

# Antifungal activities and the mechanisms of biocontrol agent WE-3 against postharvest sour rot in citrus

Zhonghuan Tian, Yang Li, Qian Yang, Ping Liu, Yujie Du, Chuanwu Chen and Chao-an Long

European Journal of Plant Pathology 161: 723–733. 2021.

---

## Abstract

Sour rot caused by *Geotrichum citri-aurantii* is a serious postharvest disease of citrus that can result in devastating economic losses. In this study, a new bacterial strain, WE-3, was isolated from soil samples of orchards at Huazhong Agricultural University and then screened in vitro to investigate its antifungal activity against *G. citri-aurantii*. Bacterium WE-3 was characterized as a member of the *Bacillus* family by physiological, biochemical, and 16S ribosomal gene analyses. The culture filtrate from strain WE-3 could effectively restrain the expansion of *G. citri-aurantii* in citrus after 6 d of artificial inoculation. Scanning electron microscopy examination showed that the WE-3 culture filtrate-treated *G. citri-aurantii* spores were morphologically longer and smoother. The expression of two chitin synthase-related genes and a redox-related gene remained downregulated when *G. citri-aurantii* was incubated with the WE-3 culture filtrate. Meanwhile, cellular content leakage was accompanied by cell vacuolation of the culture filtrate-treated *G. citri-aurantii* cells upon transmission electron microscopy examination. Finally, culture filtrate-handled citrus fruit exhibited similar physiological qualities to distilled water-handled fruit. Our study reveals that bacterial strain WE-3 might be a potent biological control agent against *G. citri-aurantii* in citrus.