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MEETING ABSTRACT OP

Holistic comparative transcriptomic analysis to investigate the factors affecting the quality of *Koroneiki* olive fruit and olive oil due to different cultivation practices in Crete, Greece

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Abstract: In the island of Crete, Greece, there are over 42 million olive trees, producing 60–70,000 tons of extra virgin olive oil annually. Despite this, the molecular basis of how cultivation practices affect olive fruit quality, biology, and biochemistry remains largely unexplored, especially in Greek varieties (Bullones et al., 2023). In this study, we present a holistic comparative transcriptomic analysis of "Koroneiki" olive fruits grown under four certified cultivation systems in Crete: Organic Farming (OF), Biodynamic Farming (BF), Integrated Production Management (IPM), which emphasize sustainability and environmental responsibility as all the above will be compared to non-certified Traditional Conventional Farming (CF), allowing them to use conventional inputs like synthetic fertilizers and pesticides. While phenotypic traits showed minimal variation, transcriptomic profiling revealed significant differences (Rao et al., 2021). Notably, Organic and Biodynamic systems exhibited similar gene expression patterns, distinct from those in Conventional and Integrated systems. We also assessed expression levels of genes linked to fruit quality and oil composition, highlighting the impact of cultivation practices on molecular traits. These findings deepen our understanding of how agricultural systems influence olive fruit biology and offer valuable insights for developing quality-focused, sustainable cultivation strategies.

Keywords: Koroneiki, olive, organic, biodynamic, integrated management, comparative transcriptomic analysis

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