

Title Ripening behaviour and induction of ripening in *Capsicum annuum*

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Abstract

In an attempt to understand why capsicum (*Capsicum annuum* L.) fruit do not ripen when harvested at a light green stage, we have been examining the ripening behaviour of fruit on and off the plant as well as investigating the effect of various postharvest or preharvest treatments on ripening. The ripening behaviour of fruit from three cultivars (Papri Queen, Caysan and Aries) was typical for non-climacteric fruit. However, there was a significant difference in ripening behaviour of fruit ripened on and off the plant especially with regards to internal CO₂ concentration, total soluble solids and extractable colour. In addition, ethylene production and enzyme activity was not correlated with ripening on or off the plant. Even though CO₂ was much higher in fruit ripened on the plant, cincturing only delayed ripening but did not prevent it suggesting sugar only plays a minor role. When various plant growth regulators were applied into cinctures before or after harvest, only very high concentrations of ethephon (48,000 ppm) had an effect. Interestingly, this effect was delayed. Fruit harvested at the light green stage only began to ripen (as measured by extractable colour and chlorophyll degradation) at least 14 days after ethephon treatment. We have attempted to explain this by examining the expression of different genes in the carotenoid synthesis pathway in response to ethephon and during ripening (on and off the plant). We will discuss our findings which suggest the initiation of chloroplast degradation to form the chromoplast is finely regulated in capsicum fruit.