

BEE&YOU PROPOLIS

Propolis is a natural bee product collected from the buds, leaves, and plants' stems, exhibiting powerful antioxidant and antimicrobial features. There are more than 5200 scientific articles listed in the database of "Web of Science" since the last two decades. About 19% of those are categorized in the pharmacology discipline. Similarly, more than 2000 manuscripts are available in the "Pubmed" database since 2010. Due to its polyphenolic content, propolis has antiviral, antibacterial, antifungal, anticarcinogen, and anti-inflammatory activities. Many scientific studies revealed that propolis enhances the immune system and protects against infections when regularly consumed.

Bee&You propolis is poplar-type propolis harvested from the pristine highlands of Anatolian and named "Anatolian Propolis."

Poplar-type propolis is one of the most investigated types of propolis, particularly for its pharmacological properties. This type of propolis contains bioactive flavonoid group of components, including caffeic acid phenethyl ester (CAPE), pinocembrin, galangine apigenin, pinobanksin, quercetin, chrysin, and caffeic acid. These bioactives determine the high biological value of Anatolian propolis. The following graph shows the presence of flavonoid compounds in propolis extract. (1-5)

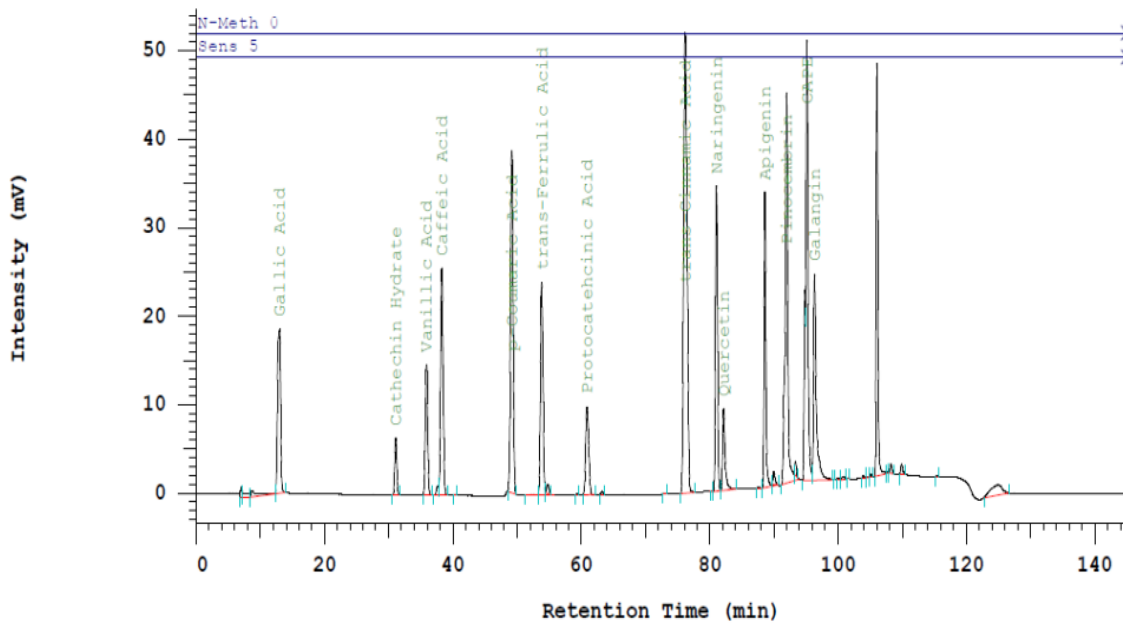


Figure 1. Flavonoid composition of poplar type propolis. Çapanoğlu E (6)

BEE&YOU propolis also exhibits antimicrobial activity through in vitro type testing, which is in line with the data available in the current literature. The following table received from the final report of bee product analysis (7) Recep Tayyip Erdogan University Microbiology Department presents the efficacy of propolis on gram⁺ and gram⁻ bacteria and yeast/mold.

Analysis results:
Table 2. In-vitro antimicrobial activity results of propolis products

Samples	Microorganisms and Inhibition Zone (mm)										
	Gram-Negative Bacteria			Gram-Positive Bacteria						Fungi Yeast	
	Ec	Yp	Pa	Sm	Ef	Ef (clinic)	Sa	Lc	Bc	Sc	Ca.
1. Tablet	6	10	-	26	12	12	15	20	16	12	16
2. Nasal Spray	-	-	-	14	8	8	15	14	16	6	6
3. Syrup	-	-	15	16	14	14	14	13	15	8	6
Amp.	10	10	18	NT	10	NT	35	NT	15		
Flu.										25	25

Ec: *Escherichia coli* ATCC 25922, Yp: *Yersinia pseudotuberculosis* ATCC 911, Sm: *Streptococcus mutans* RSKK07038, Pa: *Pseudomonas aeruginosa* ATCC 27853, Ef: *Enterococcus faecalis* ATCC 29212, Ef: *Enterococcus faecalis* klinik suş, Sa: *Staphylococcus aureus* ATCC 25923, Bc: *Bacillus cereus* 702 Roma, Lc: *Lactobacillus casei* RSKK591, Ca: *Candida albicans* ATCC 60193.

Sc: *Saccharomyces cerevisiae* RSKK 251, Amp.: Ampicillin, Str.: Streptomycin, Flu.: Fluconazole,

(-): no activity,

The biological properties of Anatolian propolis were compared to other propolis types harvested from different parts of the world. For instance, Gencay et al. (8) investigated the differences in polyphenolic composition, responsible for antioxidant activity, of propolis obtained from Anatolia (17 samples), Brazil (4 samples with types of paranagreen, ultra-green, dark-green, and brown), and Japan (1 sample). The results of this study revealed that Turkish propolis samples have reasonably high aromatic acid and their derivatives, showing antibacterial, antimicrobial, and antitumor activities. Also, the flavonoid content of Turkish propolis was reported to be higher than those of propolis samples collected from Brazil and Japan.

Another scientific study published by Seyhan et al. (9) compared the efficiency of Anatolian propolis to the samples obtained from Argentina and China on different types of breast cancer cell lines. The results demonstrated that Anatolian propolis exhibited a higher polyphenolic content than that of other propolis samples. Besides, it was reported that Anatolian propolis inhibited human breast cancer cell growth via its apoptotic effects and had no cytotoxic effect on normal cell lines. In general, these effects were observed to be depending on propolis type-, dose- and time. Finally, the scientists also claimed that Argentina propolis was slightly effective on cell proliferation inhibition on MCF-7 breast cancer type, where China propolis was ineffective.

According to the results of another study (10), Anatolian propolis sample showed significant anti-proliferative effect on breast cancer cell lines. These results suggest that Anatolian propolis can be considered as a potent agent on breast cancer treatment for further investigations.

Based on many scientific studies, the amount and the variety of bioactive compounds differ depending on the type of propolis, geographic location, and botanical origin. However, the difference between polyphenolic compounds may also affect the biological activity and the expected health benefits of propolis. Moreover, post-harvest practices and technologies also influence the bioactivity of propolis. BEE&YOU Anatolian propolis is harvested under best practices and extracted with a patented process to save its biological activity and polyphenolic structures. BEE&YOU products are standardized and characterized for their polyphenolic content using sophisticated analytical instruments (HPLC-ESI-MS) to approach the norms for pharmaceutical quality (10-13).

According to the analysis carried out in our laboratories in the propolis samples collected from the US market, the caffeic acid phenethyl ester (CAFE) amounts are provided in the following table. Based on the value presented in this table, the CAPE value of Anatolian propolis is much higher than that of those collected samples; hence, these results revealed that Anatolian propolis, which is a poplar-type propolis, has more CAFE flavonoid than the other samples.

Brand Name	CAPE (µg/mL)	Total Antioxidant (mg TE/g)
Dr Danielle Propolis 1000mg	nd	30,2
Terry Natural Propolis 200 mg	528,4	132,3
Now Royal jelly-Pollen (Propolis 200mg)	1020	84,9
Now propolis 1500 mg Tb	459,1	299
Eco Bee Farms %70 Propolis 350 mg	478	228,7
Green Propolis Propolis 333mg Hydroglycolic extract	47,5	55
Beekeeper's Natural	nd	nd
Pon Lee Propolis 1500mg	12,8	107
Bee&You %20 Propolis	11738,6	191,4

References:

1. Tugba Degirmencioglu H, Guzelmeric E, Yuksel PI, Kırmızıbekmez H, Deniz I, Yesilada E. A New Type of Anatolian Propolis: Evaluation of Its Chemical Composition, Activity Profile and Botanical Origin. *Chem Biodivers*. 2019 Dec;16(12):e1900492. doi: 10.1002/cbdv.201900492. Epub 2019 Nov 20. PMID: 31642168.
2. Gülhan Vardar-Ünlü, Sibel Silici, Mehmet Ünlü. Composition and in vitro antimicrobial activity of Populus buds and poplar-type propolis *World J Microbiol Biotechnol* (2008) 24:1011–1017 DOI: 10.1007/s11274-007-9566-5
3. Petar Ristivojević, Ivica Dimkić, Etil Guzelmeric, Jelena Trifković, Magdalena Knežević, Tanja Berić, Erdem Yesilada, Dušanka Milojković-Opsenica, Slaviša Stanković Profiling of Turkish propolis subtypes: Comparative evaluation of their phytochemical compositions, antioxidant and antimicrobial activities. *LWT - Food Science and Technology* (2018), doi: 10.1016/j.lwt.2018.04.063.
4. Ristivojević et al. Poplar-type Propolis: Chemical Composition, Botanical Origin and Biological Activity. *Natural Product Communications Vol. 10* (11) 2015
5. Guzelmeric, E., Ristivojević, P., Trifković, J., Dastan, T., Yilmaz, O., Cengiz, O., Yesilada, E., Authentication of Turkish propolis through HPTLC fingerprints combined with multivariate analysis and palynological data and their comparative antioxidant activity, *LWT – Food Science and Technology* (2017), doi: 10.1016/j.lwt.2017.08.060.
6. Çapanoğlu Güven Esra, Aslı Elif Tanuğur Samancı, Taylan Samancı, Özdemir Ece. Investigation Of Antioxidant Properties Of Propolis Products Collected From Different Countries. *Natural* 2019 <https://akademi.itu.edu.tr/search-results?st=Propolis>
7. BEE'O Data On File- Karaoglu A. The final report of bee product analysis- Recep Tayyip Erdogan University Microbiology Department 2019.

8. Gençay et al. Gc-MS Analysis Of Propolis Samples From 17 Different Regions Of Turkey, Four Different Regions Of Brazil And One From Japan. *Mellifera* . 2009, Vol. 9 Issue 17, p19-28. 10p
9. Seyhan MF, Yılmaz E, Timirci-Kahraman Ö, Saygılı N, Kısakesen Hİ, Gazioğlu S, Gören AC, Eronat AP, Begüm Ceviz A, Öztürk T, Yılmaz-Aydoğan H, Öztürk O. Different propolis samples, phenolic content, and breast cancer cell lines: Variable cytotoxicity ranging from ineffective to potent. *IUBMB Life*. 2019 May;71(5):619-631. doi: 10.1002/iub.1996. Epub 2018 Dec 27. PMID: 30589200.
10. Tugba Ozdal, Gulce Sari-Kaplan, Ergul Mutlu-Altundag, Dilek Boyacioglu & Esra Capanoglu (2018): Evaluation of Turkish propolis for its chemical composition, antioxidant capacity, anti-proliferative effect on several human breast cancer cell lines and proliferative effect on fibroblasts and mouse mesenchymal stem cell line, *Journal of Apicultural Research*, DOI:10.1080/00218839.2018.1494888
11. Rezzan Aliyazicioglu , Huseyin Sahin , Omer Erturk , Esra Ulusoy & SevgiKolayli (2013) Properties of Phenolic Composition and Biological Activity of Propolis from Turkey, *International Journal of Food Properties*, 16:2, 277-287, DOI: 10.1080/10942912.2010.551312
12. Ricardo Silva-Carvalho, Fátima Baltazar, and Cristina Almeida-Aguiar Propolis: A Complex Natural Product with a Plethora of Biological Activities That Can Be Explored for Drug Development *Evidence-Based Complementary and Alternative Medicine* Volume 2015, Article ID 206439, 29 pages <http://dx.doi.org/10.1155/2015/206439>
13. Ozdal T, Ceylan FD, Eroglu N, Kaplan M, Olgun EO, Capanoglu E. Investigation of antioxidant capacity, bioaccessibility and LC-MS/MS phenolic profile of Turkish propolis. *Food Res Int*. 2019 Aug;122:528-536. doi: 10.1016/j.foodres.2019.05.028. Epub 2019 May 21. PMID: 31229108.