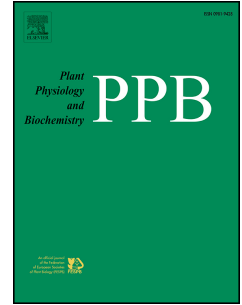


Accepted Manuscript

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PII: S0981-9428(18)30385-1

DOI: [10.1016/j.plaphy.2018.08.028](https://doi.org/10.1016/j.plaphy.2018.08.028)

Reference: PLAPHY 5389

To appear in: *Plant Physiology and Biochemistry*

Received Date: 21 May 2018

Revised Date: 11 August 2018

Accepted Date: 23 August 2018

Please cite this article as: A. Banerjee, D.K. Tripathi, A. Roychoudhury, Hydrogen sulphide trapeze: Environmental stress amelioration and phytohormone crosstalk, *Plant Physiology et Biochemistry* (2018), doi: 10.1016/j.plaphy.2018.08.028.

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Hydrogen sulphide trapeze: environmental stress amelioration and phytohormone crosstalk

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Abstract

Hydrogen sulphide (H₂S) is recognized as the third endogenous gasotransmitter in plants after nitric oxide (NO) and carbon monoxide (CO). Though initially visualized as a toxic gaseous molecule, recent studies have illustrated its diverse role in regulating plant growth and developmental physiology. H₂S is also a potent inducer of osmolytes and cellular antioxidants of enzymatic and non-enzymatic origins. It interacts with the Ca²⁺ and NO signaling pathways. Exogenous fumigation of H₂S or application of the H₂S donor, sodium hydrosulphide (NaHS) has been found to be beneficial in the amelioration of multiple abiotic stresses like salinity, drought, temperature, hypoxia and heavy metal toxicity. H₂S also protects stress-sensitive proteins via persulphidation of cysteine residues, prone to ROS-mediated oxidation. It is well established that plants are highly dependent on phytohormone signaling during any physiological process. By virtue of the diversity of the H₂S-mediated signaling network, interactions and crosstalks of this gasotransmitter with the plant hormones are evident. This article presents a detailed summary regarding the role of H₂S in oxidative and environmental stress tolerance; and furthermore illustrates the reported interactions with crucial hormones like abscisic acid, auxins, gibberellic acid, ethylene and salicylic acid under physiologically differing circumstances.

Keywords: Hydrogen sulphide; osmolytes; antioxidants; environmental stresses; reactive oxygen species; phytohormones; H₂S-hormone interactions

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