



Abstract

Essential Oils from Oregano and Thyme Plants Organically Cultured in Lemnos Island (Greece) Present Strong Antimicrobial Action against Some Important Foodborne Bacterial Pathogens [†]

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[†] Presented at the 3rd International Electronic Conference on Foods: Food, Microbiome, and Health—A Celebration of the 10th Anniversary of Foods' Impact on Our Wellbeing, 1–15 October 2022; Available online: <https://sciforum.net/event/Foods2022>.



Citation: Kostoglou, D.; Gala, F.; Iroglidou, M.; Maniki, E.; Papachristoforou, A.; Paterakis, N.; Giaouris, E. Essential Oils from Oregano and Thyme Plants Organically Cultured in Lemnos Island (Greece) Present Strong Antimicrobial Action against Some Important Foodborne Bacterial Pathogens. *Biol. Life Sci. Forum* **2022**, *18*, 70. <https://doi.org/10.3390/Foods2022-13008>

Academic Editor: Arun Bhunia

Published: 30 September 2022

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Abstract: The growing negative perception of consumers towards synthetic chemicals has shifted the search for new antimicrobials to those derived from natural sources (e.g., plants). Oregano and thyme are both well-known aromatic plants that belong to the Lamiaceae family. Their essential oils (EOs) have been extensively studied for their bioactivity, which is attributed to their rich content of secondary metabolites, especially terpenoids such as carvacrol and thymol. In this study, EOs from oregano (*Origanum vulgare* subsp. *hirtum*) and thyme (*Thymus capitatus*) plants organically cultured in Lemnos island (north-eastern Greece) were investigated for their antimicrobial actions against three foodborne pathogenic bacterial species (i.e., *Salmonella enterica* ser. Typhimurium, *Listeria monocytogenes*, and *Yersinia enterocolitica*). For this, the minimum inhibitory concentrations (MICs) and minimum biofilm-inhibitory concentrations (MBICs) of each EO against the planktonic and biofilm growth, respectively, of each pathogen were determined. To calculate the MICs, the broth-microdilution method was used, while before the calculation of MBICs, the optimal conditions for biofilm formation by each target microorganism were determined using 96-well polystyrene microplates as the growth substrate. Results revealed that the MICs ranged from 0.031% to 0.125% (v/v) depending on the EO and the target pathogen, with the thyme EO always more potent than oregano. The MBIC values of oregano and thyme EOs were the same for *S. Typhimurium* at 0.125% (v/v), as well as for *L. monocytogenes* at 0.031% (v/v). On the other hand, to inhibit the biofilm growth of *Y. enterocolitica*, oregano EO needs to be applied at 0.063% (v/v), whereas thyme EO needs to be applied at 0.031% (v/v). These results demonstrated that the EOs of two endemic organic plants of a Greek island both present strong antibacterial action and could be further exploited as natural antimicrobials for food and health applications.

Keywords: oregano essential oil; thyme essential oil; foodborne bacterial pathogens; biofilms; antimicrobial action; food safety

Supplementary Materials: The poster presentation can be downloaded at: <https://www.mdpi.com/article/10.3390/Foods2022-13008/s1>.

Author Contributions: Conceptualization, E.G.; methodology, D.K., N.P. and E.G.; validation, D.K. and E.M.; formal analysis, D.K.; investigation, D.K., F.G., M.I. and E.M.; resources, A.P., N.P. and E.G.; data curation, D.K. and E.M.; writing—original draft preparation, D.K.; writing—review and

editing, D.K. and E.G.; visualization, D.K.; supervision, D.K. and E.G.; project administration, E.G. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: The data presented in this study are available on reasonable request from the corresponding author.

Conflicts of Interest: The authors declare no conflict of interest.