

Short communication

PACLOBUTRAZOL INCREASES WOUND-INDUCED ETHYLENE PRODUCTION IN PRIMARY LEAVES OF BEAN SEEDLINGS

I. TARI, and M. NAGY

*Department of Plant Physiology, József Attila University,
H-6701 Szeged, P. O. B. 654, Hungary*

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Paclobutrazol (/2RS,3RS/-1-/4 -chlorophenyl/-4,4-dimethyl-2-/1,2,4-tiazol-1-yl/pentan-3-ol), like other growth retardants (SAUERBREY et al., 1987, 1988; GROSSMANN, 1990) is known to inhibit stress ethylene production (WANG and STEFFENS, 1985).

When seeds of bean (*Phaseolus vulgaris* L. cv. Juliska) had been soaked in 10 mg/l paclobutrazol solution and then were grown in sterile vermiculite under controlled conditions (NAGY et al., 1991) the retardant proved to be very effective for inhibiting shoot elongation and leaf area expansion.

In earlier experiments we found higher indole-3-acetic acid (IAA) level in the blades of primary leaves of 14-day-old plants than in the control (NAGY et al., 1991).

The ethylene production of vegetative tissues is thought to be regulated by the amount of internal free IAA (YANG and HOFFMANN, 1984), which stimulates ethylene biosynthesis by inducing the synthesis of the immediate precursor of ethylene, 1-aminocyclopropane-1-carboxylic acid (ACC). At the same time in most of the cases plant growth retardants exercise influence on the last step in ethylene biosynthesis, conversion of ACC to ethylene (SAUERBREY et al., 1988, GROSSMANN et al., 1989).

In present paper we investigated the result of these two, theoretically opposite effects on the ethylene production of primary leaves of bean (Table 1 and 2.).

Table 1. Effect of excision on ethylene production in primary leaf blades of paclobutrazol-treated 14-day-old bean plants

Time intervals after excision (hours)	Ethylene production (n.l. fresh weight ⁻¹ . g ⁻¹)	
	control	treated
0— 1	2,57±0,21	2,93±0,33
1— 6	11,87±1,09	34,54±5,27
6—24	13,94±1,41	24,92±2,85

(Mean±SE, n=5)

Ethylene samples were withdrawn at given time intervals from 100 ml gas tight flasks containing plant material and analysed by gas chromatography as described earlier (NAGY et al., 1991). After each determination flasks were aerated and resealed.

Table 2. Time-course of excision-induced ethylene production in primary leaf blades of paclobutrazol-treated bean plants

Time (days)	Ethylene production (nl. fresh weight ⁻¹ . g ⁻¹ . 6 h ⁻¹)	
	control	treated
7	4,19±0,59	7,57±1,07
14	10,71±1,67	42,91±3,82
18	11,44±2,05	24,73±1,62
21	2,79±1,45	8,78±1,21

(Mean±SE, n = 5)

Otherwise as in Table 1.

In blades of primary leaves paclobutrazol resulted in an increase in excision-induced ethylene production.

These data suggest that the inhibition of ethylene biosynthesis by retardants in cell suspensions or in leaf discs treated directly with test solutions cannot be extended over the all parts of a treated plant.

The effect of paclobutrazol on ethylene formation in an organ of treated seedlings will depend on the balance of the level of other endogenous plant growth regulators.

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