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Fungicide Use to Treat This Condition Can Harm the Ecosystem and Breed Genetically Resistant Fungus Phytopathogens

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Description

Capsicum annum is a major vegetable crop consumed worldwide as a spice, vegetable, pickle, condiment, and sauce. Each year in of the yield loss of hot peppers is caused by Fusarium wilt. Controlling this disease using fungicides can pollute the environment and induce genetic resistance in fungal phytopathogens. To solve this serious problem, it is necessary to look for economically safe, long-lasting, and effective bio control alternatives. Therefore, the objective of this work was to evaluate antagonistically active Trichoderma strains against. Oxysporumf.sp.capsici using a dual culture assay. The results of this study revealed that out of Trichoderma isolates tested in vitro, only six varied hamate vixens and longibrachiatum strains showed a varying rate of bio control activity toward the tested pathogen. Of six isolates, three strains showed effective antagonists against the root pathogen Fusarium oxysporum of hot pepper with a colonization percentage of respectively [1].

These Trichoderma strains showed higher inhibition efficiency against the mycelia growth. *Oxysporum* with good stress tolerance temperature, pH, salt concentration, and heavy metals ability. The isolates also produce different hydrolytic enzymes amylase, protease, cellulose, and chitins with mycoparasitism potential against the mycelia growth of *F. oxysporum*. Therefore, the results of this study concluded that Trichoderma strains showed potential bio control effects with wide stress tolerance ability against the root pathogen. Oxysporum of hot pepper and can thus be recommended as the best alternative for wide greenhouse and field trial evaluations. *Capsicum annul* L. is a vegetable crop, commonly known as bell pepper, sweet pepper, hot pepper, or chili, that is widely grown in several parts of the world. It is consumed as a spice, vegetable, pickle, condiment, and sauce. Internationally, pepper is consumed as a spice and has become an ingredient in medicines and beverages [2].

Hot peppers have high nutritional value, comprising diverse biochemical compounds such as antioxidant phenolic compounds, volatile oils, fatty oils, capsaicinoids, carotenoids, vitamins A, C and E, potassium, folic acid, protein, fibre, and mineral elements . However, the heavy loss of hot pepper yield is increasing due to phytopathogens. Plant disease needs to be controlled to maintain the quality and enhance the productivity of the crops produced by farmers across the world. Beyond good agronomic and agricultural practices, farmers use different approaches to prevent, mitigate, or control plant diseases such as chemical fertilizers, herbicides, fungicides, and pesticides. Such inputs significantly contribute to crop quality and productivity enhancement. However, the environmental pollution caused by excessive use or misuse of agrochemicals is not underlined by most farmers. In addition to causing pollution and harmful effects to human health and the environment, the use of chemicals for the control of plant pathogens also enhances the development of chemical resistant phytopathogenic strains.

Worldwide, plant fungal diseases are the most important issues in agriculture and food production. It is estimated that losses due to plant diseases account for approximately half of all crop losses in developing countries, with fungal diseases accounting for one-third of these losses oxysporum is one of the fungal predominant pathogens that induce destructive wilt in more than 100 plants and is ranked out of the most lethal death-causing plant pathogens. Fusarium wilt is the most economically important disease of hot pepper caused by F. oxysporum. It is responsible for up to of hot pepper yield losses. Recent efforts have focused on developing economically safe, long-lasting, and effective bio control methods for the management of plant diseases [3]. Biological control is the suppression of disease by the application of a bio control agent, usually a fungus, bacterium, virus, or a mixture of these, to the plant or the soil.

The main advantage of using is that they are highly specific for a pathogen and hence are considered harmless to no target species. Over the past decades, there have been a number of reports conducted on the identification and utilization of effective for fungal and bacterial diseases in crops, and a number of are in commercial production. Recently, the use of has attracted a lot of interest due to the ability of some species to suppress different plant diseases and the possibility of combining them with other control methods. There has also been a great demand for safer, alternative, and effective control agents. Globally, among the fungi that constitute effective, species of the genus Trichoderma are well known as model organisms because of their ability to multiply, spread, isolate, and culture easily. The use of Trichoderma for bio control of Fusarium wilt is not only safe for farmers and consumers but also an environmentally acceptable alternative [4].

Trichoderma uses several bio control mechanisms against the growth of a number of phytopathogenic organisms, including bacteria, nematodes, and purposively fungi *Pithier*, *Phytophthora*, *Botrytis*, *Rhizoctonia*, and *Fusarium*, by either direct interaction hyper parasitism, competition for nutrients and space, and antibiosis or indirectly by enhancing their ability to take up nutrients, increasing stress tolerance, promoting plant growth, bioremediation of the contaminated rhizosphere, and producing several secondary metabolites, enzymes, and pathogenesis-related proteins [5]. Trichoderma has become one of the most researched subjects today, and many commercial preparations have been developed and used against plant pathogens, many studies have been conducted on the bio control of F. oxysporum using entophytic or rhizospheric bacterial isolates of hot pepper, but the documented information on bio control of this pathogen using *Trichoderma* fungi is very limited. This necessitates the current research to be conducted. Therefore, the present study was focused on the isolation, characterization, and selection of Trichoderma strains that have the ability to suppress and limit the growth.

Conflict of Interest

None.

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