

Sea Water Makes Tomatoes Better

A new study from Italy shows that diluted sea water (12%) made tastier and more nutritious tomatoes.

Season lightly for nutrient-rich tomatoes

By Stephen Daniells

Differences between salt and fresh water organisms does not usually extend to land plants, but Italian researchers report that watering tomatoes with diluted seawater can boost their nutrient content. Irrigation of cherry tomatoes with salt water led to ripe fruit with significantly greater antioxidant levels of vitamins C and E, dihydrolipoic acid, and chlorogenic acid, according to research published in the *Journal of Agricultural and Food Chemistry*. The research, focusing on standard cherry tomatoes and varieties genetically engineered for ripening, suggests opportunities for antioxidant-enhanced fruit and extracts produced in parts of the world with critical water shortages.

"The use of controlled salinity levels can be an effective method to produce tomatoes of a superior organoleptic and nutritional quality and with a higher market price, which may compensate for the reduction in crop yield," wrote lead author Cristina Sgherri from Pisa University. Tomatoes are a valuable source of nutrients, including beta-carotene, vitamins C and E, and lycopene, a potent antioxidant that gives the fruit its characteristic red color. Recent studies have linked tomatoes and their extracts to reducing the risk of several diseases, such as prostate cancer, and lowering inflammation that may cause hypertension and heart disease.

The Italian researchers looked at the effect of diluted seawater (12 per cent) on the nutritional content of cherry tomatoes (*Lycopersicon esculentum* L. cv. Naomi). Sgherri and co-workers report that ripening and growing the tomatoes under saline (salty) conditions induced oxidative stress in the fruit, and resulted in increased production of antioxidants. Specifically, levels of two forms of vitamin E, alpha- and gamma-tocopherol, increased by about 20 per cent following the salt water irrigation, while chlorogenic acid levels increased by 14 per cent. On the other hand, levels of the polyphenols, protocatechuic, vanillic, caffeic, and ferulic acids all fell by 22, 11, 30, and 14 per cent, respectively, stated Sgherri.

"It was hypothesized that protocatechuic, vanillic, caffeic, and ferulic acids were utilized to counteract the damaging effects of salinity-induced oxidative stress, allowing tomato fruits to maintain a high reduced status even following salinisation," said the researchers. Sgherri and co-workers did stress caution about the use of salt water to irrigate the crops, noting that the practice may lead to soil damage. "Despite the enormous interest in phenolic compounds as potential protective agents against the development of human diseases, the real contributions of such compounds to health maintenance and the mechanisms through which they act are still unclear," they wrote. "Anyway, phenolic acids and, in particular, chlorogenic acid might have important biological effects for human health other than physiological roles in plants, and greater attention should be given to these compounds," they concluded.

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"Irrigation with Diluted Seawater Improves the Nutritional Value of Cherry Tomatoes"

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