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PROTECTION OF HOT PEPPER AGAINST MULTIPLE INFECTION OF VIRUSES BY UTILIZING ROOT COLONIZING BACTERIA

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ABSTRACT

Mix virus infection is a common phenomena in nature. It results in severe of disease symptoms and yield loss. We utilized seven selected root colonizing bacteria (rhizobacteria) isolated from hot pepper rhizosphere to improve the effectiveness of virus management. The efficacy of those rhizobacteria in inducing plant growth and systemic resistance (ISR) on hot pepper against multiple infection of *Tobacco mosaic virus* (TMV), and *Chili veinal mottle virus* (ChiVMV) were evaluated in greenhouse trials. The rhizobacteria was applied as seed treatment and soil drench. All bacterial treated plants showed better growth character, milder symptom expressions than control and increased the peroxidase enzyme activities and ethylene but these depends on the species. It slightly affected the accumulation of TMV, however it suppressed the ChiVMV accumulation. Based on the morphological characters and full length nucleotide sequences analysis of 16S r-RNA, *Bacillus cereus* (I-35) and *Stenotrophomonas sp* (II-10) were the potential isolates as PGPR.

Key words : multiple viral infection, rhizobacteria, *Bacillus cereus*, *Stenotrophomonas* sp, ISR

INTRODUCTION

Hot pepper (*Capsicum annuum*) is one of important vegetables in Indonesia. However, infection by plant pathogens, including plant viruses become a serious constraint for hot pepper production. The main viral disease infecting hot-pepper are *Chili veinal mottle virus* (ChiVMV), *Pepper veinal mottle virus* (PVMV), *Pepper mottle virus* (PeMoV), *Pepper severe mosaic virus* (PeSMV) and *Cucumber mosaic virus* (CMV). In Indonesia ChiVMV, CMV, TMV and recently Geminivirus are important viruses infecting hot pepper (Duriat, 1996; Sulandari 2004). In nature, multiple infection by pathogens is a natural phenomena which causes damage more severe than a single infection by a pathogen.

Management strategies to control plant viruses in Indonesia is limited to the use of resistant cultivars, culture management and most farmers rely on chemical insecticides to control the insect vectors. To minimize the use of pesticides which pollute the environment and to improve the effectiveness of virus disease control, the utilization of beneficial root colonizing bacteria isolated from the plant rhizosphere referred to as Plant Growth Promoting Rhizobacteria (PGPR) might offer a promising viral diseases control method as previously reported to be effective in controlling fungi, bacterial and viruses (Maurhofer et al., 1994; De Meyer et al., 1999; Murphy et al., 2000; Murphy et al., 2003). Plants develop an enhanced defensive capacity against a broad spectrum of plant pathogens after colonization of the roots by selected strains of nonpathogenic bio-control bacteria (Pieterse et al., 2000).

In Indonesia, the availability of hot-pepper resistant cultivars against either pest or diseases are

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