



Beyond Sweetness: Comprehensive Sensory Profiling of 16 Texas Honey



Samantha Chapa, Gabriella Hicks, Michael Frei
The University of Texas at San Antonio, San Antonio TX, 78249

Abstract

Sensory analysis was conducted on sixteen Texas honey samples to investigate potential correlations between taste profiles and geographical origin. All samples were sourced from Texas and analyzed in an attempt to discern the relationship between taste characteristics and geographical proximity. Factors such as botanical origins, weather conditions, beekeeper practices, and bee species contribute to the diverse sensory profiles observed across samples. Interestingly, no consistent pattern emerged linking taste profiles to geographical locations. While similarities were observed between color and taste notes, it remains uncertain whether these similarities stem from geographical origin or other factors such as environment or chemical makeup. The study underscores the complexity of honey sensory analysis and emphasizes the need for further research in this area. Differences in taste perception among individuals, timing of sampling in relation to food consumption, and researcher-related variables may introduce variability in sensory data. To minimize error, strict protocols should be followed, including abstaining from aromatic foods, ensuring adequate rest, and maintaining consistency in tasting conditions. This study, conducted by researchers with limited experience in honey sensory analysis, serves as an initial exploration into the sensory profiles of Texas honey. Future research should address identified limitations and explore the potential for targeted marketing based on sensory characteristics, thus supporting both consumers and local beekeepers as well as foster growth in the honey industry.

Introduction

Honey is beloved by many, not only because of its sweet taste, but also because honey is used for its nutritional and functional properties.¹ At its simplest, honey is made up of a complex mixture of carbohydrates, water, and phenolic compounds.² honeys that are available commercially, differ in quality on account of factors such as geographical origin, floral source, packaging quality, storage period, season during harvest and processing conditions.³ It is known that honey from particular floral sources has specific sensorial characteristics, in terms of color, texture, aroma and flavor with unique physicochemical properties (pH, electrical conductivity, ash, acidity, moisture, reducing sugars and protein content etc.).⁴ Notably, honeys are a well-known remedy against numerous diseases due to the physicochemical properties they possess.⁵ With this in mind, it is no surprise that the variety of honey can be overwhelming for consumers looking to purchase honey for their favorite meals or to simply satisfy their sweet tooth. This might cause one to ponder whether honey sourced from beekeepers geographically close to one another would have similar aromas, tastes, and smells. It is hypothesized that, if these honey samples were collected from similar geographic locations, then they will have nearly identical sensory profiles, because of the nearly identical environmental conditions they are sourced from.



Objective

This research aimed to create sensory profiles for 16 honey samples from local Texas beekeepers. This study is significant because other studies have not been conducted with the aim to create sensory profiles for Texas honeys.

Sensory analysis and the creation of sensory profiles can be used to provide beekeepers information that is essential for the packaging of honey. Information like taste profile and honey characteristics can be used to inform consumers, helping them make decisions on the honey that is right for them.

Materials and Methods

Assessors should abstain from any highly aromatic odors or strong flavors that can alter sensory analysis. Assessors must not smoke, consume chocolate, use toothpaste, mouthwash, or perfumes. Assessors will be limited to tasting a maximum of 7 samples per day to prevent sensory fatigue. There should be 30 minutes between each sample tasting. Any tasting must take place at least 2 hours after meals. Order of sample tasting should vary between assessors. Assessors will only taste the honey using disposable spoons and must use distilled water to cleanse the palate between samples. Tasters may employ a 'yes/no' classification method to identify attributes related to odor, aroma, families, subfamilies, trigeminal sensations, and salt perception. Our honey aroma wheel for Texas honeys was constructed using the odor and aroma wheel created by American Honey Tasting Society in 2013.⁶



Figure 1: A map of Texas indicating the locations from which we collected our 16 honey samples.

Results

Table 1: Sensory Analysis Profiles of Sixteen Texas Honey Samples of Differing Geographical Location

Honey #	Honey Origins	Color	Aroma	Flavor	Texture
11	Wildflower	Extra Light Amber	Warm: Lactic	Fruit: Dried	Viscous
12	Wildflower	White	Molasses, Barnyard	Fruit: Dried	Fluid
13	Wildflower	Amber	Warm: Nut	Warm: Carmel	Viscous
15	Wildflower, Horsemint	Light Amber	Sulfur	Chemical: Petrochemical	Fluid
16	Tallow	Amber	Spoiled: Earthy	Warm: Caramel	Moderately Viscous
22	Mixed Wildflower	Light Amber	Fruity: Dates	Fruit: Dried	Fluid, Fine Crystals
32	Mesquite, Native Wildflowers	Extra Light Amber	Spoiled	Warm: Burnt	Moderately Viscous
37	Oak Cedar Elm	White	Earthy, Buckwheat	Warm: Caramel: Butterscotch	Viscous
48	Oaks, Four-Nerve Daisy, Bee Balm, Indian Blanket	Light Amber	Molasses	Warm: Nut	Fluid
52	Beebalm, Sunflower, Mesquite	White	Barnyard	Woody: Resinous	Viscous
96	Texas Wildflowers	White	Waxy	Warm: Carmel Fruit: Fresh	Viscous, Large Crystals
97	Mesquite	Extra Light Amber	Dried Fruit, Dates	Fruit: Citrus	Extremely Viscous, Large Crystals
106	Horsemint	Extra Light Amber	Fermented, Dry Fruit	Fruit: Berry	Fluid
109	Snow on the Prairie and Forest	Amber	Chemical: Medicine	Chemical: Medicine	Moderately Viscous
117	Neighborhood Wildflowers	Light Amber	Brown Raisins	Woody: Dry	Moderately Viscous
118	Horsemint	Amber	Fruit: Dried	Chemical: Medicine	Fluid

The Texas honeys tested in this study presented a variety of different origins, colors, aromas, flavors and textures.

Conclusions

Our sensory analysis of the sixteen Texas honey samples revealed no discernible correlation between sensory profiles and geographic origin. Despite all samples being sourced within Texas, numerous variables present in each location, including botanical origins, weather conditions, beekeeper practices, and bee species contribute to the diverse sensory characteristics observed.

References

- [1] María Inés Isla, Ana Craig, Roxana Ordoñez, Catiana Zampini, Jorge Sayago, Enrique Bedascarrasbure, Alejandro Alvarez, Virginia Salomón, Luis Maldonado, Physico-chemical and bioactive properties of honeys from Northwestern Argentina, *LWT - Food Science and Technology*, Volume 44, Issue 9, 2011, Pages 1922-1930, ISSN 0023-6438, <https://doi.org/10.1016/j.lwt.2011.04.003>. (<https://www.sciencedirect.com/science/article/pii/S0023643811001289>)
- [2] Frasco, D., Scientific, T. F., & Amber, L. (2018). Analysis of honey Color and HMF Content using a GENESYS UV-Visible Spectrophotometer. Thermo Fisher Scientific Inc.
- [3] Anupama, D., K.K. Bhat, V.K. Sapna. Sensory and physico-chemical properties of commercial samples of honey, *Food Research International*, Volume 36, Issue 2, 2003, Pages 183-191, ISSN 0963-9969, [https://doi.org/10.1016/S0963-9969\(02\)00135-7](https://doi.org/10.1016/S0963-9969(02)00135-7). (<https://www.sciencedirect.com/science/article/pii/S0963996902001357>)
- [4] Kumar, A., et al. (2019). "Sensorial and physicochemical analysis of Indian honeys for assessment of quality and floral origins." *Food Res Int* 108: 571-583.
- [5] Starowicz, M., et al. (2021). "Characterizing the Volatile and Sensory Profiles, and Sugar Content of Beeswax, Beebread, Bee Pollen, and Honey." *Molecules* 26(11).
- [6] Piana, M. L., et al. (2004). "Sensory analysis applied to honey: state of the art." *Apidologie* 35(Suppl. 1): S26-S37.

Acknowledgements

We extend our sincere gratitude to Dr. Ferhat Ozturk, Dr. Laura Stan, and our Teaching Assistants for their invaluable guidance, constant availability, and continuous support throughout the duration of this research endeavor. It is through their dedication and assistance that this project has achieved its intended objectives and realized its full potential.

