

PO-24

doi: 10.14232/tnpr.2019.po24

Green synthesis of silver nanoparticles using *Pinus nigra* bark aqueous extract and their potential applications

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This study aimed to develop an innovative, eco-friendly, cost-effective and rapid method for the synthesis of silver nanoparticles from a silver salt and *Pinus nigra* bark aqueous extract [1,2]. The extract had a total phenolic content of 1.26 mg/mL, procyanidins being major constituents as revealed by HPLC-DAD-ESI-Q-TOF-MS/MS analysis. The synthesis of silver nanoparticles was monitored by UV-VIS spectroscopy which showed a peak between 420 and 430 nm corresponding to the surface plasmon resonance of silver nanoparticles. Dynamic light scattering technique revealed uniform and stable silver nanoparticles indicated by a size range between 50 and 60 nm and a zeta potential of -16 mV. Electron transmission microscopy showed a uniformly distributed spherical shape, while the EDX analyse confirmed a crystalline elemental silver composition of the bio-synthesised silver nanoparticles. Moreover, the potential genotoxicity and antioxidant capacity of *Pinus nigra* bark aqueous extract before and after silver nanoparticles synthesis was screened using *Allium cepa* root apices and DPPH assays, respectively. To conclude, we present herein a facile route for the synthesis of silver nanoparticles which could be further explored for their therapeutic applications due to promising antioxidant and cell cycle arrest potential.

References

[1] Karthika V et al. *J Photochem Photobiol B*. 2017; 167:189-199.

[2] Nasiriboroumand M et al. *J Photochem Photobiol B*. 2018 ; 179 :98-104.