

# Effect of Salicylic acid foliar spraying on growth parameters, $\gamma$ -pyrones, phenolic content and radical scavenging activity of drought stressed Ammi visnaga L. plant

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## Abstract

The present study was conducted to evaluate the impact of drought stress and foliar spraying of salicylic acid (SA) on the secondary metabolites particularly the  $\gamma$ -pyrones and total polyphenolic content in the different organs of Ammi visnaga L. plant. The following were measured: different growth parameters,  $\gamma$ -pyrones, total polyphenolic content (TPC) and the antioxidant activity of the methanolic extracts. From the results obtained, it was clear that drought stress had a negative impact on growth of the plant and on the yield of the fruits, whereas it caused an increase in the percentage of the two major  $\gamma$ -pyrones: khellin and visnagin in most organs. The adverse effects of drought stress on growth parameters was found to be partially alleviated by the salicylic acid foliar spray. On the other hand, combination of SA foliar spray and normal irrigation gave the highest percentage of khellin ( $1.544 \pm 0.002\%$ ) and visnagin ( $0.902 \pm 0.002\%$ ), as well as an increase in the yield of fruits per plant. In contrast, drought alone and in combination with SA significantly ( $p < 0.001$ ) increased the polyphenolic content and the radical scavenging activity. The highest polyphenolic content was recorded in the water stressed aerial parts sprayed with 2 mM SA, where it reached  $78.28 \pm 0.14$  mg/gm dry weight calculated as gallic acid equivalent (GAE). Antioxidant activity, using DPPH assay, was measured for the different plant organs under different treatments where a reduction from  $12.967 \pm 0.983$  to  $2.803 \pm 0.262$   $\mu\text{g/ml}$  in the IC<sub>50</sub> was noted in the drought stressed aerial parts sprayed with 2 mM SA vs the normally irrigated plant. UPLC/MS analysis was used to demonstrate the effect of SA foliar application on the  $\gamma$ -pyrones and total polyphenolic content in Ammi visnaga L. fruits.

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