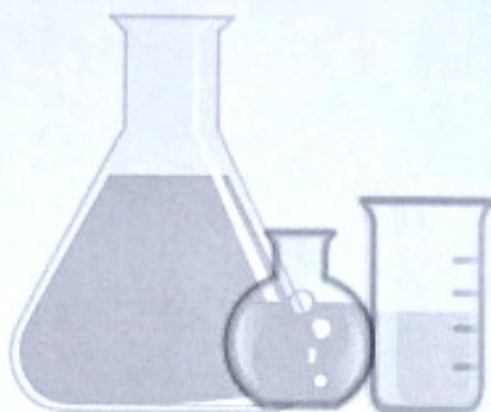


**TELANGANA TRIBAL WELFARE
RESIDENTIAL DEGREE COLLEGE
(GIRLS), MAHABUBABAD**



(BATCH: 2022-2023)

**CHEMISTRY PROJECT
ANALYSIS OF HONEY**

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STUDENT'S STUDY PROJECT



Topic: Analysis of Honey

Academic Year: 2022-2023

Undertaken by K. Prafulla

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AIM

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



REQUIREMENTS

APPARATUS:

- * Test Tube
- * Test Tube Stand
- * Burner
- * Water Bath

CHEMICALS:

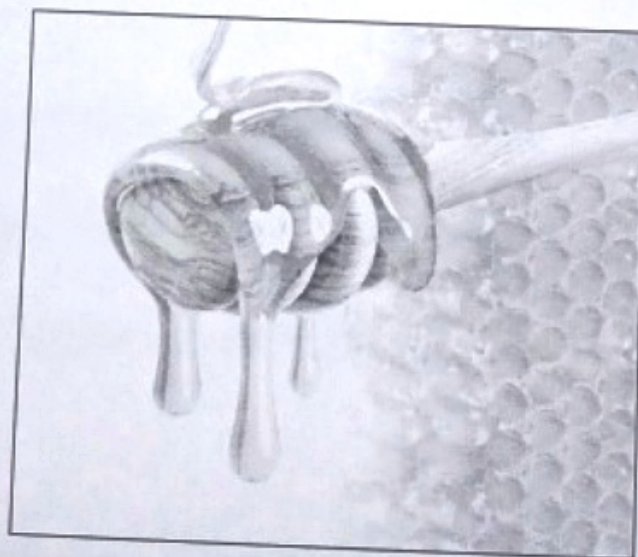
- * Fehling Solution A
- * Fehling Solution B
- * Ammonium Chloride Solution
- * Ammonium Oxalate Solution
- * Ammonium Phosphate
- * Concentrated Nitric Acid
- * Potassium Sulphocyanide Solution

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 & flavour 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.

Honey has a fuel value of about **3307 cal/kg [1520 cal/lbs]**. It readily picks up moisture from the air and is consequently used as a moistening agent for Tobacco and in baking. Glucose crystallizes out of honey on standing at room temperature, leaving on uncrystallised layer of dissolved fructose. Honey to be MARKETED is usually heated by a special process to about **66 °C [150.01°F]** to dissolve the crystals and is sealed to prevent crystallization. The fructose in crystallized honey ferments readily at about **16°C**.



PROCEDURE

TEST FOR MINERALS

1. Test for Potassium:

2ml of honey is taken in a test tube and picric acid solution is added. Yellow precipitate indicates the presence of K^+ .

2. Test for Calcium:

2ml of honey is taken in a test tube and NH_4Cl solution and NH_4OH solutions 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 Ca^{2+} ions.

3. Test for Magnesium:

2 ml of honey is taken in a test tube and NH_4Cl 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 precipitate indicates the presence of Mg^{2+} ions.

4. Test for Iron:

2ml of honey is taken in a test tube and a drop of conc. NH_3 is added and it is heated. It is cooled and 2-3 drops of Potassium sulphocyanide solution is added to it. Blood red colour shows the presence of iron.

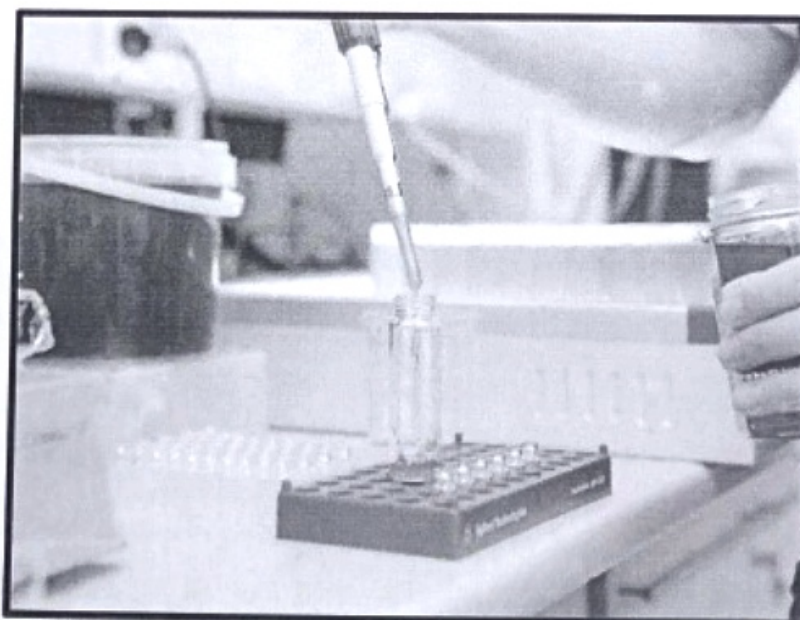
TEST FOR CARBOHYDRATES

1. Fehling's test:

2ml of honey is taken in a test tube and 1ml each of Fehling's solution A and Fehling's solution 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. 2-3ml of Tollens' 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.



OBSERVATION TABLE

S. NO	TESTS	OBSERVATION	INFERENCE
1	Test for Potassium Honey + Picric acid solution	Yellow ppt. is observed	Potassium is present
2	Test for Calcium Honey + NH_4Cl soln. + NH_4OH soln. filtered + $(NH_4)_2C_2O_4$	White ppt. or milkiness is not observed	Calcium is absent
3	Test for Magnesium Honey + NH_4OH (till solution become alkaline)	White ppt. is not observed	Magnesium is absent
4	Test for Iron Honey + conc. NH_3 heated and cooled + potassium sulphocyanide	Blood red colour is observed	Iron is present
5	Fehling's Test Honey + 1ml each of Fehling's soln. A and Fehling's soln. B	Red ppt. is observed	Reducing sugar is present
6	Tollens' Test Honey + 2-3 ml Tollens' reagent, test tube in water bath for 10 minutes	Shining silver mirror is observed	Reducing carbohydrate is present

RESULT

- Potassium is present
- Iron is present
- Calcium is absent
- Magnesium is absent
- Honey contains reducing sugar
- Reducing carbohydrate is present

Benefits of Consuming Honey

Consuming honey offers a wide range of health benefits, making it a popular and versatile natural sweetener. Here are some of the benefits of consuming honey:

- ⊙ **Nutrient-rich:** Honey is not just a source of natural sweetness; it also contains small amounts of vitamins and minerals, including vitamin C, calcium, and iron.
- ⊙ **Antioxidant properties:** Honey is rich in antioxidants, such as flavonoids and phenolic compounds, which can help protect your cells from damage caused by free radicals. This may reduce the risk of chronic diseases.
- ⊙ **Cough and throat relief:** Honey has been used for centuries as a natural remedy for soothing sore throats and coughs. It can help alleviate irritation and reduce coughing.
- ⊙ **Wound healing:** Honey has antimicrobial properties and can be used topically to help heal minor wounds, burns, and abrasions. It creates a protective barrier and promotes tissue regeneration.
- ⊙ **Allergy relief:** Some people believe that consuming local honey can help reduce seasonal allergy symptoms, as it may expose the immune system to small amounts of local pollen, helping the body build tolerance.
- ⊙ **Energy source:** The natural sugars in honey, primarily fructose and glucose, provide a quick and easily digestible source of energy, making it a great choice for athletes and those needing a quick energy boost.

- ⊙ **Weight management:** Honey can be used as a healthier alternative to refined sugar in moderation. It can satisfy sweet cravings while providing more nutrients and a lower glycaemic index, which can help with weight management.
- ⊙ **Digestive health:** Honey may have mild laxative properties and can help alleviate constipation. It also promotes the growth of beneficial gut bacteria.
- ⊙ **Skin benefits:** Honey can be used in skincare routines to moisturize, cleanse, and exfoliate the skin. Its antimicrobial properties can help with acne and other skin conditions.
- ⊙ **Antimicrobial effects:** Honey's natural antibacterial and antifungal properties make it a valuable ingredient for combating infections and promoting overall oral health.
- ⊙ **Improved sleep:** Consuming honey before bedtime may help improve sleep quality, as it can raise insulin levels and allow tryptophan (a precursor to serotonin and melatonin) to enter the brain more easily.
- ⊙ **Heart health:** Some studies suggest that honey may help improve heart health by reducing LDL cholesterol levels and lowering blood pressure.

It's important to note that while honey offers various health benefits, it should be consumed in moderation, as it is still a source of calories and sugars. Additionally, children under one year of age should not consume honey due to the risk of infant botulism. Always choose raw, unprocessed honey for the most health benefits, as processing can destroy some of its beneficial compounds

CONCLUSION

Upon comprehensive analysis of the honey samples, it is evident that honey is not just a simple sweetening agent but a complex substance composed of a myriad of essential minerals and diverse carbohydrates. The presence of these constituents' underscores honey's potential health benefits and its importance as a dietary supplement. Minerals detected include potassium, and trace elements like zinc, selenium, and iron, which play pivotal roles in human health. The carbohydrate profile was predominantly made up of fructose and glucose, with traces of maltose and sucrose, underlining honey's rapid energy-releasing properties. The variations in mineral and carbohydrate concentrations among the samples can be attributed to the nectar source and the environmental conditions of the bees. In conclusion, this analysis underscores the richness of honey in essential minerals and carbohydrates, making it a potent natural product that offers both nutritive and therapeutic values. Future studies might further delve into the benefits of these constituents in promoting human health and well-being.

PRECAUTION

1. Wear appropriate safety gear, including lab coat, gloves, and safety goggles, as picric acid can be hazardous to skin and eyes.
2. Perform the test in a well-ventilated area or under a fume hood to avoid inhaling any potentially harmful fumes.
3. Be cautious when handling picric acid. It should be stored and handled according to safety regulations. Do not touch it with bare hands.
4. Ensure proper filtration of the solution to separate the precipitate. Use a suitable filter paper and funnel for this purpose.
5. Handle ammonium chloride and ammonium hydroxide with care. These chemicals may emit ammonia gas, which can be harmful if inhaled in large quantities.
6. Ensure proper filtration of the solution to separate the precipitate. Use a suitable filter paper and funnel for this purpose.
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