**HPLC-HRMS simultaneous determination of salicylic, shikimic and jasmonic acids in wild and transgenic *Nicotiana Langsdorffii* plants exposed to abiotic stresses**

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When dealing with adverse or limiting growth conditions, plants respond by specific-stress mechanisms which are regulated by the phytohormonal network. Salicylic acid (SA) and Jasmonic acid (JA) are hormones involved in plant growth and development, which also take part in plant response towards different kind of stresses. Shikimic acid (SHA) is an important plant intermediate and a key molecule in the biosynthesis of many secondary metabolites implicated in the stress response mechanisms. The *Nicotiana* genus includes small, well characterized plants, traditionally used as biological models for genetic and physiological studies; the insertion of the rolC gene from *Agrobacterium rhizogenes* and the rat glucocorticoid receptor (GR) gene in *Nicotiana* plants have been previously investigated, demonstrating interesting results for the production of resistant plants. In this study, a new HPLC-ESI-LTQ Orbitrap method for the simultaneous quantification of SA, JA and SHA in *N. Langsdorffii* is presented. The method was developed and validated by estimating matrix effect, accuracy, precision and the detection limits. The method, which, to our known, is the first which permit the simultaneous quantification of these three compounds, was then applied to 82 wild and transgenic plants, exposed to chemical, water and heat stresses. The results showed a differential regulation of the phytohormones’ levels in the wild and genetically modified plants, as a clear indication of the activation of stress response processes. A differential induction of the shikimic acid pathway in stressed plants was moreover observed, highlighting the mechanisms the plant behavior against different abiotic stresses.

**Keywords:** HPLC-HRMS, *Nicotiana Langsdorffii*, environmental stresses, genetic modification

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