

**Title:** Prediction of optimal harvest date for processing tomato based on the accumulation of daily heat units over the fruit ripening period.

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**Abstract:**

For maximum yield of processing tomato by once-over mechanical harvesting, an optimum date for harvest has to be selected at the time when the factory-graded fruit yield is at its maximum. By recording the proportion of green, ripe (i.e. turning and red) and rotten (i.e. over-ripe and damaged) fruit over a period of approximately 20 days, the optimal harvest date can be identified. Based on observations taken from crops at 4 sites in the Mediterranean region over 3 years (1997-1999), the proportional change of fruit types (i.e. total fruit weight percentage) was closely related to the accumulation of daily maximum temperature during crop maturation. When the heat units were calculated based on the daily maximum and minimum temperatures by 6 well-known methods, the reduction in green fruit percentage was significantly related to the sum of heat units calculated by all methods. The maximum ripe fruit percentage, approximately 80% of the total fruit weight, occurred soon after the green fruit percentage was equal to the rotten fruit percentage, both approximately 10% of the total fruit weight. Therefore, the heat units required to reduce the green fruit from 25 to 10% of the total fruit weight, calculated by different methods, can be used to accurately predict the optimal harvest date based on the accumulation of ambient temperature. In a range of likely temperature regimes, 7-9 days prediction for optimal harvest date can be made. However, the simplest method based on daily maximum temperature alone is as accurate as all the more complex methods and is likely to find wider application in the processing tomato industry

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