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Role of ethylene in abnormal shoot growth induced by high concentration of brassinolide in rice seedlings

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Abstract:

A high concentration of brassinolide (BL) induced abnormal shoot shape in rice seedlings, that is, the newly developed leaf sheath was shorter than the old sheath, and increased the number of leaves. The involvement of ethylene and cyanide, co-metabolites during ethylene biosynthesis, in abnormal shoot growth was analyzed by comparing the action mechanism of BL with that of quinclorac in barnyard grass seedlings. BL strongly stimulated ethylene production, and the amount of ethylene and the third leaf sheath length in rice seedlings were negatively correlated. Exogenously applied ethephon also induced abnormal growth of rice seedlings. L- α -amino-ethoxyvinyl-glycine (AVG), an ethylene biosynthetic inhibitor, partially reversed abnormal shoot growth. The level of endogenous cyanide was low in rice seedlings, because of the high level of β -cyanoalanine synthase (CAS) activity, and exogenously applied KCN did not induce abnormal shoot growth. The results indicate that BL-induced abnormal shoot growth of rice seedlings was probably mediated by ethylene production.

Keywords:

barnyard grass, brassinolide, β -cyanoalanine synthase, ethylene, rice

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