys sweets or snacks kept in open.
7. Avoid buying things from street side vendors.

GOVERNMENT MEASURES

To check the suppliers of food from doing so, the government has passed a stringent act which is known as preservation of food Adulteration Act. They has been implemented with the objective of providing 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 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 being safe for human beings beyond a certain level.
CONCLUSION

The increasing number of food producers and the outstanding amounts of imported food stuffs enables the producers to mislead and cheat consumers. To differentiate of those who take advantage of legal rules from the once who commit food adulteration is very difficult. The consciousness of consumers has become very crucial. However, how can we expect consequent behavior from them regarding controversial issues emerging day by day? In addition, ignorance and unfair market behaviors is endangering consumer health. So we need sanctions and judicial penalties with adequate restaning force to halt this process.

OBSERVATIONS AND RESULT

<table>
<thead>
<tr>
<th>SNO.</th>
<th>FOOD STUFF</th>
<th>QUANTITY TAKEN</th>
<th>OBSERVATION</th>
<th>ADULTERANT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Sugar</td>
<td>20 gm</td>
<td>No Brisk effervescence seen</td>
<td>No Chalk powder or washing soda present.</td>
</tr>
<tr>
<td>2</td>
<td>Ghee</td>
<td>20gm</td>
<td>Pink color obtained</td>
<td>Vanaspati ghee present</td>
</tr>
<tr>
<td>3</td>
<td>Butter</td>
<td>20 gm</td>
<td>Orange red color not obtained</td>
<td>Nil</td>
</tr>
<tr>
<td>4</td>
<td>Chilly powder</td>
<td>10 gm</td>
<td>i) No yellow ppt. ii) settling of brick powder</td>
<td>No lead salts and brick powder present</td>
</tr>
<tr>
<td>5</td>
<td>Turmeric powder</td>
<td>10gm</td>
<td>No effervescence</td>
<td>Nil</td>
</tr>
<tr>
<td>6</td>
<td>Fats</td>
<td>20gm</td>
<td>Red colour obtained</td>
<td>Dye</td>
</tr>
</tbody>
</table>