CHEMISTRY INVESTIGATORY PROJECT

PROJECT REPORT

Analysis of Honey

Submitted to:

Submitted by:

ARMY PUBLIC SCHOOL AMBALA CANTT

Session 2024-25

CERTIFICATE

This is to certify that this bonafide project work in the subject of Chemistry has been done by

of Class XII in the academic session 2024-25 and submitted to AISSCE Practical Examination conducted by CBSE at Army Public School, Ambala Cantt, on

Teacher In-Charge Principal

Internal Examiner External Examiner

Analysis of Honey

Aim

To analyse a sample of Honey and check for presence of various minerals and carbohydrates.

Requirements

• Test Tubes + Stand
• Burner
• Water Bath
• Picric Acid
• Fehling Solutions A & B
• Ammonium Chloride Solution
• Ammonium Oxalate Solution
• Ammonium Phosphate
• Concentrated Nitric Acid
• Potassium Sulphocyanide Solution
• Tollens’ Reagent

Theory

Honey is a **thick**, **viscous**, **sweet**, **saturated sugar solution** manufactured by bees to sustain and nourish their colonies.

Honey is produced by collecting and processing **organic secretions** such as **nectar** from flowers and **honeydew** from aphids. Refinement is done by **regurgitation** and **enzymatic activity** of the bees, as well as by the **evaporation** of water during storage in the hive, which concentrates the sugars in the honey until it is thick and viscous.

Honey is mainly composed of **fructose**, **glucose** and **water** in varying proportions. **15 mL** of honey provides around **190 kilojoules** of energy. It has useful chemical properties for **baking** and has a distinct flavor when used as a **sweetener** for other foods. It is a hostile environment for microorganisms, due to which **it doesn't spoil easily**.

Procedure

Testing for Minerals:

1. ***Testing for Potassium***
2 mL of Honey is taken in a test tube and **picric acid solution** is added. **Yellow precipitate** indicates presence of K^+.

2. ***Testing for Calcium***

2 mL of Honey is taken in a test tube. **NH_4Cl solution** and **NH_4OH solution** are added to it. The solution is **filtered** and to the filtrate, 2mL of **Ammonium Oxalate solution** is added. **White precipitate** or **milkiness** indicates presence of Ca^{2+} ions.

3. ***Testing for Magnesium***
2 mL of Honey is taken in a test tube. **NH_4Cl solution** is added to it, along with **excess of Ammonium Phosphate solution**. The sides of the test tube are then **scratched** with a glass rod. **White precipitate** indicates presence of Mg^{2+} ions.

4. ***Testing for Iron***
2 mL of Honey is taken in a test tube. A drop of **concentrated HNO_3** is added, and then **heated**. It is **cooled** and 2-3 drops of **Potassium Sulphocyanide** solution is added to it. **Blood red color** indicates the presence of iron.

Testing for Carbohydrates:

1. ***Fehling's test***
2 mL of Honey is taken in a test tube. 1 mL each of **Fehling's solutions A and B** are added to it and boiled. **Red precipitate** indicates the presence of Reducing sugars.

2. ***Tollens' test***
2-3 mL of aqueous solution of Honey is taken in a test tube. 2-3 mL of **Tollens' reagent** is added. The tube is then kept in a **boiling water bath** for ~10 minutes. A **shining silver mirror** indicates the presence of Reducing carbohydrates.

Observations

S. No.	*Test*	*Observation*	*Inference*
1	Test for **Potassium**: Honey + Picric Acid Solution	Yellow Precipitate is **observed**.	Potassium is **present** in Honey.
2	Test for **Calcium**: Honey + NH_4Cl solution + NH_4OH solution, Filtered + $(NH_4)_2C_2O_4$	White Precipitate or Milkiness is **NOT observed**.	Calcium is **not present** in Honey.
3	Test for **Magnesium**: Honey + NH_4OH (Till solution becomes alkaline) + $(NH_4)_3PO_4$	White Precipitate is **NOT observed**.	Magnesium is **not present** in Honey.
4	Test for **Iron**: Honey + conc. HNO_3 (Heating and cooling) + Potassium Sulphocyanide	Blood red colour is **observed**.	Iron is **present** in Honey.
5	**Fehling's Test**: Honey + 1mL Fehling's Solution A + 1 mL Fehling's Solution B	Red Precipitate is **observed**.	Reducing sugars are **present**.
6	**Tollen's Test**: Aq. Solution of Honey + 2-3 mL Tollens' reagent, test tube in boiling water bath for ~10 minutes	Shining silver mirror is **observed**.	Reducing Carbohydrates are **present**.

Result

From these tests, we can conclude that Honey

- Contains Potassium
- Contains Iron
- Contains Reducing Sugars
- Contains Reducing Carbohydrates
- Does not contain Calcium
- Does not contain Magnesium.

Bibliography

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