

SCNM GOVERNMENT DEGREE COLLEGE  
DEPARTMENT OF CHEMISTRY  
NARAYANPET


STUDENT STUDY PROJECT 2022-2023

TOPIC:- A Project on Honey Analysis

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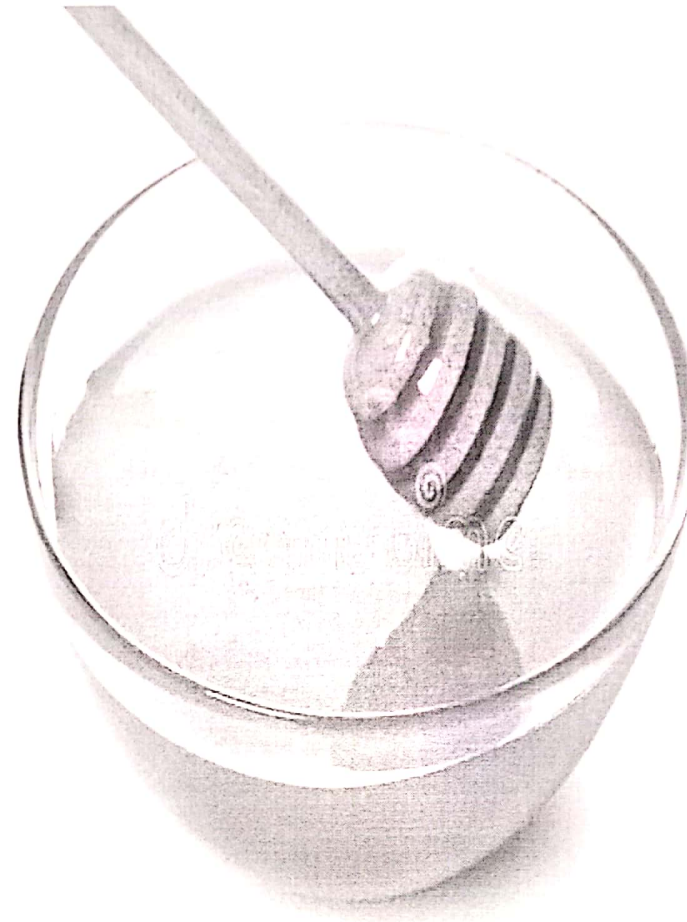
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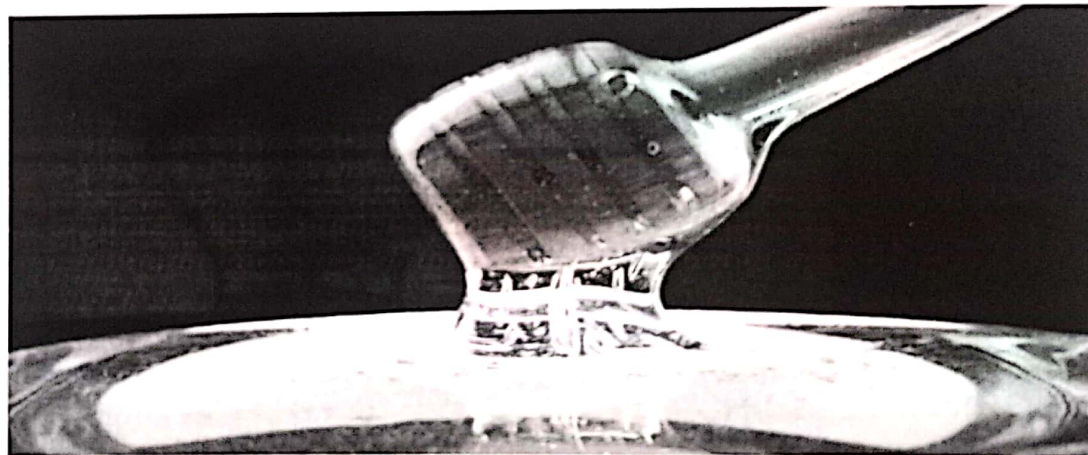
## 10. Bibliography



## 1.ABSTRACT

### **a) About Honey**

- Sweet fluid produced by honey bees.
- Derived from flower nectar.
- Sweetness from monosaccharides, fructose and glucose.
- It has a long history in human consumption and is used in various foods and beverages as a sweetener and flavouring agent.



## **b)Honey Production**

- Origin in certain plant material (mainly nectar and honey dew).
- To produce 100gms honey, a foraging bee must visit nearly a thousand flowers,
  - sucking up nectar and filling its honey stomach.
- Workers bees ingest the nectar, pollens and cane sugar which get mixed with saliva
  - and undergo
  - chemical changes due to enzymes.
- Then bees come back to hive and regurgitate it in the honey cells and honey is called semi-ripened honey”.

### c) Chemical Constituents

- Honey is aqueous solution of glucose 35%, fructose 45%, and sucrose about 2%.
- The proportion of sugar may vary depending upon the source of nectar and enzymatic activity responsible for converting nectar into the honey.
- The other constituents of honey are maltose, gum, traces of succinic acid, acetic acid, dextrin, formic acid, colouring matters, enzymes (invertase, amylase) and traces of vitamins.
- Proteins and pollen grains from various flowers are also found in honey.

## 2.Honey Benefits

### **a) Medicinal Properties of Honey**

- In Ayurveda, a 4000 year-old treatise on medicine originating from India, honey is considered to positively affect to all three primitive
- It has sweetness with added astringent as end taste.
- It is heavy dry, and cold. Its effect on doshas (imbalances) is that it aggravates vata (air/moving forces).
- It promotes the healing process.
- Some wound gels which contain antibacterial raw honey.
- One new Zealand researchers says a particular type of honey (manuka honey) may be useful in treating MRSA infections.

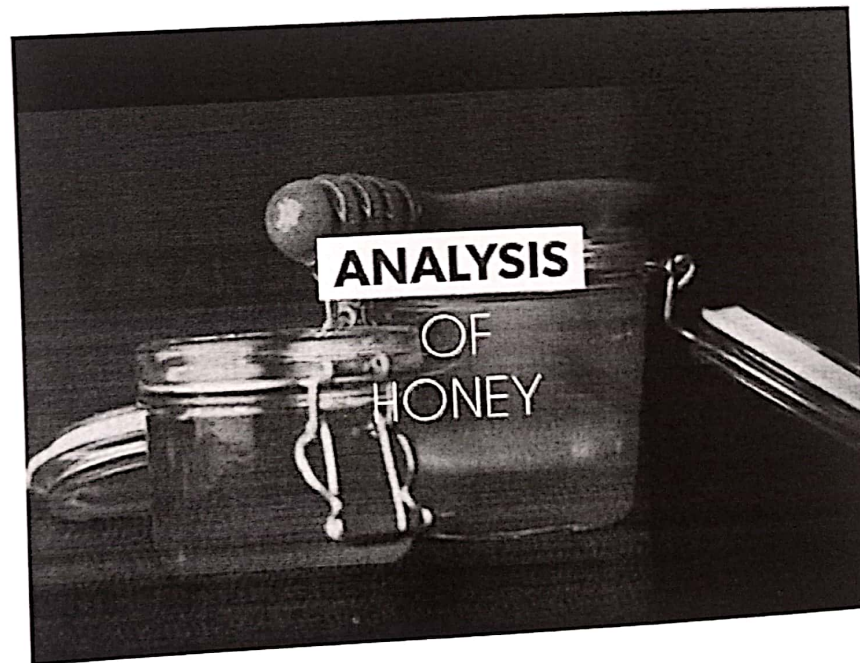


## **b) Health Benefits of Honey**

- Prevents cancer and heart diseases.
- Reduce ulcers and other gastrointestinal disorders.
- Anti- bacterial, anti- fungal.
- Blood sugar regulation.
- Reduces cough and throat irritation.
- Strengthens the immune system.

### 3. Aim of Experiment

To analyse the available honey for presence of different minerals and carbohydrates.





## 4. Requirements

### (a) Apparatus

- Test tube
- Test tube stand
- Burner
- Water bath

### (b) Chemicals

- Ammonium chloride solution
- Ammonium hydroxide
- Ammonium phosphate
- Fehling solution A
- Fehling solution B
- Tollen's reagent

## 5.Theory

Honey, thick, sweet, super saturated sugar solution manufactured by bees to feed their larvae and for the subsistence during winter.

Bee honey is composed of fructose, glucose and water, in varying proportions.

It also contains several enzymes and oils. The colour and flavor depends on the age of the honey and the sources of the nectar. Light coloured honeys are usually of higher quality than dark coloured honeys. Other high grade honeys are made by bees from orange blossoms, clover and Alfalfa. A well known, poorer grade honey is produced from buckwheat.



## 6.Procedure

### Test for minerals:-

#### 1.Test for calcium:-

2ml of honey is taken in a test tube and  $\text{NH}_4\text{Cl}$  solution and  $\text{NH}_4\text{OH}$  solution are added to it .

The solution is filtered and to the filtrate 2ml of ammonium oxalate solution is added. White ppt or milkiness indicates the presence of  $\text{Ca}^{+2}$  ions.

#### 2.Test for magnesium :-

2 ml of honey is taken in a test tube and  $\text{NH}_4\text{Cl}$  solution is added to it and then excess of ammonium phosphate solution is added. The side of the test tube is scratched with a glass rod. White ppt indicates the presence of  $\text{Mg}^{+2}$  ions.



## Test for carbohydrates

### 1. Fehling's test:-

2ml of honey is taken in test tube and 1ml of each of Fehling's solution A and Fehling's solution B are added to it and boiled. Red precipitation indicates the presence of reducing sugars.

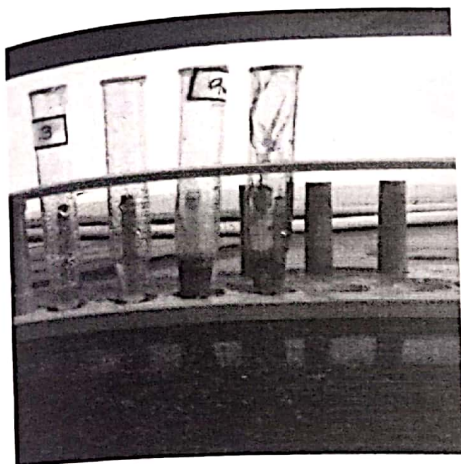
### 2. Tollen's test:-

2-3ml of aqueous solution of honey is taken in a test tube. 2-3ml of Tollen's reagent is added. The test tube is kept in a boiling water bath for about ten minutes. A shining silver mirror indicates the presence of reducing carbohydrates.



## 7. Observation

Substances taken : Honey: Lion



s.no	Tests	Observation	Inference
1.	Test for calcium:- Honey + $\text{NH}_4\text{Cl}$ solution + $\text{NH}_4\text{OH}$ solution filtered + Ammonium oxalate solution.	white ppt is observed.	calcium is present.
2.	Test for magnesium:- Honey + $\text{NH}_4\text{OH}$ + Ammonium phosphate .	white ppt is observed.	magnesium is present.
3.	Fehling's Test:- Honey + 1ml each of fehling's solution A + Fehling's solution B.	red ppt is observed.	reducing sugar is present.
4.	Tollen's test:- Honey + 2-3ml tollen's reagent, test tube in water bath for 10 min.	Shinning silver mirror is present.	Reducing carbohydrate is present.

Substances taken : Honey: Apollo



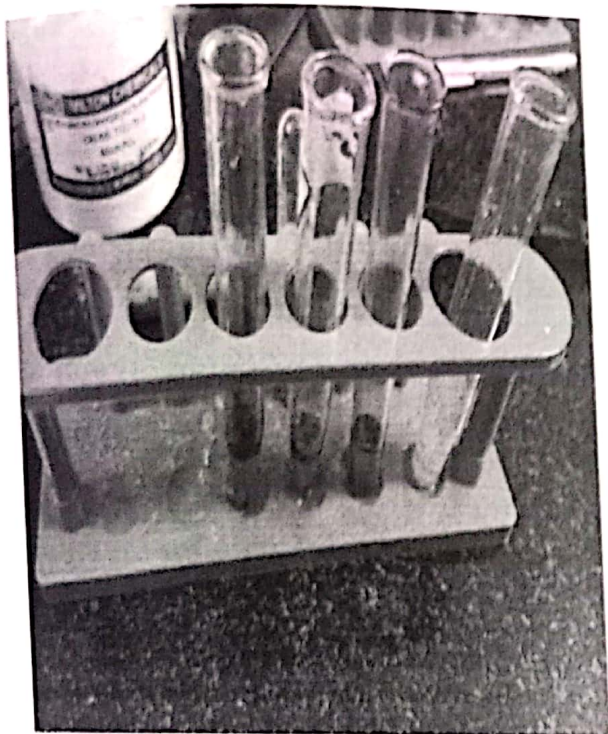
s.no	Tests	Observation	Inference
1.	Test for calcium:- Honey + $\text{NH}_4\text{Cl}$ solution + $\text{NH}_4\text{OH}$ solution filtered + Ammonium oxalate solution.	white ppt is observed.	calcium is present.
2.	Test for magnesium:- Honey + $\text{NH}_4\text{OH}$ + Ammonium phosphate .	white ppt is observed.	magnesium is present.
3.	Fehling's Test:- Honey + 1ml each of fehling's solution A + Fehling's solution B.	red ppt is not observed.	reducing sugar is not present.
4.	Tollen's test:- Honey + 2-3ml tollen's reagent, test tube in water bath for 10 min.	Shinning silver mirror is present.	Reducing carbohydrate is present.

stances taken : Honey: Saffola



s.no	Tests	Observation	Inference
1.	Test for calcium:- Honey + $\text{NH}_4\text{Cl}$ solution + $\text{NH}_4\text{OH}$ solution filtered + Ammonium oxalate solution.	white ppt is observed.	calcium is present.
2.	Test for magnesium:- Honey + $\text{NH}_4\text{OH}$ + Ammonium phosphate .	white ppt is observed.	magnesium is present.
3.	Fehling's Test:- Honey + 1ml each of fehling's solution A + Fehling's solution B.	red ppt is observed.	reducing sugar is present.
4.	Tollen's test:- Honey + 2-3ml tollen's reagent, test tube in water bath for 10 min.	Shinning silver mirror is not present.	Reducing carbohydrate is not present.

Substances taken : Honey: Dabur



s.no	Tests	Observation	Inference
1.	Test for calcium:- Honey + $\text{NH}_4\text{Cl}$ solution + $\text{NH}_4\text{OH}$ solution filtered + Ammonium oxalate solution.	white ppt is observed.	calcium is present.
2.	Test for magnesium:- Honey + $\text{NH}_4\text{OH}$ + Ammonium phosphate .	white ppt is observed.	magnesium is present.
3.	Fehling's Test:- Honey + 1ml each of fehling's solution A + Fehling's solution B.	red ppt is observed.	reducing sugar is present.
4.	Tollen's test:- Honey + 2-3ml tollen's reagent, test tube in water bath for 10 min.	Shinning silver mirror is present.	Reducing carbohydrate is present.



stances taken : Honey: Himalaya

s.no	Tests	Observation	Inference
1.	Test for calcium:- Honey + $\text{NH}_4\text{Cl}$ solution + $\text{NH}_4\text{OH}$ solution filtered + Ammonium oxalate solution.	white ppt is observed.	calcium is present.
2.	Test for magnesium:- Honey + $\text{NH}_4\text{OH}$ + Ammonium phosphate .	white ppt is observed.	magnesium is present.
3.	Fehling's Test:- Honey + 1ml each of fehling's solution A + Fehling's solution B.	red ppt is observed.	reducing sugar is present.
4.	Tollen's test:- Honey + 2-3ml tollen's reagent, test tube in water bath for 10 min.	Shinning silver mirror is present.	Reducing carbohydrate is present.

Substances taken : Honey: Himalaya

s.no	Tests	Observation	Inference
1.	Test for calcium:- Honey + $\text{NH}_4\text{Cl}$ solution + $\text{NH}_4\text{OH}$ solution filtered + Ammonium oxalate solution.	white ppt is observed.	calcium is present.
2.	Test for magnesium:- Honey + $\text{NH}_4\text{OH}$ + Ammonium phosphate .	white ppt is observed.	magnesium is present.
3.	Fehling's Test:- Honey + 1ml each of fehling's solution A + Fehling's solution B.	red ppt is observed.	reducing sugar is present.
4.	Tollen's test:- Honey + 2-3ml tollen's reagent, test tube in water bath for 10 min.	Shinning silver mirror is present.	Reducing carbohydrate is present.



## 8.Result

### **Brand : Lion**

- Calcium is present.
- Magnesium is present.
- Honey contains reducing sugars and carbohydrates.

### **Brand : Apollo**

- Calcium is present.
- Magnesium is present.
- Honey not contains reducing sugars and carbohydrates is present.

### **Brand : Saffola**

- Calcium is present.
- Magnesium is present.
- Honey contains reducing sugars and carbohydrates not present.

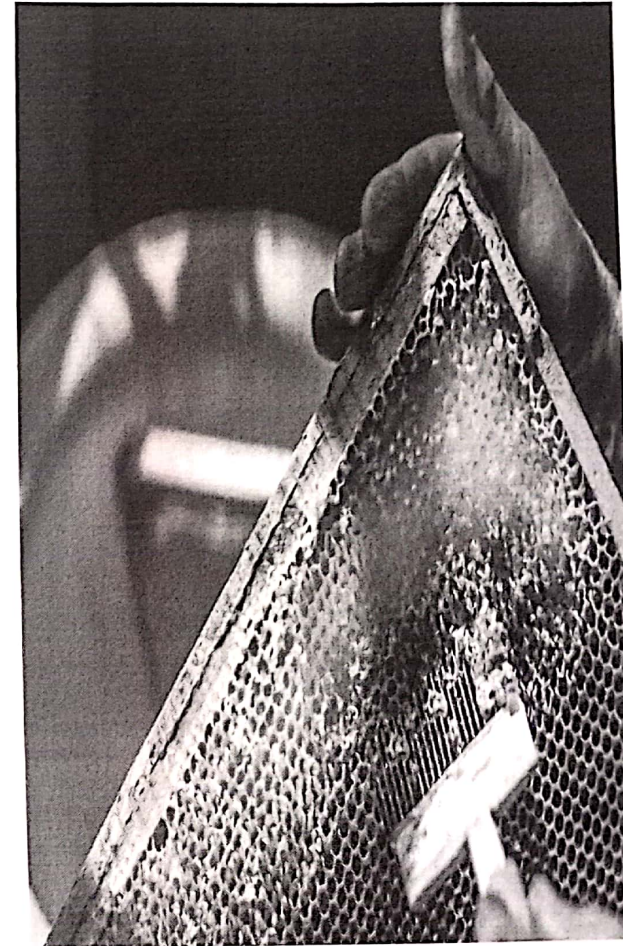


**Brand : Dabur**

- Calcium is present.
- Magnesium is present.
- Honey contains reducing sugars and carbohydrates.

**Brand : Himalaya**

- Calcium is present.
- Magnesium is present.
- Honey contains reducing sugars and carbohydrates.



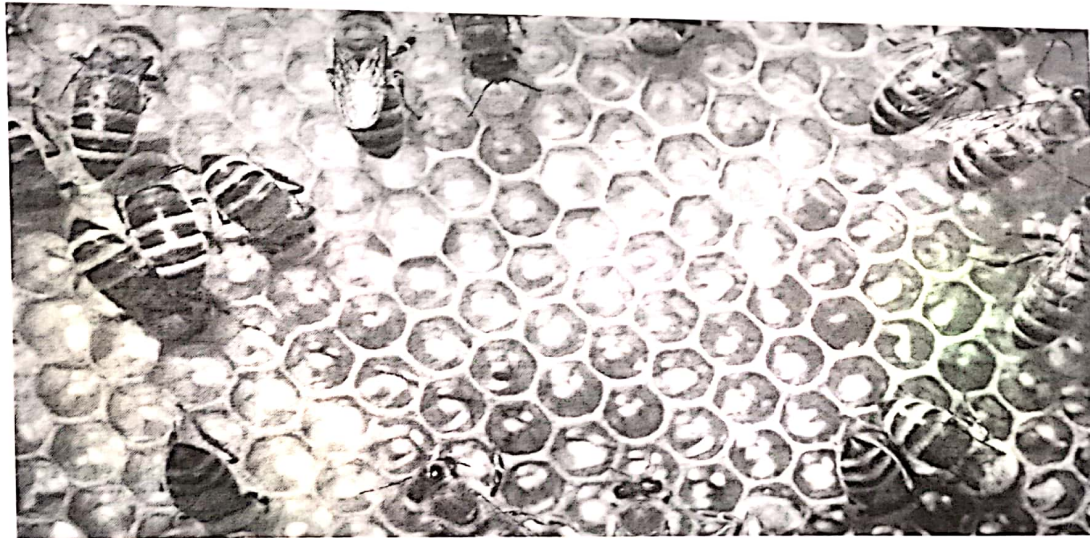
## 9. Conclusion

Production of honey has been the major aim of the industry. Modern bee keeping also includes production of bees wax, bee collected pollen, bee venom royal jelly, s, an also of package bees, queen bees and nucleus colonies.

About 10,000 tons of forest honey are produced annually.

A single worker honey bee can contaminate the whole hive.

Insecticide treatments should not be recommended in plantations and crops during flowering, but at proper time.



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- Google images



SCNM GOVT DEGREE COLLEGE-NARAYANPET

DEPARTMENT OF CHEMISTRY

STUDENT STUDY PROJECT-2022-2023

TOPIC; **A PROJECT ON AMOUNT OF CASEIN IN  
DIFFERENT MILK SAMPLES**

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**DEPARTMENT OF CHEMISTRY**

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## INTRODUCTION

Casein is the protein found in all mammals' milk. Mammals include cow, goat, sheep, yak, buffalo, camel and humans. Milk is a complete diet as it contains minerals, vitamins, proteins, Carbohydrates, Fats and Water.

Casein is the most predominant protein in milk and is a mixed phosphor protein. Casein has an isoelectric pH of about 4.7 can be easily separated around this isoelectric pH. It readily dissolves in dilute acids and alkalis.

## REQUIREMENT

- Beakers (250 ml)
- Filter-paper
- Glass rod
- Weight box
- Filtration flask
- Buchner funnel
- Test tubes
- Porcelain dish
- Different samples of milk
- 1 % acetic acid solution
- Ammonium sulphate solution

## PROCEDURE

1. Wash the beaker (250 ml) with the distilled water and dry it.
2. Take 20 ml of buffalo's milk in 250 ml beaker and find its weight.
3. Add 20 ml saturated solution of ammonium sulphate slowly with stirring. Fat and casein will separate out as precipitate.
4. Filter the above solution and transfer the precipitate in another beaker.
5. Treat the above precipitate with 30 ml distilled water. Casein dissolves forming milky solution whereas fat remains as such.
6. Warm the above contents of the beaker to 40 – 45°C on a low flame. Now, add 1% acetic acid solution drop wise with stirring when casein gets precipitated.
7. Filter the precipitated casein and wash with distilled water and dry it.
9. Find the weight of dry precipitate.
10. Repeat the whole experiment with cow's milk, goat's milk and sheep's milk.

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## RESULT

- Different Samples of milk contains different percentage of casein.
- Highest percentage of casein is present in Goat's milk.



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2023-2024

STUDENT STUDY PROJECT ON

**To study the food adulterants present in chilli powder,  
turmeric powder and sugar**

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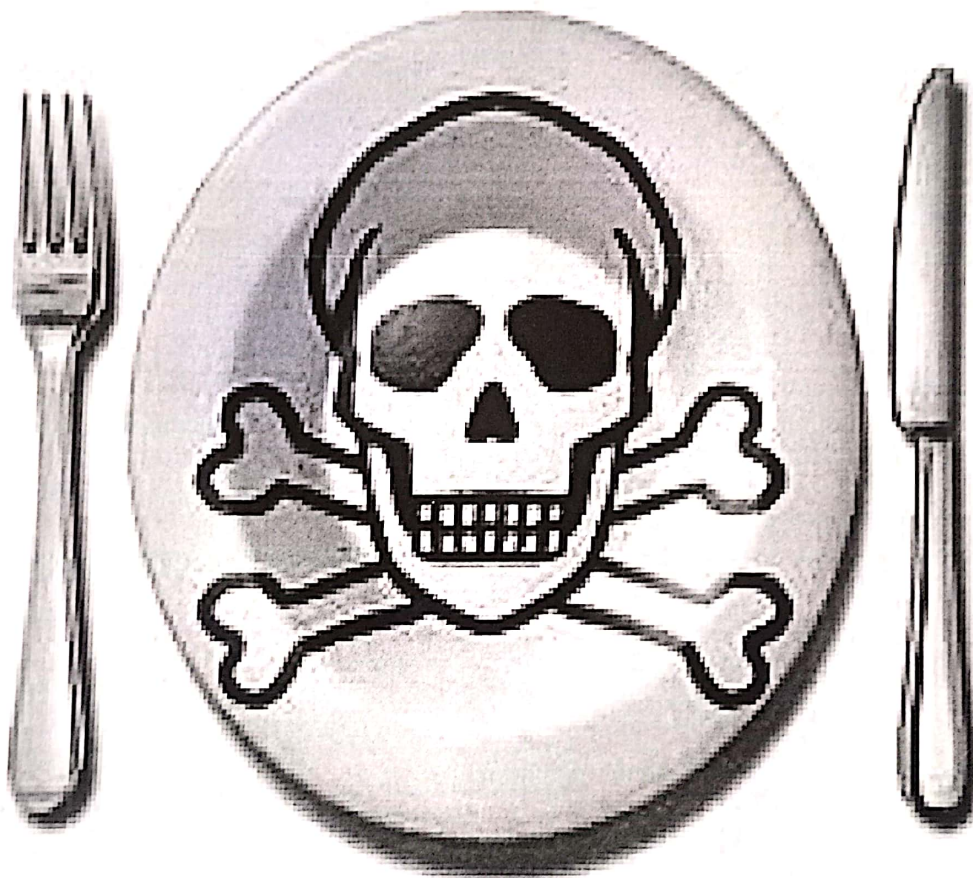
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## OBJECTIVE

The Objective of this project is to study the adulterants present in chilli powder ,turmeric powder and sugar .



## 2 INTRODUCTION

Food is one of the basic necessities for sustenance of life. Pure, fresh and healthy diet is most essential for the health of the people. It is no wonder to say that community health is national wealth. Adulteration of food-stuffs was so rampant, widespread and persistent that nothing short of a somewhat drastic remedy in the form of a comprehensive legislation became the need of the hour. To check this kind of antisocial evil a concerted and determined onslaught was launched by the Government by introduction of the Prevention of Food Adulteration Bill in the Parliament to herald an era of much needed hope and relief for the consumers at large.

About the middle of the 19th century chemical and microscopical knowledge had reached the stage that 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 violation 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, of restaurants, and of 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 a number of States in India for the prevention of adulteration of food-stuffs, 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 food-stuffs 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 all India 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 to 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).

**ACT 37 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 1st 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 preservation of food Adulteration Act. They have 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.

## **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 colored sweets and buy only from reputed shops.
6. Do not buy sweets or snacks kept in open.
7. Avoid buying things from street side vendors.

## THEORY

The increasing number of food producers and the outstanding amount of import 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 one of the serious problems. Consumption of adulterated food causes serious diseases like cancer, diarrhoea, asthma, ulcers, etc.

Majority of fats, oils and butter are paraffin wax, castor oil and hydrocarbons. Red chilli 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 stuffs.

**AGMARK:** 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 commode

## EXPERIMENT I

Aim: To detect the presence of adulterants in sugar.

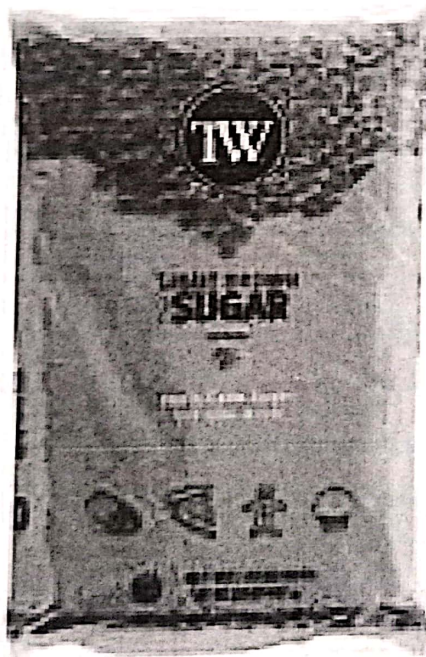
Apparatus : Test Tubes, Dil. HCl, Spatula, Watch glass.

Procedure: Sugar is usually contaminated with washing soda and Chalk Powder, They are Detected as follows,

### I. Adulterants of Chalk powder and washing soda in sugar.

Take small amount of sugar in a test tube, add few drops of dil. HCl

- Small bubbles are observed
- Brisk effervescence of  $\text{CO}_2$  shows the presence of Chalk powder.



## EXPERNIMENT- II

**Aim:** To detect the presence of adulterants in sample of chilli powder

**Apparatus:** Test-tube, spatula, water, watch glass. **Procedure:** common adulterants present in chili powders are brick powder addition of colours, they are detected as follows.

### I. Adulteration of brick powder in chili powder.

Take a test tube, add small amount of chili powder in test tube, now add few quantity of water and shake it. Brick powder settles at the bottom of the test tube.

### II. Adulteration of colour in chili powder.

Take a test tube, add small amount of chili powder in test tube, add few quantity of water and shake it.

Dark red colour is observed.



## EXPERIMENT -III

Aim: To detect the presence of adulterants in sample of turmeric powder.

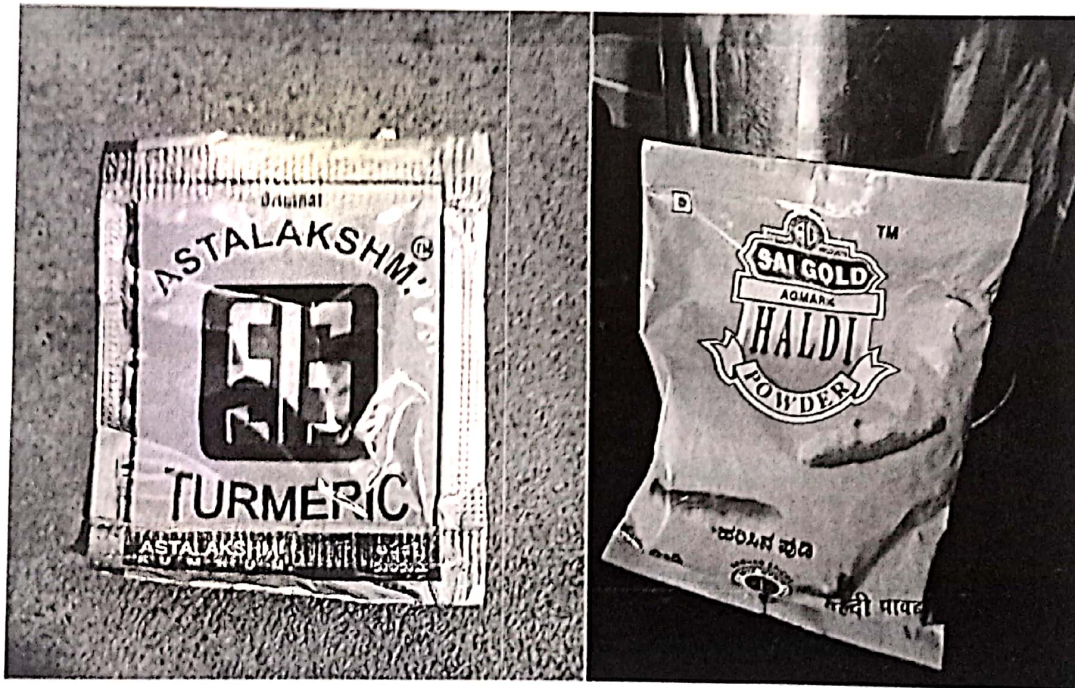
Apparatus: Test tube, water, Conc. Hcl, spatula, watch glass, dropper, test-tube holder.

Procedure : Common adulterant presence in turmeric powder is lead salts, they are detected as follows.

### I. Adulterants of lead salts to turmeric powder.

Take a small amount of turmeric powder in a test tube, add few drops of Conc. Hcl by using dropper.

. Appearance of violet colour shows the presence of lead salts in turmeric powder.



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## OBSERVATIONS

EXPERIMENT NO:	EXPERIMENT	PROCEDURE	OBSERVATION
1.	Adulterants of chalk powder and washing soda in sugar.	Take small amount of sugar in a test tube, add few drops of <b>dill.Hcl</b>	<b>Brisk effervescence is observed.</b>
2.	Adulterants of lead salts to turmeric powder.	Take a small amount of turmeric powder in a test tube, add few drops of <b>conc.Hcl</b>	<b>Dark violet colour is observed.</b>
3.	Adulteration of brie powder in chilli powder.	To a small amount of chilli powder, add few quantity of water.	<b>I.Brie powder settles at the bottom of the test tube</b> <b>II.Dark red colour (Addition of red colour).</b>

**RESULT:** The required analysis for adulterants in chilli powder, turmeric powder and gar has been made.

