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1-107a-6 METABOLIZATION OF CYANOGENIC GLYCOSIDES

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Cyanogenic glucosides are metabolized during the development of Hevea brasiliensis seedlings (1). Changes in the content of cyanogen were analyzed in other Hevea species and varieties. Whereas the content of linamarin stored in the endosperm decreased in all Hevea species, the amount of cyanogenic glucosides in the developing seedling varied greatly. Linamarin is transported out of the endosperm as linustatin which is then hydrolyzed by a diglucosidase to form acetone cyanohydrin and gentiobiose (2) instead of linamarin and glucose. Therefore, the linamarin pool in the seedling represents newly synthesized cyanogenic glucoside, possibly formed by glucosylation of acetone cyanohydrin. The large variation in newly formed cyanogens in individual seedlings, in contrast to the pattern of decrease in cyanogen content in the endosperm, implies that these two cyanogen pools are independent.

(1) Lieberei, Selmar, Biehl (1985), Plant Syst. Evol. 150, 49-63; (2) Selmar et al. "Metabolization of cyanogenic glucosides", Plant Physiol., submitted.

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1-113a-8 CYANOGENESIS AND PLANT RESISTANCE TO MICROBIAL ATTACK

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Enzymatic breakdown of cyanogenic precursors in plant tissues occurs during cellular decompartmentation and leads to HCN liberation. HCN inhibits many metabolic reactions and therefore cyanogenesis was assumed to be a resistance factor of cyanogenic plants against fungal or bacterial infection. This assumption had been accepted though never a clear correlation between cyanogen content and disease resistance has been shown. It was not taken into consideration that during cyanogenesis both, the host and the pathogen are influenced by HCN. Studies on the pathogenesis of leaf blight in the cyanogenic plant Hevea brasiliensis (rubber tree) reveal, that especially the high cyanogenic plants are susceptible because the active, energy and synthesis dependent resistance reactions of these plants are impaired drastically by HCN. The enzymatic and non enzymatic factors regulating amount and velocity of HCN liberation have been analysed. Not only the high cyanogenic precursor content but also the time course of HCN liberation are factors governing resistance impairment.

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PHYSIOLOGICAL CHANGES IN ROOTS OF THE RUBBER TREE (HEVEA BRASILIENSIS) IN THE COURSE OF COLONIZATION BY MYCORRHIZAL FUNGI

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In the course of symbiotic and parasitic plant-fungus interactions changes in the physiological status of the host plants occur. Using seedlings of the rubber tree the plants' reactions were followed by analysis of two secondary substances of the root, cyanogenic glycosides (CG) and scopoletin. In the course of infections of Hevea-roots with the pathogenic fungus Thanatephorus cucumeris, the content of scopoletin and CG increases. The content of both substances is also modified in the course of mycorrhizal symbiosis with two different isolates of Glomus etunicatum (D13, T6). D13-inoculated roots reveal a significantly decreased scopoletin content and an unchanged content of CG whereas T6-inoculated roots are characterized by increased CG content. Regarding the fact, that liberated HCN potentially impairs active defense reactions in plants and that the coumarin derivative scopoletin is a fungitoxic component these data show that the "defense metabolism" in rubber roots is influenced in different ways by the two different isolates of G. etunicatum.