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BIOLOGICAL CONTROL OF *F. OXYSPORUM* f. sp. *LYCOPERSICI* CAUSING WILT OF TOMATO BY *PSEUDOMONAS FLUORESCENS*

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Abstract- *Pseudomonas fluorescens* is one of the major fungal biocontrol agents found in the soil and the rhizosphere of various crop systems. Ten isolates of *P.fluorescens* were isolated from rhizosphere soil samples collected from various tomato-growing fields and evaluated for their efficacy in increasing seed quality variables of tomato and in inhibiting the mycelial growth of *Fusarium oxysporum*. *Pseudomonas* isolate 2 produced effective results and was selected and mass multiplied. Talc and sodium alginate formulations of mass multiplied using different agents were prepared and evaluated for their effects against fusarium wilt under greenhouse conditions. Fresh cultures of Pf2 isolate was found to increase seedling emergence and reduce fusarium wilt disease incidence when compared to the control and the formulations.
Keywords: *Pseudomonas fluorescens;* formulation; mass production; seed quality; tomato wilt control

INTRODUCTION

The production of tomato is of worldwide agricultural importance. Tomato (*Lycopersicon esculentum* Mill.) is one of the most popular important commercial vegetable crops rich in vitamins A, B, and C grown throughout the world. In India, it occupies an area of 0.54 million ha with a production of 7.60 million tons [1]. Many diseases and disorders can affect tomatoes during the growing season. *Fusarium oxysporum* f.sp. *lycopersici* (FOL) is a highly destructive pathogen of both greenhouse and field grown tomatoes in warm vegetable production areas. The disease caused by this fungus is characterized by wilted plants, yellowed leaves and minimal or absent crop yield. There may be a 30 to 40% yield loss [2].

Management of seed-borne and soil-borne diseases such as wilt caused by *Fusarium* species has always been problematic [3, 4]. Soil solarization/disinfection, crop rotation and mixed cropping are the best ways of eliminating soil borne pathogens [5]. Seed treatment with synthetic fungicides such considerably reduce wilt incidence in tomato. However, their use is costly as well as environmentally undesirable [6]. The use of resistant varieties is one of the most effective alternative approaches to controlling wilt disease [7]. But, due to breakdown of resistance in the face of high pathogenic variability in the pathogen population, the usefulness of many resistant cultivars is restricted to only a few years. Thus there is a need to develop alternative strategies to provide durable resistance over a broad geographic area. In this context, biocontrol is an eco-friendly way of managing fusarium wilt in tomato which offers an alternative to fungicides [8]. *Pseudomonas* sp. are the most extensively studied plant growth-promoting rhizobacteria (PGPR), and are known to protect the plant from many deleterious soil and foliar plant pathogenic microorganisms [9, 10]. There is evidence that *Pseudomonas* have a role in the suppressiveness of certain soils to Fusarium wilt of flax radish and cucumber [11]. *Pseudomonas fluorescens isolate Pf1* biovar I showed the lowest disease incidence in tomato and hot pepper respectively, and increased the plant growth under green house conditions. Powder formulations of Pf1 biovar1 was effective in controlling the disease and promoted the plant growth under field conditions [12].

The major constraint for extensive use of biological control under field conditions is a lack of knowledge concerning how to mass produce and properly deliver biocontrol agents [13]. In the present study, *Pseudomonas fluorescens* isolates were isolated from rhizosphere, checked for their *invitro* antagonistic activity, formulated and evaluated for their ability to control fusarium wilt and promote growth of tomato plants under greenhouse conditions. The media chosen for study were talcum powder and sodium alginate formulations.

MATERIALS AND METHODS

Seed material

Tomato seeds of PKM variety were obtained from local seed agencies, Mysore district, Karnataka state, India. The seeds were surface- sterilized with 0.5% sodium