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The effect of BC204, a plant bio-stimulant, on the growth of *A. thaliana and S. lycopersicon*

J Loubser and **PN Hills**
Stellenbosch University, South Africa

BC204, an agricultural product of a local company in South Africa, is a biostimulant consisting of a citrus extract and certain organic acids. The plant growth-promoting effect of BC204 has been demonstrated previously and is currently used in agriculture to promote plant growth in a variety of crops, increase yield and stimulate plants to improve resistance against abiotic and biotic stress. Although the physiological effects have been seen in practice, very little molecular or biochemical data has been collected. The aim of this study was to gain a deeper understanding of the biochemical and genetic changes occurring in *A. thaliana and S. lycopersicon* following the application of BC204. Wild-type Arabidopsis (Col-0) plants were treated weekly with three different concentrations of BC204 or a water control for three weeks, after which the fresh weight, dry weight, leaf number, and leaf surface area were measured. The growth experiments were repeated using only the optimal BC204 concentration (0.01% v/v) and the same physiological measurements were recorded, with the addition of photosynthesis rates. Control and BC204-treated A. thaliana plants were harvested, RNA extracted and analysed for transcriptomic changes via an RNA-sequencing approach. Additionally, a hydroponic system was established for *S. lycopersicon* to analyse changes in root exudates via LC-MS following treatment with BC204. Furthermore, plants of both species were subjected to NaCl as a biotic stress and treated with BC204. Basic physiological measurements were recorded, as well as established osmotic stress markers. The expression of certain genes responsive to salt-stress was evaluated via RT-qPCR.

16173740@sun.ac.za