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Investigating Possible Synergism in the Antioxidant and Antibacterial Actions of Honey and Propolis from the Greek Island of Samothrace through Their Combined Application

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Academic Editors: M. Carmen Seijo and Paweł Kafarski

Foods **2022**, *11*(14), 2041; https://doi.org/10.3390/foods11142041 (registering DOI)

Received: 14 June 2022 / Revised: 29 June 2022 / Accepted: 7 July 2022 / Published: 10 July 2022

(This article belongs to the Section Food Microbiology)

Abstract

Several honeybee products are known for their functional properties, including important antioxidant and antimicrobial actions. The present study examines the antioxidant activity (AA), total polyphenolic content (TPC), and antibacterial action of honey and propolis samples collected from the Greek island of Samothrace, which were applied in vitro either individually or in combination in selected concentrations. To accomplish this, the 2,2-diphenyl-1-picrylhydrazyl (DPPH) scavenging activity and the Folin–Ciocalteu assays were employed to determine the AA and TPC, respectively, while the antibacterial action was investigated against each one of four important pathogenic bacterial species causing foodborne diseases (i.e., *Salmonella enterica*, *Yersinia enterocolitica*, *Staphylococcus aureus*, and *Listeria monocytogenes*) using the agar well diffusion assay. Compared to honey, propolis presented significantly higher AA and TPC, while its combined application with honey (at ratios of 1:1, 3:1, and 1:3) did not increase these values. Concerning the antibacterial action, *Y. enterocolitica* was proven to be the most resistant of all the tested bacteria, with none of the samples being able to inhibit its growth. *S. enterica* was susceptible only to the honey samples, whereas *L. monocytogenes* only to the propolis samples. The growth of *S. aureus* was inhibited by both honey and propolis, with honey samples presenting significantly higher efficacy than those of propolis. No synergism in the antibacterial actions was observed against any of the tested pathogens. Results obtained increase our knowledge of some of the medicinal properties of honey and propolis and may contribute to their further exploitation for health promotion and/or food-related applications (e.g., as preservatives to delay the growth of pathogenic bacteria). View Full-Text

Keywords: **honey; propolis; Samothrace; Greece; antioxidant action; antibacterial action; synergism; bacterial pathogens; functional foods; novel antimicrobials**

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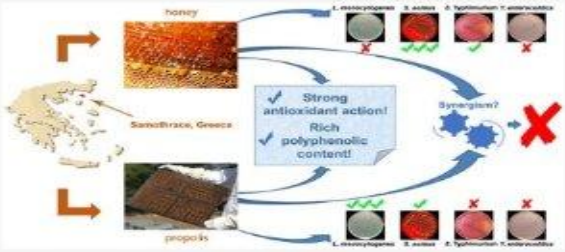

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Postali, E.; Peroukidou, P.; Giaouris, E.; Papachristoforou, A. Investigating Possible Synergism in the Antioxidant and Antibacterial Actions of Honey and Propolis from the Greek Island of Samothrace through Their Combined Application. *Foods* **2022**, *11*, 2041. https://doi.org/10.3390/foods11142041

AMA Style

Postali E, Peroukidou P, Giaouris E, Papachristoforou A. Investigating Possible Synergism in the Antioxidant and Antibacterial Actions of Honey and Propolis from the Greek Island of Samothrace through Their Combined Application. *Foods*. 2022; 11(14):2041. https://doi.org/10.3390/foods11142041

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Postali, Evdoxia, Panagiota Peroukidou, Efstathios Giaouris, and Alexandros Papachristoforou. 2022. "Investigating Possible Synergism in the Antioxidant and Antibacterial Actions of Honey and Propolis from the Greek Island of Samothrace through Their Combined Application" *Foods* 11, no. 14: 2041. https://doi.org/10.3390/foods11142041

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