

Marine-derived fungi: a promising source of halo tolerant biological control agents against plant pathogenic fungi

ABSTRACT

In this study, twenty marine-derived fungi were evaluated for their antagonistic activities against 10 economically important plant pathogenic fungi and investigated for their halo tolerance on potato dextrose agar (PDA) amended with 1%-25% NaCl. The results of dual culture tests showed that the marine *Trichoderma* species, *T. asperellum* and *T. harzianum* exhibited higher antagonistic effects against all plant pathogens than the other tested fungi, causing percentages of mycelial growth inhibition ranging from 59.31-100%. The results of dilution plate assays revealed that crude extracts of marine-derived fungi in the genera *Emericella*, *Myrothecium*, *Neocosmospora*, *Penicillium* and *Talaromyces* displayed great antifungal activity against plant pathogenic fungi at a low concentration of 1 g/L. However, the crude extract of *Myrothecium verrucaria* showed the best antifungal activity: more than 52% inhibition of five of the tested species of plant pathogenic fungi and complete mycelial growth inhibition of *Bipolaris oryzae* and *Lasiodiplodia theobromae* at 1 g/L. All of the tested marine-derived fungi were tolerant to NaCl at concentrations up to 7%. These results revealed marine-derived fungi possess exploitable antagonistic activities against plant pathogenic fungi through antibiosis, competition for nutrients and space and halo tolerance. Moreover, the results from this study showed their potential as novel BCAs for supporting crop production under climatic changes in the future.

Keyword: Antagonistic activities; Marine fungi; Plant pathogens; Halo tolerant fungi