

## Effects of calcium on mitochondria isolated from Blackberry (*Rubus fruticosus*)

cell suspension culture

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In addition to its energetic function mitochondria can serve as a stress sensor and an important regulator of programmed cell death (PCD) either in animals or plants..PCD in plants occurs during development or in response to environmental factors. Hypersensitive response (HR) is an example of PCD in plants that restrict the microbe spreading; calcium influx, in turn, appears to be involved in HR-related cell death. In this study we isolated and characterized mitochondria from blackberry cell suspension culture and tested the effects of calcium. By measuring oxygen consumption and membrane potential we found that the classical components of mitochondrial electron transport chain (ETC, complexes I-IV) are present in the blackberry mitochondria, as well as alternative NAD(P)H dehydrogenases, alternative oxidase (AOX) and the plant uncoupling mitochondrial protein (PUMP). In addition, mitochondrial respiration and generation of reactive oxygen species (ROS) in organelles energized with were stimulated in the presence of calcium (1-5 mM) while the mitochondrial membrane potential was dissipated. Lipoperoxidation, determined as malonaldehyde acid (MDA), increased. Cyclosporin A, an inhibitor of the calcium-induced mitochondrial permeability transition (MPT) process had no effect on these responses. We suggest that the calcium effects on mitochondria are due its action upon inner membrane lipids, a potential contribution for future understanding of the mechanism by which calcium affects plant mitochondria.

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