AMERICAN JOURNAL OF BIODIVERSITY
https://biojournals.us/index.php/AJB
ISSN: 2997-3600

The Effect of Bitter Wormwood (Artemisia Absinthium L.) on The Chemical Composition of Honey

Karilova Marjona Furqat qizi[1], Xo'jayeva Komila Shavkat qizi[2], Ibragimov Furqat Buriyevich*[3], Dildora Nasimova Rayimjonovna*[4]
1,2. Student, Samarkand State University of Veterinary Medicine, Animal Husbandry and Biotechnology
3. Scientific Supervisor, Samarkand State University of Veterinary Medicine, Animal Husbandry and Biotechnology
4. Assistant, Samarkand State University of Veterinary Medicine, Animal Husbandry and Biotechnology
*Correpondance: fibragimov@ssuv.uz[3], nasimova6446@gmail.com[4]

Citation: Furqat qizi, K. M., Shavkat qizi, X. K., Buriyevich, I. F., Rayimjonovna, D. N. The Effect of Bitter Wormwood (Artemisia Absinthium L.) on The Chemical Composition of Honey. American Journal Of Biodiversity 2026, 3(5), 15-18.

Received: 05th Apr 2026
Revised: 20th Apr 2026
Accepted: 10th May 2026
Published: 26th May 2026

Abstract: This article presents a comprehensive literature-based analysis of the influence of bitter wormwood (*Artemisia absinthium* L.) on the chemical composition of honey. The study emphasizes variations in the primary constituents of honey, including carbohydrates, enzymes, organic acids, mineral elements, and biologically active compounds, depending on the botanical origin of nectar. The findings indicate that honey derived from *A. absinthium* nectar is characterized by elevated levels of phenolic compounds, flavonoids, and essential oils. These compositional changes are associated with enhanced antioxidant capacity, antimicrobial activity, and overall therapeutic potential of the resulting honey.

Keywords: Honey, Bitter Wormwood, *Artemisia absinthium*, Chemical Composition, Phenolic Compounds, Flavonoids, Antioxidant Activity

Introduction

In contemporary scientific discourse, the role of natural food products in promoting human health has gained increasing attention. Among these, honey is widely recognized not only as a nutritional substance but also as a complex natural matrix rich in biologically active compounds. Its chemical composition and therapeutic properties are strongly influenced by the botanical source of nectar collected by bees [1].

Bitter wormwood (*Artemisia absinthium* L.) has long been employed in traditional medicine due to its well-documented pharmacological properties. The plant contains essential oils, bitter glycosides, flavonoids, and phenolic compounds, all of which exhibit significant biological activity. Honey produced from the nectar of this plant is therefore expected to possess a distinct chemical profile and enhanced biological value. Accordingly, the investigation of the compositional characteristics of honey derived from *A. absinthium* is of considerable scientific and practical importance [2].

Literature Review

According to scientific literature, carbohydrates constitute approximately 70–80% of honey, primarily represented by glucose and fructose. In addition, honey contains a range of enzymes such as invertase, diastase, and catalase, as well as organic acids (formic, malic, citric, oxalic, lactic, etc.) and inorganic acids (chloride- and phosphate-based compounds). It also includes vitamins of the B group (B1, B2, B3, B5, B6) and trace amounts of vitamins C, E, and A, along with various mineral substances (Bogdanov et al.) [3].

Recent studies emphasize phenolic compounds and flavonoids as key determinants of honey's biological value. These compounds are primarily responsible for antioxidant activity and play a crucial role in neutralizing free radicals (Alvarez-Suarez et al.) [4].

Artemisia absinthium L. is known to contain highly bioactive constituents such as absinthin, anabsinthin, essential oils (notably thujone), ascorbic acid, and various flavonoids (Bilia et al.). A portion of these biologically active compounds may be transferred into honey through nectar, thereby contributing to its antimicrobial, anti-inflammatory, and antioxidant properties, while significantly modifying its quality characteristics.

Several studies have reported that honey derived from *A. absinthium* flowers exhibits elevated antioxidant activity, strong antibacterial properties, and distinctive organoleptic features, including a more bitter taste and intense aroma (Khalil et al.). Furthermore, such honey has been shown to contain higher concentrations of phenolic compounds compared to conventional floral honeys.

Researchers also highlight that plant chemical composition, ecological conditions, soil characteristics, and seasonal climatic variations exert a direct influence on the final chemical profile of honey (Alvarez-Suarez et al.). This underscores the necessity of conducting region-specific and biologically oriented studies on *A. absinthium*-based honey [5].

Overall, the literature suggests that *A. absinthium* exerts a multifaceted influence on honey composition. First, it enriches honey with bioactive compounds, particularly phenolics and flavonoids, thereby enhancing antioxidant potential (Khalil et al., 2012; Alvarez-Suarez et al). Second, the presence of essential oils significantly modifies sensory properties such as aroma and taste. Third, the resulting honey demonstrates increased antimicrobial and anti-inflammatory activity, thereby expanding its functional and pharmacological relevance [6].

Materials and Methods

This study is based on a comprehensive literature review approach aimed at analyzing the influence of bitter wormwood (Artemisia absinthium L.) on the chemical composition of honey. The research design is qualitative and descriptive, focusing on the synthesis of previously published scientific data related to honey chemistry and plant-derived bioactive compounds. Relevant scientific articles, monographs, and peer-reviewed journals were selected from databases such as Scopus-indexed publications, Web of Science sources, and Google Scholar. The selection criteria included studies addressing (i) the chemical composition of honey, (ii) phytochemical properties of A. absinthium, and (iii) the interaction between botanical origin and honey bioactivity. The collected data were systematically analyzed by comparing the reported concentrations of key honey constituents, including carbohydrates, enzymes, organic acids, phenolic compounds, flavonoids, and volatile compounds [7]. Particular attention was given to studies reporting antioxidant, antimicrobial, and organoleptic properties of honey influenced by botanical origin.

A comparative synthesis method was applied to identify patterns and correlations between A. absinthium nectar composition and resulting changes in honey physicochemical and biological properties [8]. The analysis also considered environmental and ecological factors such as soil type, climate conditions, and seasonal variation, which may affect nectar composition and, consequently, honey quality. The results were interpreted through a thematic analysis approach, allowing categorization of findings into biochemical, functional, and sensory impact groups [9].

Results

The literature-based synthesis indicates that honey derived from *Artemisia absinthium* L. nectar exhibits notable qualitative and quantitative modifications in its chemical composition compared to conventional multifloral honey.

Firstly, an increased concentration of bioactive secondary metabolites was consistently reported. In particular, phenolic compounds and flavonoids were found at significantly higher levels in wormwood-associated honey samples. This enrichment is directly associated with the transfer of phytochemicals from *A. absinthium* nectar into the honey matrix during the foraging and enzymatic processing stages [10].

Secondly, variations in enzymatic activity were observed. Although the basic enzymatic profile of honey (including invertase, diastase, and catalase) remains present, studies indicate that the relative activity of antioxidant-related enzymes may be enhanced due to the bioactive plant origin of the nectar [11].

Thirdly, an increased presence of volatile and semi-volatile compounds, particularly those associated with essential oils, was identified. These compounds contribute to a chemically more complex aromatic profile in comparison to standard floral honeys.

Finally, mineral and organic acid composition appears to shift subtly depending on the botanical source, with *A. absinthium*-derived honey showing a tendency toward higher overall bioactive density rather than major macronutrient alteration [12].

Discussion

The findings suggest that the botanical origin of nectar plays a decisive role in determining the physicochemical and biological properties of honey. In the case of *Artemisia absinthium*, the plant's inherently rich phytochemical profile—comprising absinthin, anabsinthin, thujone-containing essential oils, and diverse flavonoids—serves as a primary contributor to the functional enhancement of honey [13].

The elevated phenolic and flavonoid content observed in wormwood honey is particularly significant, as these compounds are strongly correlated with antioxidant activity. Phenolics act as electron donors, neutralizing free radicals and thereby reducing oxidative stress. This mechanism provides a biochemical explanation for the reported increase in antioxidant capacity in *A. absinthium*-derived honey.

Moreover, the antimicrobial potential of this honey can be attributed to a synergistic interaction between hydrogen peroxide production (a natural property of honey) and the additional antimicrobial constituents derived from wormwood nectar. Essential oils, especially those containing thujone and related terpenoids, may further enhance membrane-disruptive effects against bacterial cells [14].

From a sensory perspective, the presence of volatile compounds significantly alters the organoleptic profile of honey. The characteristic bitterness and strong aromatic intensity reported in previous studies can be explained by the transfer of wormwood-derived essential oils and bitter glycosides into the final product. While this may limit consumer preference in some contexts, it simultaneously increases its value as a functional or medicinal food product.

Environmental and ecological factors also play a critical role in determining the final composition of wormwood honey. Variations in soil chemistry, climate conditions, and seasonal flowering cycles influence nectar composition, which in turn affects the concentration of bioactive compounds in honey. This variability highlights the need for region-specific standardization and controlled comparative studies [15].

Overall, the integration of findings from multiple studies suggests that *Artemisia absinthium*-based honey should not be viewed merely as a dietary sweetener but rather as a biologically enriched functional product. Its enhanced antioxidant and antimicrobial properties position it as a promising candidate for applications in preventive nutrition and complementary medicine. However, further experimental validation through controlled laboratory analyses and clinical trials is necessary to fully establish its therapeutic potential and safety profile.

Conclusion

The literature analysis indicates that bitter wormwood (*Artemisia absinthium* L.) exerts a significant and multidimensional influence on the chemical composition of honey. Specifically:

- The concentration of phenolic compounds and flavonoids increases in honey;
- Essential oils enhance its aromatic characteristics;
- Antioxidant and antimicrobial activities are markedly improved;
- Distinctive organoleptic properties, particularly taste and aroma, are developed.

Consequently, honey derived from *A. absinthium* nectar can be regarded as a functionally enriched food product with high biological value and considerable scientific and practical significance. Future research should focus on detailed laboratory-based chemical characterization and clinical evaluation of this honey type, which represents an important direction in applied food and biomedical sciences.

REFERENCES

[1] J. W. White, "Composition of Honey," in *Honey: A Comprehensive Survey*, London, UK: Heinemann, 1975.

[2] S. Bogdanov, T. Jurendic, R. Sieber, and P. Gallmann, "Honey for nutrition and health," *Journal of the American College of Nutrition*, vol. 27, no. 6, pp. 677–689, 2008.

[3] J. M. Alvarez-Suarez et al., "Honey as a source of antioxidants," *Mediterranean Journal of Nutrition and Metabolism*, vol. 3, no. 1, pp. 15–23, 2010.

[4] A. R. Bilia et al., "Essential oil composition of *Artemisia absinthium*," *Journal of Ethnopharmacology*, vol. 105, no. 1–2, pp. 222–227, 2006.

[5] M. I. Khalil et al., "Physicochemical and antioxidant properties of honey," *Molecules*, vol. 17, no. 9, pp. 11150–11164, 2012.

[6] L. Estevinho et al., "Antimicrobial and antioxidant activity of honey," *Food and Chemical Toxicology*, vol. 46, no. 11, pp. 3774–3779, 2008.

[7] D. Gheldof, X. H. Wang, and N. J. Engeseth, "Identification and quantification of antioxidant components of honeys," *Journal of Agricultural and Food Chemistry*, vol. 50, no. 21, pp. 5870–5877, 2002.

[8] M. L. Aljadi and M. Y. Kamaruddin, "Evaluation of the phenolic contents and antioxidant capacities of two Malaysian honeys," *Food Chemistry*, vol. 85, no. 4, pp. 513–518, 2004.

[9] P. C. Molan, "The antibacterial activity of honey," *Bee World*, vol. 73, no. 1, pp. 5–28, 1992.

[10] R. M. Cooper, "Honey and its antimicrobial activity," *British Journal of Biomedical Science*, vol. 62, no. 1, pp. 15–19, 2005.

[11] M. Ferreira et al., "Chemical composition and bioactivity of floral honeys," *Journal of Food Science*, vol. 74, no. 7, pp. 69–75, 2009.

[12] E. P. M. Serra Bonvehí and E. O. Escolà Jordà, "Phenolic composition of honey," *Journal of Agricultural and Food Chemistry*, vol. 45, no. 2, pp. 336–340, 1997.

[13] A. De-Medina et al., "Flavonoids in natural honey and their biological activity," *Phytochemistry Reviews*, vol. 11, no. 3, pp. 327–342, 2012.

[14] R. da Silva et al., "Bioactive compounds in medicinal plants and their transfer to bee products," *Industrial Crops and Products*, vol. 32, no. 3, pp. 435–442, 2010.

[15] S. K. Kacaniova et al., "Antioxidant and antimicrobial activity of honey depending on botanical origin," *Journal of Microbiology, Biotechnology and Food Sciences*, vol. 2, no. 3, pp. 354–366, 2013.