

# Melatonin treatment inhibits gray mold and induces disease resistance in cherry tomato fruit during postharvest

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## Abstract

Melatonin, an indolic compound, is a ubiquitous molecule with pleiotropic roles in plant. The effects of melatonin treatment on the development of gray mold, disease resistance signals and phenylpropanoid pathway in cherry tomato were investigated after the mature-green fruit were dipped in 0.1 mM melatonin for 60 min and subsequently stored at  $22 \pm 1$  °C. The results showed that melatonin did not have antifungal activity against *Botrytis cinerea* *in vitro*, but significantly inhibited gray mold development caused by *B. cinerea* in tomato. The melatonin treatment induced a reactive oxygen species (ROS) burst, increased endogenous melatonin and salicylic acid (SA), and enhanced activities of chitinase (CHI) and  $\beta$ -1,3-glucanase (GLU) in tomato. Moreover, the treatment regulated the phenylpropanoid pathway by increasing activities of phenylalanine ammonia-lyase (PAL), 4-coumarate-coenzyme A ligase (4CL), and peroxidase (POD) accompanied by higher contents of total phenols, flavonoids and lignin in tomato. It was suggested that melatonin treatment would induce signaling molecules via the phenylpropanoid pathway that might contribute to enhancing resistance in tomato against fungi such as *B. cinerea* during postharvest storage.