Cyprus University of Technology

Geotechnical Sciences and Environmental Management

Master's Thesis

The efficacy of priming agents on agronomic characteristics, yield performance and fruit quality attributes of raspberry (*Rubus idaeus* L.) under mild water stress conditions

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Limassol, April 2020

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Approval Form

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ABSTRACT

Raspberries (*Rubus idaeus* L.) are value-added products, but its cultivation in Cyprus is restricted to few hectares, mainly due to the lack of the necessary expertise. Agricultural biostimulants (ABs), also mentioned as priming agents (PAs), are generally recognized as safe since they do not leave any harmful residues on fruits and are abundant in natural environments. Furthermore, they have been shown to trigger crop protection mechanisms, against abiotic stress factors. The aim of the current thesis was to test the efficacy of three agricultural biostimulants (ABs) under two water deficit conditions in raspberry plant (cv. 'Erika'). Therefore, instead of irrigating 10 L per liner meter per day during July, in the course of 30 days 2.5 and 0 L were applied per linear meter per day, to IRRIGATED and STRESSED plots, accordingly. Before the application of water stress conditions, the plants were subjected to fertigation with three different AB's: an osmo-conditioning product (OSMO) and two bio-priming agents consisted of *Bacillus*, *Pseudomonas* and *Streptomyces* (BIO1) and a *Bacillus amyloliquefaciencs strain* (BIO2). The efficacy of the three ABs was tested by determining plant development (plant height, number of laterals and flowers), physiological parameters (leaf gas exchange and photosynthetic pigments) and biochemical stress indicators [hydrogen peroxide (H_2O_2), malonaldehyde (MDA) and proline content] in the newly fully developed leaves, during the peak of stress period. OSMO demonstrated the most promising results by improving plant water status and leaf gas exchange, during water deficit of 30 days. Results showed that the OSMO product had doubled proliferation of stomatal conductance and demonstrated 80% retention of soil moisture for up to 4 weeks. Moreover, OSMO-treated plants had the higher photosynthetic pigments and proline contents and significantly higher height, laterals, leaves and flowers, indicating advanced photosynthetic activity and better adaptation under water deficit conditions. Qualitative data of raspberry fruits are also discussed.

Keywords: *Rubus idaeus*, priming agents, agricultural biostimulants, drought stress, *Ascophyllum nodosum*