Phytohormones

629(3pK01)

LEPIDIMOIDE IN SOME ORGANS OF *ARABIDOPSIS* PLANTS AND ITS GROWTH REGULATING EFFECTS

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Lepidimoide was first isolated from germinating cress seeds as an allelopathic substance. Thereafter, lepidimoide has been found in seeds of various plants including *Arabidopsis thaliana.*

We confirmed by HPLC analysis that lepidimoide was included not only in seeds but also in growing organs such as leaves, stems, inflorescences and roots.

Lepidinoide of *A. thaliana* promoted hypocotyl and petiole elongation, inhibited root growth, enlarged cotyledon area, and shortened flowering time.

These results suggest that lepidimoide acts as a growth regulator in various growing processes in *A. thaliana.*

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HISTOCHEMICAL ANALYSIS OF INVOLVEMENT OF HMG-CoA REDUCTASE IN MELON FRUIT DEVELOPMENT

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The determination of fruit size is a major issue in plant development in higher plants. The size of melon fruit is defined by the cell number in the pericarps (Higashi et al., 1999). An possible factor that accounts for the size of melon fruit is HMG-CoA reductase (HMGR) that catalyzes the synthesis of mevalonic acid. Actually an involvement of HMGR in cell division of tomato and avocado fruits has been reported. We previously demonstrated that the mRNA expression and enzyme activity of HMGR increased during early fruit development in melon. In this study, we attempted to clarify the involvement of HMGR in cell division that related to fruit development in melon.

Flowcytometric analysis of the pericarp cells showed that the division of pericarp cells occurred immediately after pollination. Western and tissue print analysis of fruits revealed that the accumulation of HMGR protein also increased with the activation of cell division and localized in pericarps. These results suggest that HMGR is account for melon fruit enlargement by enhancing cell division in pericarps after pollination.

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The relationship between sex expression of flowers and ethylene induction of *ETR1*-related gene expression in cucumber

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In cucumber (*Cucumis sativus L.*) plants, it has been reported that a high correlation exists between the evolution of ethylene from the apices and the development of female flowers. But it is impossible to account for entire sex expression of cultivars of cucumber solely by ethylene evolution. For example, the ethylene evolution from the apices of both monoecious (cv. Otone No. 1) and andromonoecious (cv. Lemon) cucumber was much less than that of gynoecious (cv. Higan-fushinari) cucumber. In addition, application of ethylene induced the formation of female flowers in Otone No. 1, whereas it induced the formation of hermaphloditic flowers but not female flowers in Lemon. These facts suggest that sensitivity of stamens to ethylene in Lemon is somewhat lower than that in Otone No. 1 and Higan-fushinari. To elucidate this hypothesis, we investigated the varietal difference in ethylene sensitivity between Otone No. 1 and Lemon. As the markers of ethylene sensitivity, we used the ethylene induction of ethylene receptor-related gene (*CS-ETR1, CS-ETR2, CS-ERS*) expression in the apices and triple response of dark-grown seedlings. We found that *CS-ETR2* and *CS-ERS* gene expression were induced by ethylene application in Otone No. 1, but not in Lemon. Also, the inhibition of the length of hypocotyl under low concentration of ethylene was smaller in Lemon than in Otone No. 1. These results suggest that *CS-ETR2* and *CS-ERS* genes may play some role in the inhibition of the development of stamen.

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WATER STRESS INDUCED ETHYLENE BIOSYNTHESIS AND FRUIT SOFTENING IN KAKI (*Diospyros kaki* Thunb.)

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'Tonewase' kaki fruit grown in a forced greenhouse softens within several days after harvest. We investigated the relationship between ethylene biosynthesis and the rapid fruit softening using a strong inhibitor of ethylene perception, MCP. The MCP treatment inhibited fruit softening but did not ethylene production. Interestingly alleviation of water stress by covering the fruit with a perforated polyethylene bag delayed the onset of ethylene production and fruit softening, resulting in extended self-life of the fruit. In order to determine the molecular mechanism of this observation, we isolated two genes encoding ACC synthase by RT-PCR. Northern analysis showed that one of the cloned genes was inducible by water stress and the other was inducible by ethylene. In conclusion, the rapid fruit softening of 'Tonewase' kaki is associated with both water stress induced ethylene and autocatalytic ethylene triggered by the first one.