

Honey With Purpose: Evaluating Brands Through Quality and Sustainability

Ms. Priyanka R. Patel¹, Mr. Nandkishor S. Sangle²

^{1,2} Department of Physics, B. N. Bandodkar College of Science (Autonomous), Thane
nssangle@vpmthane.org

Abstract:

The determination of honey purity is critical for ensuring quality and authenticity in the food industry. This study explores various physical tests employed to assess the purity of honey. Physical properties such as colour, density, velocity of ultrasound, refractive index, PH value and added sugar are measured and analysed to determine the correlation with the purity of honey. This study uses the refractive index, ultrasonic sound velocity, cold water test, PH and Sulphuric acid test as effective methods for determining the purity of honey. Refractive index values were obtained using a spectrometer and refractometer, while ultrasonic sound velocity was measured with an ultrasonic interferometer, sulphuric acid test for identification of the sugar and PH meter used for determining the value of PH. These techniques were applied to a variety of honey samples with different company brand of honey. The results revealed a clear correlation between refractive index values and honey purity, with adulteration leading to measurable shifts in both refractive index, sound velocity and acid test. This non-destructive, cost-effective approach could serve as an efficient quality control tool for honey authenticity testing. The results from these tests can be used to establish quality standards for honey and to detect fraudulent practices in the market.

Further more research highlights importance of promoting sustainability beekeeping practices and making hive sensors that provides an idea for creating comfort environment for bees which not only enhanced honey quality of commercial products but also plays major role as pollinators that essential for good cultivations.

Keywords: Density, Velocity of Ultrasound, Refractive Index, PH, Sustainability Beekeeping, Pollination.

Introduction:

In recent years ,the purity of honey has gained significant attention due to concerns over adulteration and impact of commercials practices on quality of INDIAN HONEY BRANDS

Our motive is for starting research stem for how these companies can enhance their quality over adulterated practice though sustainable way by promoting bee keeping practice. And making honey hive sensors to monitoring the outer and inner environment which comforts bees for cultivating honey , Beekeeping practice initiates since from our ancestors ,Slovenia is the one of no. 1 country in World for beekeeping practice purpose even though not environmental support ,But in India's northern side specially where beekeeping practice can be succeed, According to report published by BEEKEEPING DEVELOPMENT COMMITTEE on 2023 ,there are 2.3 Million honeybee colonies are there and registered 9000 professional beekeepers only ,here we get proper idea that how this profession needs

to be increased, this practice not only ensures the cultivation of honey ,but also helps to survive food system. Human existence is next to impossible without bees , via pollination process 1/3rd food production of world depends on bees.

Materials and Methods:

In this research, we utilized various materials and methods to access the purity and quality of honey ,the primary materials include

1. **Honey samples-** We collect samples of famous Indian commercial honey brands such as PATANJALI HONEY ,PPHONDAGHA(PHARM HONEY) SAFFOLA HONEY, BAIDYANATH(NAGPUR), DABUR ,& NATURAL HONEY.

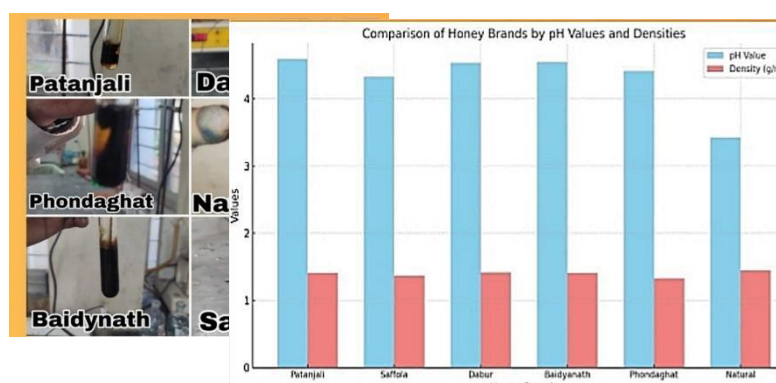
• TEST WE CONDUCTED ON SUCH HONEY BRANDS GIVEN BELOW-

2. **Refractometer test-** This instrument is used to measure the moisture content of honey samples provides the accurate reading helps to determine quality of honey ,as higher the refractive index pure the honey is.
3. **PH Value test-** Here we used PH meter which measures the acidity level typically has PH of honey ranges between 3.2-4.5 and deviation from this range can indicate adulteration
4. **Sulphuric acid test –** This chemical test was performed to identify the quantity of sugar present in honey samples, when sulphuric acid reacts with adulterated honey it turns honey blackish ,darker the black color indicates higher the artificial sugar contents
5. **Density test –**Higher the density , Higher the **purity**.

Sr no.	Honey brands	Refractive index	PH value	Density
1.	NATURAL RAW HONEY	1.7032 (18.6%)	3.43	1.45 g/cm ³
2.	SAFFOLA HONEY	1.61428 (17.6%)	4.33	1.37 g/cm ³
3.	BAIDYANATH (NAGPUR) HONEY	1.4854 (16.2%)	4.55	1.41 g/cm ³

4.	PATANJALI	1.6832 (17.5%)	4.60	1.41 g/cm ³
5.	PHONDAGHAT (PHARM HONEY)	1.4654 (16%)	4.42	1.33 g/cm ³

Methodology involved systematically testing each honey samples using above materials, each test was repeated multiple times to ensure accuracy and reliability of results.



Result:

In our exploration of honey quality and critical role of beekeepers, we have uncovered fascinating insights highlighting importance in natural and commercial honey.

Rigorous testing methods include pH value, sulphuric acid test, refractive index, ultrasound. Overall, natural honey often maintains higher quality standards.

By choosing honey from brands that prioritize quality and sustainability, we can make a positive impact on the environment and even support the vital work of beekeepers. By ensuring the roles of pollination and food.

Discussion:

From the above test we conducted, NATURAL RAW HONEY is almost always high in density, refractive index, and moisture content and also low in pH value as it is high in acidic nature, while other INDIAN COMMERCIAL HONEY BRANDS actually failed somewhere. But if somehow we compared honey brands within it, we get SAFFOLA AND PATANGALI as less adulterated and may be a good option.

And for innovative purpose and for future aspect for more honey production, human minds can make sensors called hive sensors which monitor the outer and inside environmental conditions. A smart sensor system for bee hive monitoring for measuring parameters related to temperatures, CO₂ inside, weight of hives, and sounds etc. Though all this, beekeepers ensure the cultivation of honey. This also has been mentioned in A SMART SENSOR SYSTEM OF BEE HIVE, Written by :- Stefania Vecchi, Susanna Spinsante (in their Research paper).

Conclusion:

Though the methodology we get the amounts of adulterations in different Indian Honey brands where all of them. Needs to improve their quality through sustainability practices. All this study reveals stark contrast between natural and commercial honey which somewhere faltered in quality assessment, as we face challenges in the honey market, it becomes increasingly clear to supporting natural honey and essential for maintaining the health of our ecosystem, ensuring high quality products, this not only reinforces the value of natural honey but also calls for collective efforts to promote sustainable beekeeping practices. We can safeguard the future of this vital resource (honey)

Bee decline can be a direct threat to crop production.

References:

1. "Honey adulteration and corporate irresponsibility in India" By:- **'BISHNUPRASAD MOHAPATRA'**
2. "Honey quality and international regulatory standards" By :- **'S.BOGDANOV, C.LULLMANN, P.MARTIN'**
3. "Consideration factors influencing the success of beekeeping programs in developing countries" By:- **'C.NAT SCHOUTEN, TAYLOR AND FRANCIS'**
4. "A smart sensor based measurement system for advanced bee hive monitoring" By:- **'S.cecchi, S.Spinsante'**

~*~*~*~*~*~*~