Trichoderma Species Associated with Medicinal Plants

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Objective: The genus Trichoderma comprises a great number of fungal strains that act as biological control agents, the antagonistic properties of which are based on the activation of multiple mechanisms. Methods: Trichoderma strains exert biocontrol against fungal phytopathogens either indirectly, by competing for nutrients and space, modifying the environmental conditions, or promoting plant growth and plant defensive mechanisms and antibiosis, or directly, by mechanisms such as mycoparasitism. In order for identification of Trichoderma species, sampling was performed from plant tissues and soil samples of medicinal plants in the South Khorasan province during 2012-2114 years. Several isolates of Trichoderma were isolated from soil and tissue samples using the Trichoderma selective medium. Results: Isolates were identified based on macroscopic and microscopic morphological characteristics such as a growth and shape of the colony, type of conidiophore formation, shape and size of phialide and conidium on CMD and MEA and using valid Trichoderma keys. So far, four species were identified harzianum, crassum, brevicompactum, and virens spices. T. harzianum was the most frequent species among isolates and isolated from Russian olive, Camelthorns, Jujube, Barberry and Basil samples.

1. INTRODUCTION

Trichoderma species, which present in manure, soil and decaying plant tissues, are avirulent plant symbionts and parasites of other fungi (Kubicek et al., 1998). Their dominance in soil may be attributed to their diverse metabolic capability and aggressive competitive nature (Harman, 2006). Trichoderma controls phytopathogen with secretion antibiotics and fungal cell wall degrading enzymes, out compete pathogenic fungi for nutrients and mycoparasitism mechanisms. (Chincholkar and Mukerji, 2007). More than 1700 species of medicinal and industrial plants are known in Iran which only 200-300 species are harvested. Others spontaneously grow, dry and die without any use (Amin, 1991). The aim of this study was to identify and characterized Trichoderma spices associated with medicinal plants in South Khorasan province for improve the production and quality of medicinal plants.

2. MATERIALS AND METHODS

Soil samples were collected from different regions of South Khorasan province in the east of Iran during 2012-2014 years. Trichoderma strains were isolated from soil samples by first washing the soil using sterilized water, 1/10,000 dilutions of the samples were prepared, and then followed by plating 1 mL of the soil dilutions on potato-dextrose agar (PDA; 20 g white potato boiled and filtered, 20 g dextrose, 20 g agar, 1,000 ml distilled water) in a 9-cm-diam petri plate at 25°C in darkness
about the plant species in the family Fabaceae. Barberry is a genus of flowering plants in the family Rosaceae. It is a shrub native to central and southern Europe, northwest Africa, and western Asia. It is also naturalized in northern Europe, including the British Isles and Scandinavia, and North America. Zereshk is a Persian name for the dried fruit of Berberis spp. especially that of B. integerrima, which is widely cultivated in Iran (Tehrani, 2002). Colletotrichum gloeosporioides, C. acutatum, Pestalotiopsis sp., Phomopsis sp., Sclerotinia sclerotiorum, and Alternaria spp. were found to be associated with stem, leaf, flower, and fruit disease of barberry (Waipara et al., 2005; Jahan et al., 2013; Stakman and Fletcher, 1930). The application of Trichoderma species which isolated in this research can control foliar and soil borne pathogens in Barberry. Basil (Ocimum basilicum L.) is cultivated in large quantities in different regions of Iran (Sajjadi, 2006). Recently, there has been much research into the health benefits conferred by the essential oils found in basil.
Scientific studies in vitro have established that compounds in basil oil have potent antioxidant, antiviral, and antimicrobial properties, and potential for use in treating cancer (Stakman and Fletcher, 1930; Gülçin et al., 2007). *T. harzianum* isolates may induce systemic resistance, increased nitrogen use efficiency and increasing the number of deep roots in Basil plants. *T. harzianum* has been reported from all the geographical regions of the world on a wide range of crop plants (Kubicek et al., 1998). The use of *Trichoderma* products control diseases and enhance growth of crops as a short term effects and reduce pesticide applications as a long term effects. Presently, *Trichoderma*-based products are considered as relatively novel biological control agents which can help farmers reduce plant diseases and increase plant growth.

REFERENCES


