

'Changjiao' Hot Peppers are Nonclimacteric

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Various peppers have been classified as nonclimacteric (Rhodes, 1980); however, Gross et al. (1986) reported that 'Choorae-hong' hot peppers are climacteric fruit. Our study showed that 'Changjiao' hot peppers are nonclimacteric.

It is now widely accepted that nonclimacteric fruits show no significant increase in respiration or ethylene production during ripening (McGlasson, 1985). Treatment of nonclimacteric fruits with ethylene induces a rise in respiration, and the peak respiration value increases with increasing concentration of ethylene. Removal of exogenous ethylene leads to a fall in the rate of respiration to the value before treatment; therefore, respiration can be repeatedly stimulated by successive ethylene treatments (Rhodes, 1980).

'Changjiao' hot peppers (*Capsicum annuum* L. cv. Changjiao), harvested at the mature-green stage (30 days after pollination), were ripened at 22 to 25C. For ethylene treatment, 5-liter containers holding six peppers and 5 ml of 5 M KOH to absorb the evolved CO₂ were flushed with pure O₂ or air for 5 min; then ethylene was injected to give final concentrations of 10, 20, or 30 μl-liter⁻¹. During the treatment, containers were reflushed with fresh O₂ or air and reinfected with ethylene every 3 hr. Carbon dioxide production was measured with an infra-red gas analyzer (FQ, Fushan, people's Republic of China) in the absence of KOH. Ethylene production was determined by enclosing five peppers in a 500-ml bottle for 3 hr and analyzing a 1-ml aliquot from the container atmosphere or from the pepper core cavity. We used a gas chromatography (SP-2308, Beijing, People's Republic of China) fitted with a GDX-502 (60- to 80-mesh) column. The detection limit of the chromatography was 10 nl ethylene in a 1-ml sample.

'Changjiao' hot peppers underwent a 30% rise in respiratory rate when the fruit began

to color (10 days after harvest), but no ethylene was detected inside or outside the fruit during the 20 days after harvest. The respiratory rate of mature-green hot peppers was significantly stimulated by ethylene applied in O₂ and the respiratory rate increased in proportion to the concentration of ethylene (Fig. 1A). Fruit showing incipient coloration (14 days after harvest) responded to 30 μl ethylene/liter applied in air; removal of the ethylene resulted in a drop in respiratory rate,

but it was repeatedly stimulated by ethylene at 30 μl-liter⁻¹ (Fig. 1B). Grosset et al. (1986) reported that 'Choorae-hong' hot peppers underwent a respiratory climacteric that occurred when the peppers were ≈50% red. There was also a rise in ethylene production during ripening; however, the ethylene produced had to be accumulated for 18 hr to be measurable. The current results show that 'Changjiao' hot peppers responded to exogenous ethylene like other nonclimacteric fruits.

Literature Cited

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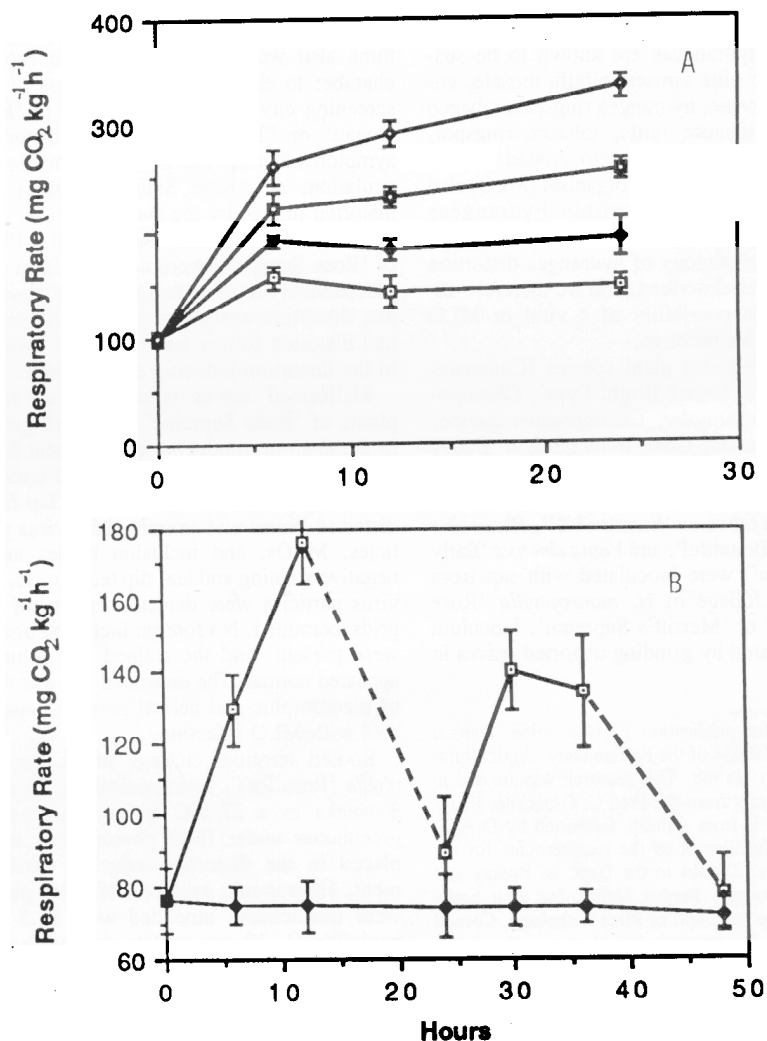


Fig. 1. Effects of applied ethylene on the respiratory rate (mg CO₂/kg per hr) of 'Changjiao' peppers. (A) Mature-green peppers (2 days after harvest) in 100% O₂ (□), and in C₂H₄ at 10 (◇), 20 (△), or 30 μl-liter⁻¹ (○) in O₂. (B) Peppers showing 10% red color (14 days after harvest) in air (◇) or 30 μl C₂H₄/liter in air (□). Dotted line indicates when ethylene was removed. D is the mean ± SE of three replicates. [Note that abscissas in (A) and (B) are not on same scale.]

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