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# MOLECULAR DIAGNOSIS OF *FUSARIUM OXYSPORUM* F.SP. *LYCOPERSICI* AND PROVING ITS PATHOGENIC CAPACITY ON THE INCIDENCE OF *FUSARIUM* WILT DISEASE

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**ABSTRACT : This study was conducted at the Mycotoxins laboratory, Department of Plant Protection, College of Agriculture, University of Baghdad for the purpose of diagnosing pathogen *Fusarium oxysporum* f.sp. *lycopersici* molecular. The DNA was extracted for identification of the fungal isolate, the polymerase chain reaction (PCR) was also used. Sample were found to contain DNA fragments 593 bp in size. The result was a the closest match 99% similarity in the NCBI GenBank database was found to be with *F. oxysporum*. The ITS rDNA sequence of strain have been deposited in the NCBI GenBank database (GenBank Accession numbers MH458918). And pathogen isolate affected the percentage of seed germination has reached 16.55% compared to the treatment of control, which was recorded 100%.**

***Key words :*** Fusarium wilt, *Fusarium oxysporum* f.sp. *lycopersici*, pathogenicity, molecular diagnosis.

## INTRODUCTION

Tomato (*Solanum lycopersicum*) belongs to the Family Solanaceae, is one of the world's most widely cultivated vegetable crops (Srivastava *el at*, 2010; McGovern, 2015). Low yield of tomato is attributed to its susceptibility to several pathogenic fungi, bacteria, viruses and nematodes which are major constraints to tomato cultivation such as Fusarium wilt, gray mold, early blight, tomato leaf curl disease, bacterial wilt, damping off and Verticillium wilt. Among these, *Fusarium oxysporum* f.sp. *lycopersici* (FOL) (Sacc.) W.C.Synder and H.N. Hans, incident of vascular wilt of tomato, alone causes 30-40% yield loss and in India, under adverse weather conditions, the losses may reach as high as 80% (Bawa, 2016; Nirmaladevi *et al,* 2016; Sidharthan *et al*, 2018).

Several applied methods have been used to combat this disease there is no one effective way to fight soil borne pathogens resulting in the use of more than one method to reduce economic losses caused by *Fusarium oxysporum* and the most important of these methods is the use of alternative methods of pesticides and safe for the environment (Fayyadh *et al*, 2012 ; Zouari *et al*, 2016; Al-Waily *et al*, 2018).

The pathogen invades the root epidermis and extends into the vascular tissue. It colonizes the xylem vessels producing mycelium and conidia. The characteristic wilt symptoms appear as a result of severe water stress, mainly due to vessel clogging (Kennelly, 2007; Girhepuje and Shinde, 2011; Ramanathan *et al*, 2010; McGovern, 2015). Three physiological races (1, , and 3) of the pathogen are distinguished by their specific pathogenicity to tomato cultivars (Reis and Boiteux, 2007; Biju *et al*, 2017). Since *F. oxysporum* f. sp. *lycopersici* (Fol) is an asexual fungus, genetic exchange occurs via somatic fusion and hetreokaryon formation between vegetative compatible strains (Leslie, 1993).

Molecular techniques have become one of the most high efficiency in determination relationships between fungal *F. oxysporum* and formae specials and differentiate (distinguishable) them and the detection of their races as well as determine the resistance of tomato varieties and sensitivity to disease. By comparing the DNA sequence and identify internal transcribed spacer (ITS) reqions in diagnosis its formae specials (Schilling *et al*, 1996; Takken and Rep, 2010).

## MATERIALS AND METHODS

### Isolation of pathogen

The isolate of *Fusarium oxysporum* f.sp. *lycopersici* was obtained of the Mycotoxins Laboratory, Department of Plant Protection, College of Agriculture, University of Baghdad, characterization morphological and restored Molecular characterization using PCR technique.

### Pathogenicity test

Used sterile soil 2:1 for Pathogenicity test fungal FOL