E217 Regulation of ACC Oxidase Expression by Ethylene: Temporal, Spatial and Speces Specific Expression of ACC Oxidase

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ACC oxidase catalyzes the oxidation of ACC to ethylene. In this study, we have investigated both the temporal and spatial expression of ACC oxidase in mung bean in response to ethylene. Polyclonal antibody against the recombinant ACC oxidase over-expressed in *E. coli* was generated. The anti-ACC oxidase antiserum recognized 36 kDa ACC oxidase polypeptide in mung bean hypocotyl extracts. The level of ACC oxidase mRNA in mung bean hypocotyls was dramatically increased to maximum at 10 h ethylene treatment, while the basal level of mRNA was slightly decreased in control tissues. The in vivo ACC oxidase activity was gradually increased during 10 h incubation with ethylene. Changes in the level of ACC oxidase polypeptide detected by immuno blot analysis were paralleled to those of in vivo enzyme activity during the incubation of ethylene. From these results, it is concluded that ethylene induces both the amounts of ACC oxidase mRNA and protein. Levels of in vivo ACC oxidase activity and corresponding polypeptide from leaf, stem and root tissues of mung bean were also highly inducible by exogenous ethylene. However, degrees of induction were considerably distinct in each tissues, indicating that induction of ACC oxidase is tissue specific. Finally, the expressions of ACC oxidase in response to ethylene were compared between monocotyledons and dicotyledons. Our preliminary results indicate that the induction of ACC oxidase by ethylene appears to be dicot specific. Differential accumulations of ethylene-induced ACC oxidase mRNA in different tissues and different species will be presented. (Supported by a grant HRC-96-0301)

E218 Inhibition of Auxin-induced Ethylene Production by Salicylic Acid in Mung Bean Hypocotyls

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Salicylic acid (SA) is a well known mediator of pathogenesis-related response in higher plants. It has been argued that the physiological role of SA is related to the ethylene production. In this study, we have investigated the effect of SA on the auxin-induced ethylene production in mung bean hypocotyls. SA at concentration of 10^{-3} M effectively inhibited the auxin-induced ethylene production. The transcript level of ACC synthase, the rate-limiting step of ethylene biosynthesis, and the ACC content were relatively constant in SA-treated hypocotyls, compared to those of control tissues. In addition, the amount of ACC oxidase transcript was not affected by SA treatment. In contrast, in vivo as well as in vitro ACC oxidase enzyme activities were strongly inhibited by SA. These results indicate that SA exerts its inhibitory effect at the level of ACC oxidase activity in the ethylene biosynthetic pathway. To examine whether the inhibitory effect of SA is concerned with its activity as a radical scavenger, we are investgating the effects of SA analogs and other radical scavengers on the ACC oxidase enzyme activity.
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