

Title Occurrence of imazalil-resistant biotype of *Penicillium digitatum* in China and the resistant molecular mechanism

Author Zhu Jin-wen, Xie Qing-yun and Li Hong-ye

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Abstract

Green mold caused by *Penicillium digitatum* (Pers.:Fr) Sacc. is one of the most important postharvest diseases of citrus fruits. Experiments were conducted to determine the occurrence of resistance of *P. digitatum* to imazalil in China. Four imazalil-Resistant (R) isolates were identified from 189 isolates of *P. digitatum*. The highest EC_{50} of an imazalil-R isolate was 0.578 mg/L, 29 times higher than that of the most imazalil-sensitive (S) isolate, suggesting that imazalil-R biotype of *P. digitatum* had occurred in China. In vitro assessment indicated that the imazalil-R isolates were not significantly different from imazalil-S isolates in their growth rate and sporulation, indicating that the imazalil-R biotype has competence similar to that of imazalil-S one and could co-exist with it in environment. To determine the mechanism of the resistance, *CYP51* gene was amplified from *P. digitatum* genome and sequenced. The results revealed that a tandem repeat of four extra copies of a unique 126-bp sequence in the upstream promoter region of *CYP51* gene present only in imazalil-R isolates, but not in imazalil-S isolates, implying this tandem repeat sequence may regulate the expression of *CYP51* positively, and lead to the sensitivity decrease.