

DOUBLE FUNCTION OF H₂O₂ IN PLANT RESPONSE TO STRESS CONDITIONS

Summary

The accumulation of high quantities of H₂O₂ and other ROS in cells is a common plant response toward abiotic and biotic stresses. This transient state of the increased level of the ROS production in cells is described as so-called oxidative stress. As a result of its high reactivity H₂O₂ provokes two kinds of responses in plant cells. The first, is related to the biochemical injury of the plant metabolism and may result with necrosis. The second, is more complicated and is associated with the change of the so-called cellular redox potential. According to the current knowledge the cellular redox potential seems to be a crucial player in plant stress acclimation/defence processes as it can regulate the activity of presented in plant cells proteins as well as it can impose on the profile of the gene expression. The

change of the gene expression profile induced by the H₂O₂ activity/change of the cellular redox potential can occurs by: induction of signal transduction pathways, modification of the course of the signal transduction pathways, induction of the expression of transcription factors involved in the expression of proteins generating the acclimation/defence processes or direct activation of presented in cells, inactive forms of these transcription factors, as well as by cross talk between redox signaling pathways and other signaling pathways existing in plant systems. Therefore, H₂O₂ accumulation in plants, in response to stress conditions, provokes the biochemical injury of the plant metabolism as well as induces some of the metabolic changes allowing life support in stressing conditions.