



شبكة المعلومات الجامعية
التوثيق الإلكتروني والميكروفيلم

بسم الله الرحمن الرحيم



MONA MAGHRABY



شبكة المعلومات الجامعية
التوثيق الإلكتروني والميكروفيلم



شبكة المعلومات الجامعية التوثيق الإلكتروني والميكروفيلم



MONA MAGHRABY



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التوثيق الإلكتروني والميكروفيلم

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التوثيق الإلكتروني والميكروفيلم

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Effect of Nano Silver Particles (AgNps) on ESBL Producing *Klebsiella* spp. and *E. coli* in Pets

A Thesis Presented by:

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(BVSc, Benha University, 2011)

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To

Cairo University

Faculty of veterinary medicine,

**For the degree of Master in Veterinary Medical Science
(Microbiology)**

Under Supervision of

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Cairo University
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Approval sheet

This is to approve that the thesis titled:

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Dedicated to
My Dear Father,
My Dear Mother,
And
My dear husband

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Thesis for the MVSc. Degree in Microbiology

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Abstract

Despite the presence of variety of modern antibacterial drugs, bacterial infections are remaining a major threatening problem due to the enormous increase in Multi- Drug resistant bacteria. Nanoparticles have become extensively used as an applicable and safe alternative to antibiotics. We aimed to explore the inhibitory effect of Silver nanoparticles on Extended Spectrum Beta Lactamase (ESBL) producing *E. coli* and *Klebsiella* spp. invitro as well as their effect on the expression of antibiotic resistance genes. Different samples (Wound swabs, Fecal swabs and urine samples) were collected from dogs and cats. Both phenotypic and molecular identification, antibiotic susceptibility testing, Double Disk Synergy test were carried out for identification of ESBL producing *E. coli* and *Klebsiella* spp. Silver nanoparticles were tested for their invitro antibacterial potential and the Minimum bactericidal concentration (MIC) and Minimum bactericidal concentration (MBC) were evaluated. Moreover, the effect of silver nanoparticles on the expression of antibiotic resistance genes (*bla*TEM, *bla*SHV and *bla*CTX) was assessed as well as their effect on the structural integrity of the bacterial cells using Scanning Electron Microscope (SEM). Results revealed that 23 isolates (19.16%) (*E. coli* =17, *Klebsiella* spp.=6) were confirmed as ESBL producing. Silver nanoparticles showed a promising antibacterial effect where MIC of AgNPs for ESBL producing *E. coli* was 0.31 mg/ml, and 0.62 mg/ml for ESBL-producing *Klebsiella* spp., while MBC of ESBL-producing *E. coli* and *Klebsiella* spp. was 0.15 mg/ml and 0.3 mg/ml respectively. Consequently, the expression of antibiotic resistance genes was down regulated in both bacteria species and there was a noticeable toxic effect of AgNPs on *E. coli* and *Klebsiella* spp. cells which was investigated using SEM. It can be concluded that silver nanoparticles have a promising antibacterial activity and could be considered an applicable alternative for control of ESBL producing bacteria.

Keywords: ESBLs, Pets, Silver nanoparticles, *E. coli*, *Klebsiella* spp.

