



Grapevine cane pruning extracts to enhance plant physiological capacities and decrease phenolic accumulation in canes and leaves

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Vine cane extracts are a valuable byproduct due to their rich content of polyphenols, vitamins, and other beneficial compounds, which can affect and benefit the vine and the grapes. This study aims to evaluate the response of grapevine plants to irrigation with water supplemented with a vine cane extract, both at physiology response and phenolic composition in different parts of the plant (root, trunk, shoot, leaf, and berry). Cane extract was obtained by macerating crushed pruning residues with warm water (5:1) and pectolytic enzymes. Two-year-old potted plants were irrigated with water (Control) while others were irrigated with cane extracts, either at 1:4 (w/v, cane extract/water; T 1:4) or at 1:8 (w/v, cane extract/water; T 1:8). During a 60-day trial, from flowering to ripening, every 15 days' physiological analyses (Multiplex, DUALEX) and leaf gas exchange analyses were performed to monitor plant status. Root, trunk, shoot, leaf, and berry samples were collected at the end of the trial for phenolic content analysis. T 1:4 and T 1:8 treatments enhanced the plant's physiological capacity 30 days after the start of the treatments, obtaining higher NBI values and chlorophyll concentrations (p-value < 0.05). Intrinsic water use efficiency (EUA_i, AN/g_s) also increased in both cane treatments (T 1:4 and T 1:8) due to higher CO₂ fixation. However, plants irrigated with water supplemented with cane extract decreased polyphenol levels amounts in cane and leaf tissues, whereas in roots and trunk organs no differences in phenolic profile were noted. Control plants had higher total concentrations of stilbenes and flavonoids (anthocyanins and flavanols) in canes and flavonoids (anthocyanins, flavonols and flavanones) in leaves. Irrigation with cane extract seems enhanced physiological capacities but decreased secondary metabolite synthesis in aerial tissues (canes and leaves).

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