

## FERTILIZING FOR DELICIOUS TOMATOES?

A favorite topic of discussion this time of year is the quality of tomatoes available at market or from the garden. Some blame for disappointing tomatoes has been laid on modern tomato varieties, but there are more things to consider.

For the home vegetable grower, taste is probably the most important concern. But in addition to taste, commercial growers have many other concerns for successfully producing and marketing their crop. Commercial tomato varieties are frequently selected for disease and pest resistance or growing season restrictions. Cultural practices, such as harvesting before the tomatoes are vine ripened, may not help achieve the best taste and quality.

Soil fertility and management of plant nutrients influence the quality of tomatoes. Supplying adequate plant nutrition is essential to harvesting abundant, flavorful, and nutritious tomatoes.

It is always best to start with a test of the soil to check what nutrients are already present. But realistically, most home gardeners have never heard of soil analysis or know how to even begin the testing process or interpret the lab results.

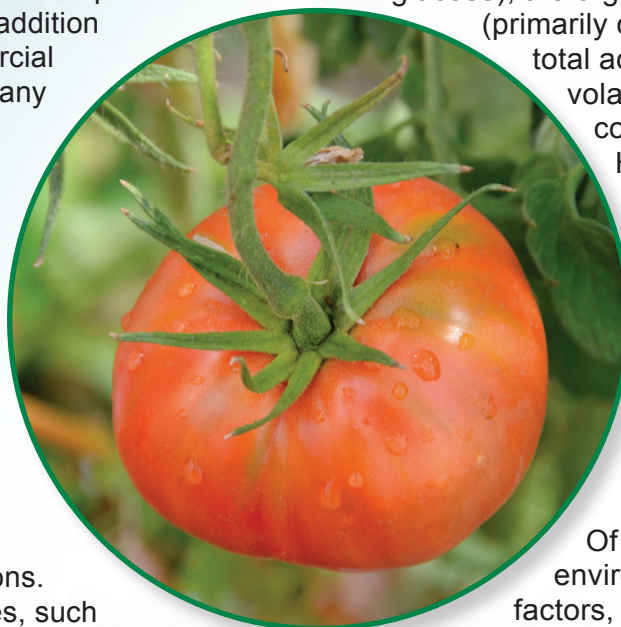
## Tomato Flavor and Degree of Ripeness

Assessing tomato flavor is not a simple matter, since flavor preferences differ among people. The intensity of flavor properties of tomato fruits is determined largely by the amount of sugar (primarily fructose and glucose), the organic acid content (primarily citric, malic, and total acidity), and the volatile compound composition.

Human taste panels typically find the best flavor associated with high soluble solids, high sugar, and a high acid content.

Of the environmental factors, light has the most profound effect on the fruit sugar concentration. As a consequence, greenhouse tomatoes grown during the winter months contain substantially less sugar than field-grown tomatoes produced in sunny summer weather.

The characteristic tomato flavor is influenced by many volatile substances, many of which develop during ripening. The development of long-chain carbonyls and terpene esters that occurs in the fruit during ripening is essential for the typical tomato aroma.



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## Effects of P and K on Tomato Quality

Many studies have directly or indirectly examined the effect of plant nutrition on tomatoes. For example, tomatoes receiving standard NPK nutrition (100%) were compared with enhanced nutrition (150%). The enhanced nutrition treatment had fruit with better quality, color, and market acceptability. Many studies have shown that P and K nutrition both have a positive effect on fruit sugar and acid content. Of the nutrition factors, the supply of K most affects the increase of total acid content in the fruit. Higher P application has been repeatedly shown to produce higher sugar content in tomatoes (soluble solids), compared with low P conditions.

It is possible to overdo a good thing. Multiple studies have reported that a moderate nitrogen (N) supply will improve tomato flavor, but an excessive N concentration will harm fruit flavor. In another study, heavy N and K fertilization had a detrimental effect on tomato flavor, although the fruit acidity and soluble solid content still increased from fertilization.

The benefit of an adequate K supply has also been shown in other fruits. For example, cantaloupe responds

to abundant K with increasing firmness, sugar content, and more ascorbic acid and beta-carotene.

The development of red color in tomato fruit during ripening is mainly due to the synthesis of various carotenoid pigments, particularly lycopene. When adequate K is supplied, tomatoes respond by producing more of the health-promoting carotenoids and red lycopene.

Uniform fruit color is important for having nice-looking salsa and canned tomatoes. Maintaining an adequate or high supply of K in the soil helps tomato fruit ripen more uniformly, with less blotchiness and a more consistent fruit color.

In addition to primary factors (such as tomato variety selection, degree of ripeness, and growing conditions), proper plant nutrition will always positively contribute to better tomato flavor and appearance.

## Further Reading

Lester, G.E., J.L. Jifon, and D. J. Makus. 2010. *Better Crops* 94 (2):18-21.

Mikkelsen, R.L. 2005. *Better Crops* 89 (2):14-15.