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## ENVIRONMENTALLY FRIENDLY PHYTOSYNTHESIS OF SILVER-BASED MATERIALS USING *Cornus mas* L. FRUITS

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### Abstract

The aim of the present study was to prepare environmentally friendly silver-based materials using *Cornus mas* L. fruits extract. For this purpose, silver nanoparticles (*Cornus mas*-AgNPs) were green synthesized using this plant extract. The bioreduction of silver ions was analyzed by UV–VIS and ATR-FTIR spectroscopic studies. Scanning Electron Microscopy (SEM) analysis revealed the formation of spherical phyto-nanosilver particles with size ranging between 12 and 40 nm. Different amounts of double walled carbon nanotubes (DWCNTs) were mixed with these herbal silver nanoparticles to obtain stable hybrids. The *Cornus mas*-AgNPs-(1 mg) DWCNTs hybrid presented the highest physical stability with zeta potential value of -31.1 mV. The DPPH radical-scavenging assay revealed high antioxidant activity (AA%) values (more than 93%) of all samples. The silver-based materials showed significant antibacterial activity, the most potent biocides being *Cornus*-AgNPs which provides inhibition zones of 23 mm, 20.3 mm and 15.3 mm against *Staphylococcus aureus* (ATCC 25923), *Enterococcus faecalis* (ATCC 29212) and *Escherichia coli* (ATCC 8738), respectively. The results obtained in this study open the perspective of applying these eco-friendly materials based on phytonanosilver, in the biomedical field (as drug delivery systems carrying bioactive cornelian principles) or in bionanotechnology (as antimicrobial and antioxidant coating).

**Key words:** antimicrobial activity, antioxidant properties, *Cornus mas* L., environmentally friendly, silver-based material phytosynthesis

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