

# Inhibitory activity and action mechanism of coumoxystrobin against *Phytophthora litchii*, which causes litchi fruit downy blight

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## Abstract

*Phytophthora litchii* is the causative agent of litchi downy blight, one of the most destructive pre- and postharvest diseases of litchi, which has caused severe economic losses. Coumoxystrobin is a novel fungicide developed by incorporating two active moieties from coumarin and methoxyacrylate into a single molecule. In the current study, coumoxystrobin showed high activity against different developmental stages of *P. litchii* tested in our research. The inhibitory activity on cystospore germination (mean  $EC_{50} = 0.034 \text{ mg L}^{-1}$ ) was the highest, then followed by zoosporangia germination (mean  $EC_{50} = 0.193 \text{ mg L}^{-1}$ ), mycelial growth on plates (mean  $EC_{50} = 0.269 \text{ mg L}^{-1}$ ), zoosporangia production (mean  $EC_{50} = 2.019 \text{ mg L}^{-1}$ ), mycelial growth in broth (mean  $EC_{50} = 3.722 \text{ mg L}^{-1}$ ) and zoospore discharge (mean  $EC_{50} = 4.451 \text{ mg L}^{-1}$ ). In the protective activity test in detached litchi fruit, coumoxystrobin exhibited excellent activity against *P. litchii*, though this compound was slightly less potent than azoxystrobin. After treatment with coumoxystrobin, the respiration rate and complex III activity of mycelia decreased significantly. These findings indicate that coumoxystrobin could have the potential to control litchi downy blight.