Synthesis and Application of Silver Nanoparticles against *Xanthomonas vesicatoria*, the Causal Agent of Tomato Bacterial Spot

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Silver nanoparticles (AgNPs) gained increased interest, since silver may penetrate into bacterial cells inducing cell death. Several factors during their production (pH, temperature, reaction time and the method used for synthesis) greatly influence the quality of nanoparticles, thus limiting or enhancing their applications. We aimed to: 1) understand the effect on AgNPs synthesis of two different methods (heating or injecting the precursor solution) during two different exposure times (12 or 15 h); 2) characterise synthesised nanoparticles and 3) assess the *in vitro* efficacy of nanoparticles against *Xanthomonas vesicatoria*. In our study, AgNPs were synthesised by chemical reductions, using chitosan as a capping agent that stabilises the synthesised nanoparticles. As a precursor of Ag, silver nitrate was added. The size and shape of silver nanoparticles were characterised by Transmission Electron Microscopy (TEM). Confirmation of the atomic species was done using the Energy Dispersive X-ray Spectroscopy (EDS). TEM micrographs demonstrated that we synthesised monodispersed, cubic shaped AgNPs, ranging from 5 to 80 nm. *In vitro* experiments showed a marked antibacterial activity of AgNPs against *X. vesicatoria*, better than copper sulphate. The observed minimum inhibitory concentration (MIC) of nanoparticles was 15 and 20 µg/ml, when they were obtained by the injection method, with 12 and 15h reduction time respectively. Alternatively, when the precursor solution was heated and exposed to 15 h reduction time, nanoparticles agglomerated, thus reducing their activity. Our study showed the potential of silver nanoparticles to control *X. vesicatoria*.