

## Original Paper

# Efficacy of several species of fungi bioagents and fungicides against *Magnaporthe oryzae* in vitro

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## ABSTRACT

On rice (*Oryza sativa* L.), more than 70 diseases caused by fungi, bacteria, viruses, and nematodes have been listed. Among them, the blast disease caused by *Magnaporthe oryzae* B. Couch (syn. *Pyricularia oryzae* Cavara) seriously threatens global rice production worldwide. Effective management strategies such as the use of resistant cultivars and the application of fungicides individually cannot sustainably contain rice blast disease, because of the emergence of resistance genes and environmental threats. Therefore, applying bioagents to reduce *M. oryzae* infections, complete other strategies, and reduce pesticide dependence. The present work was carried out to evaluate the potential of not only plant rhizosphere-associated fungi in controlling *Magnaporthe oryzae* but also the effectiveness of five fungicides in coculture *in vitro*. Twenty-three biocontrol fungi mainly *Trichoderma* and *Penicillium* evaluated on six *M. oryzae* isolates were found to reduce pathogen growth in dual culture assay. The results obtained highlighted the good ability of bioagents to inhibit the growth of *M. oryzae* by 82.7 to 97 % at 7 days after incubation. In addition, the fungicides tested namely Amistar, Horizon, Opu, Spartaktak, and Signum successfully inhibited the mycelial growth of *M. oryzae*. The major outcome of our study was evidence that all *M. oryzae* isolates were susceptible to the fungicides tested through their concentration (ppm) of 50% (EC50). No pathogen isolate was hypersensitive or resistant to fungicides with the EC50 average values of 0.24, 0.25, 0.28, 0.33, and 0.38 mg/l respectively for Spartak, Signum, Horizon, Amistar, and Opus. These good bioagents must be tested on plants in the greenhouse and the best of them could be used in IPM strategy with the combination of resistant cultivars and a reasoned use of fungicides for blast disease control.

**Keywords:** Rice, *M. oryzae*, bioagents, fungicide, EC50, *in vitro*

## INTRODUCTION

The main challenge of agriculture is the production of high quantity and quality food, safe, and affordable for a growing world population. Each plant species is frequently

affected by hundreds of different pathogens (fungi, bacteria, mollicutes, viruses, insects, and nematodes) (Liu and Wang, 2016; Soura et al. 2020). Rice blast caused by the fungus *Magnaporthe oryzae* (syn : *Pyricularia oryzae*