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Chemical analysis and bio-chemical composition of natural honey collected in and around Agraharam Rajanna Sircilla (Dist), Telangana State, India

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Abstract
The essential components of honey are sugar and water. In addition to carbohydrates, honey contains several vitamins, particularly the B complex and vitamin C, as well as many minerals, including calcium, copper, iron, magnesium, manganese, phosphorus, potassium, and zinc. Since ancient times, honey has been used for its therapeutic, dietary, and healing benefits. Due to its distinctive qualities, which are attributable to the effect of the many groups of compounds it contains, natural honey is one of the most popular products. Honey is used for nutritional, medicinal, and industrial purposes and it is an important commodity in the international market, serving as foreign exchange earner for many countries. The precise chemical composition and physical properties of natural honeys differ according to the plant species on which the bees forage. Differences in climatic conditions and vegetation are also important factors that can affect the various properties of Honey. This review covers the composition, physiochemical properties, and the most important uses of natural Honey in human diseases.
Objectives: 1) To Evaluate the Physicochemical characteristics (pH, Electrical conductivity) 2) To determine the mineral composition (Carbohydrates, Proteins & Vitamins). 3) To estimate the metal composition (Na, K, Fe, Ca & Zn). 4. To identify phytochemical components.

Keywords: Honey, physicochemical & phytochemical parameters, mineral & metal composition

Introduction
Natural honey is one of the most widely sought products due to its unique nutritional and medicinal properties, which are attributed to the influence of the different groups of substances it contains.
Constituents of Honey: Honey is a complex mixture of 82.0% carbohydrates (sucrose, fructose, maltose), 0.3% protein, 17.0% water and 0.7% minerals, vitamins, and antioxidants. Apart from sugars, honey also contains several vitamins, especially-B complex and vitamin C. While minerals such as calcium, copper, iron, magnesium, manganese, phosphorus, potassium, and zinc are also present.
The physical properties of Honey vary, depending on water content, the type of flora used to produce it (pasturage), temperature and the proportion of the specific sugars it contains. Fresh honey is a supersaturated liquid, containing more sugar than the water can typically dissolve at ambient temperatures.

Uses of Honey
Heal Wounds & Burns: Honey works as a natural antiseptic by simply apply the affected area on a cut or a burn.
Soothe Sore Throats and Coughs: Combine honey with the juice of one lemon and drink. It works like a wonder.
Remove Parasites: Combine equal parts honey, vinegar and water and drink. The combination of these three ingredients is the perfect parasite killer.
Moisturize Dry Skin: Honey is a fantastic moisturizer, especially on dry patches, like elbows, hands and lips. Rub onto your dry, patchy skin and let it sit for about 30 minutes before washing off. Honey also makes a great lip balm.
Condition Damaged Hair: Honey is a great natural conditioner.
Boost Your Energy: Replace your daily cup of coffee with a cup of tea instead of turning to coffee. About a tablespoon of honey should be added.

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Materials and Methods
Study area: Samples are collected from the Agraharam, Chandrampet, Kollanur, Ramanapet which are situated in Rajanna Sircilla Dist. Sircilla is located at 18.38°N 78.83°E. It has an average elevation of 322 meters (1056 feet).

It is located 130 kms north to Secunderabad, 40 km west to Karimnagar, 38km north to Siddipet and 56 km east to Kamareddy. It is 10 km away from the historic Vemulawada temple town.

Methods
Various Techniques were used to analyze the Honey samples. Hanan pH meter was used to determine pH, colorimeter was used to determine composition of Iron.

Collection of samples
Honey samples were collected freshly in sterile containers from the Agraharam, Chandrampet, Narayanaraopet. All samples were collected freshly in sterile containers (level with numbers, place, and date of collection) and stored at ambient temperature until analyzed. Unwanted material such as wax sticks, dead bee, and particles of combs were removed by straining the samples through cheesecloth before analysis.

Preparation of sample solution

5 g of sample accurately weighted by using analytical balance and transferred into crucible. The sample in the crucible was heated in the fuming cupboard until the ash appears and transferred ash in the beaker and added 50 mL of distilled water. In the fuming cupboard, added 5 mL of conc. HNO_3 to the beaker continue heating until the total volume in the beaker reached to half. After cooling, added 1 mL of conc. HNO_3. Filter the solution in the 100 mL volumetric flask and added the distilled water until the mark.

Qualitative analysis of carbohydrates
Fehling test: Equal volume of Fehling's A & B are mixed and add 2 mL of this mixture was added to sample solution and gently test tube boiled. A brick red precipitate was observed at the bottom of test tube which indicates the presence of reducing sugars.

Qualitative analysis of Phytochemical Component: For qualitative analysis of phytochemical components based on standard procedures were used to test the existence of alkaloids, cardiac glycosides, flavonoids, phenols, saponins, tannins, terpenoids, quinones and proteins.

Results and Discussion

Table 1: Physicochemical parameters of various Honey samples

Parameter	Sample No.				
	1	2	3	4	5
pH	4.75	4.72	4.25	4.75	4.77
Taste	Excellent	Excellent	Excellent	Excellent	Excellent
Odour	Excellent	Excellent	Good	Excellent	Excellent
Colour	Dark brown	Light brown	Water white	Dark ember	Light ember
Electrical Conductivity (us/cm)	0.35	0.37	0.27	0.35	0.36

Table 2: Iron content in various samples

Sample no	Amount of Iron (mg)
1	0.1
2	0.09
3	0.11
4	0.12
5	0.13

Table 3: Phytochemical components of various Honey samples

Phytochemical component	Sample No				
	1	2	3	4	5
Carbohydrate	+	+	+	+	+
Alcoloid	+	+	+	-	-
Flavonoids	+	-	+	-	+
Terpenoids	-	-	+	+	+
Phenolic Compounds	-	-	+	+	+
Tannins	+	+	+	-	+
Saponins	+	+	-	-	+
Phlobatannins	+	+	+	+	-
Steroids	+	+	+	+	+
Anthraquinones	-	-	-	+	+
Glycosides	+	+	+	+	+

Table 4: Solubility & Purity

Heating	No colour change		Notice brown colour	
Purity (%)	100		95	
Solubility	Cold	Hot	Cold	Hot
Distilled water	Insoluble	Soluble	Soluble	Soluble
Methanol	Insoluble	Insoluble	Insoluble	Insoluble
Chloroform	Insoluble	Soluble	Insoluble	Soluble

Conclusions and Suggestions
The physicochemical properties of honey samples obtained from the same environmental and geographical area to evaluate their global behavior in comparison with other reported honey samples around the globe. The percentage water content was an important parameter used to access quality of honey samples. It was found that percentage water content could serve as an indicator to detect an artificial honey sample disguised as a natural honey sample. The results of the study indicated the variability in honey sample analysis test. Analysis of honey sample revealed that floral source and environmental conditions has an important role in quality parameters pertaining to processing and storage. This study demonstrated that the honey samples varied significantly. The studied samples are found to be in low moisture content and therefore safe for fermentation. The obtained results could be used for processing, product development and storage of honey and honey products. These results indicate a high quality of honey, which is needed for medicinal treatment and international trade.

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