



**Investigation on the effectiveness of nano-silver in controlling *Fusarium oxysporum* as main plant pathogen fungi and one of the best fungal Candidate for Biosynthesis of nano-silver**

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### Abstract

In this study we investigated effectiveness of nano-silver in different tests and methods on *Fusarium oxysporum* f.sp *lentis*, as main pathogen of lentil. Different tests were conducted to realize type of effects. Genestate (sporulation inhibitor), fungicide (fungus killer), fungistate (fungus growth inhibitor) or complex of them. When the spores were dipped in nano-silver (liquid phase), 5ppm it had fungicide effect, when the nano-silver combined with the media, and fresh spores cultured on it, at 30-130 ppm had fungistate and at 150 ppm had fungicide effects. When nano-silver combined with different media (WA, PDA, and PPA) and one disc of fresh fungus (5mm) put on it, diameter of growing colony was very different. In the other hand, in WA media the fungus just grew on disc, not beyond. In PPA media at 200 and 500 ppm of nano-silver, growth of colony was significantly fewer than control colony. In PDA media it was no effective. At greenhouse condition where pathogen, plants and nano-silver were added to the sterile soil, result were noticeable, nano-silver could not control the pathogen and wilting of plants, took place more quickly (synergist effects), than "fungus control samples", which were treated with fungus inoculums alone. In "nano-silver control samples" the plants growth were vigorous and better than control samples. Nano-silver had positive effect at 100, 200, 500 ppm, but at 1000ppm it showed phytotoxicity on the lentil. This fungus can reduce nano-silvers in liquid phase from AgNO<sub>3</sub>.

**Key word:** Nano-silver; *Fusarium oxysporum* f.sp *lentis*; Agriculture; lab condition; greenhouse condition; Biosynthesis

### 1. Introduction

Nowadays nano-silver becomes one of the challengeable nano particles. With noticeable Antimicrobial effects, particularly against some bacteria. In the other hand, there are many concerned about its toxicity for beneficial microbes such as nitrifying bacteria and many environmental aspects (Kristen 2008). However the first step for register one martial as a fungicide is the important and determining effective dosage for controlling the target fungus correctly. Stages of fungi life cycle and made of action of fungicidally must be explained. The mechanism of inhibitory action of silver ions on microorganisms to some extent is known. It is believed that DNA loses its replication ability and cellular proteins become inactivated on Ag<sup>+</sup> treatment (sondi 2004). In addition, elsewhere demonstrated that nano-silver react with proteins by combining the -SH groups of enzymes; consequently, this reaction leads to the inactivation