

FREE RADICAL CHANGES IN CUCUMBER ROOTS INFLUENCED BY HYDROXYCINNAMIC ACIDS

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The action of different stress agents results in an increased active oxygen species (AOS) generation in cells. This may lead to an oxidative burst, i.e. to a state, in which AOS generation will exceed the efficiency of antioxidant systems and can be a cause of oxidative damages of cellular constituents i.e. lipid peroxidation, oxidative injuries of protein and strand breaks in DNA.

The aim of study was to examine whether the oxidative burst occur in cucumber roots under the influence of ferulic and p-coumaric acids.

The 7-day-old seedlings of the cucumber (*Cucumis sativus* L.) cv. 'Dar' were subjected to allelochemical stress by immersing their roots into 0.5 mM solutions of hydroxycinnamic acids - ferulic and p-coumaric. The cucumber roots were taken for determination of active oxygen species, i.e. hydrogen peroxide (H₂O₂), superoxide anion (O₂^{•-}) and hydroxyl radical (•OH) as well as stable free radical concentration 30, 60 and 90 minutes after phenolic treatment.

The total amounts of H₂O₂ were determined according to Messner and Boll (*Plant, Cell, Tissue and Organ Culture*, 1994, 39: 69-79) with some modifications. The level of •OH was determined according to the method described by Tiedemann (*Physiol Mol. Plant. Pathol.*, 1997, 50: 151-166). Determination of O₂^{•-} was based on its ability to reduce Nitro Blue Tetrazolium (NBT) according to Doke (*Physiol. Plant Pathol.*, 1983, 23: 345-357). Estimation of stable free radical concentration was carried by electron paramagnetic resonance using EPR spectrometer (Ayscough, 1967. *Electron Spin Resonance in Chemistry. Methuen and Co. Ltd. London*).

It was found cucumber seedling roots treated with ferulic and p-coumaric acids had an increased level of H₂O₂ and •OH radical already 30 minutes after the stress introduction. In the case of O₂^{•-} only a tendency to the increase of that radical level in the roots treated with ferulic acid has become evident. It was also found that the stress induced by the action of hydroxycinnamic acids caused, on the average, over a double increase of stable free radical concentration in cucumber seedling roots.

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