

**Title** A combination of heat treatment and *Pichia guilliermondii* prevents cherry tomato spoilage by fungi

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**Citation** International Journal of Food Microbiology, Volume 137, Issue 1, 31 January 2010, Pages 106-110

**Keywords** Cherry tomato fruit; Heat treatment; *Pichia guilliermondii*; Postharvest fungal spoilage

### Abstract

This study investigated the effectiveness of heat treatment and *Pichia guilliermondii*, either alone or in combination, to combat postharvest fungal spoilage in cherry tomato fruit. *In vitro* experiments demonstrated that heat treatment at 38 °C significantly inhibited mycelial growth of three different pathogens (*Botrytis cinerea*, *Alternaria alternata* and *Rhizopus stolonifer* Ehrenb). *In vivo* experiments unveiled that either heat treatment or *P. guilliermondii* reduced decay caused by these pathogens. Furthermore, a combination of heat treatment followed by the application of *P. guilliermondii* (H + P) provided the best efficacy in prevention of cherry tomato from fungal spoilage. Following, H + P treatment, electronic nose detected a reduction of volatility in cherry tomato fruit odor, an indicator of preserving fruit's freshness. Scanning electron microscopy unveiled that heat treatment at 38 °C for 24 h inhibited hyphae growth and spore germination of *R. stolonifer* Ehrenb while *P. guilliermondii* multiplied rapidly on fruit wounds, and its cells had a strong capability of adhesion to the hyphae of *R. stolonifer* Ehrenb. However, heat treatment also seriously injured *P. guilliermondii*, therefore *P. guilliermondii* should be applied after heat treatment. A combination of heat treatment and *P. guilliermondii* is one of the most effective techniques at controlling postharvest fungal spoilage in cherry tomato fruit.