Cytotoxic activity of silver nanoparticles synthesized using aerial part and root extracts of *Lythrum salicaria* L.

Nikola Srećković[1], Jelena S. Katanić Stanković[2], Paola Imbimbo[3], Daria Maria Monti[3], Vladimir Mihailović[1]

[1] University of Kragujevac, Faculty of Science, Department of Chemistry, Radoja Domanovića 12, 34000 Kragujevac, Serbia

[2] University of Kragujevac, Institute for Information Technologies Kragujevac, Department of Science, Jovana Cvijića bb, 34000 Kragujevac, Serbia

[3] University of Naples Federico II, Department of Chemical Sciences, Complesso Universitario Monte Sant'Angelo, via Cinthia 4, 80126, Naples, Italy

• Introduction

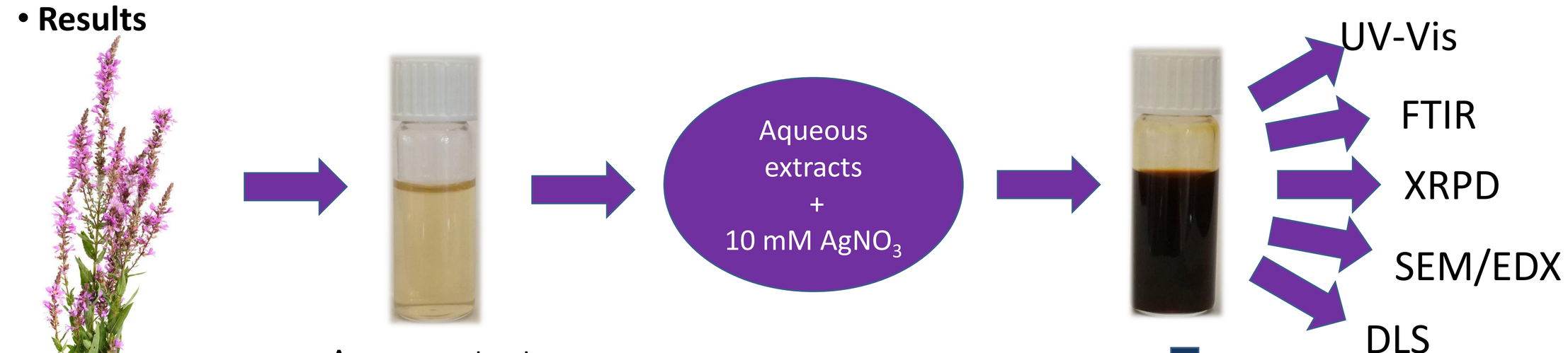
Employing biological materials, like plant extracts, for synthesizing various metallic nanoparticles proves to be more rapid, low-cost, and eco-friendly technology for large-scale production.[1] In this research silver nanoparticles (AgNPs) were synthesized using aqueous leaf (LSA-AgNPs) and root (LSR-AgNPs) extracts of *Lythrum salicaria* L., a plant know as purple loosestrife which is traditionally used for inflammatory diseases, gastrointestinal ailments, dysentery, and as astringent for external use.[2] The aim of this study was to evaluate the cytotoxic activity of synthesized silver nanoparticles against two normal cell lines (Human keratinocyte cell lines (HaCaT) and standard fibroblast cell line (3T3)) and two cancer cell lines (Human epidermoid carcinoma cells (A431) and fibroblasts cells (BalbC-3 T3)).

• Material and Methods

The powdered dried plant materials (10 g) were added in 100 mL boiling deionized water and left in it for 1 h. After boiling, the extract was filtered, and aqueous extracts were stored at 4°C and used within a week. For the synthesis of LSA-AgNPs and LSR-AgNPs silver nitrate (20 and 10 mM, respectively) was dissolved in aerial part and root aqueous extract of the plant.

For determination of cytotoxicity of LSA-AgNPs and LSR-AgNPs, cells seeded in 96-well plates were treated with different concentrations of LSA-AgNPs and LSR-AgNPs. After 48h incubation, cell viability was assessed by the MTT (3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide) assay.

• Results

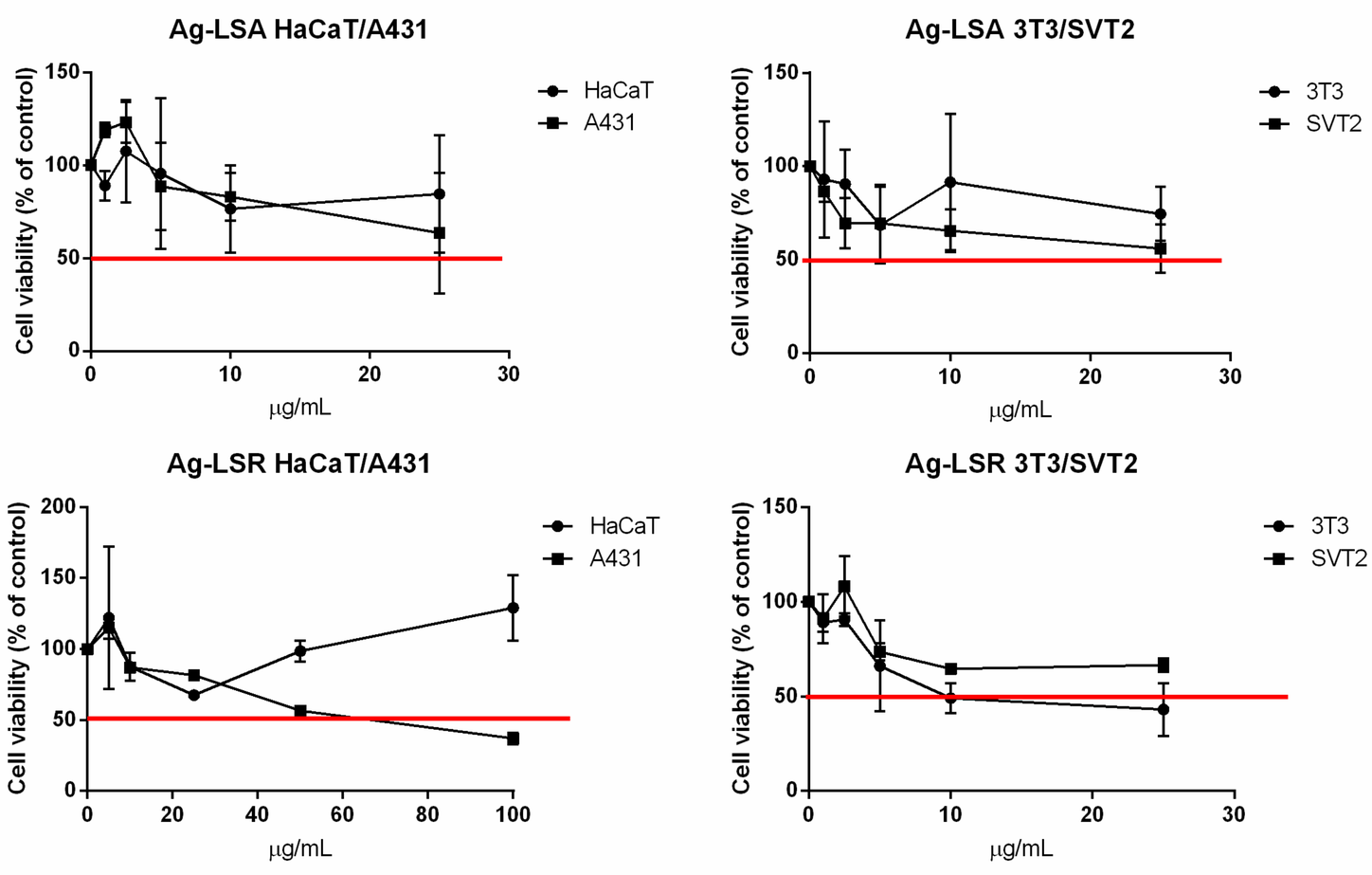


Lythrum salicaria L.

Aqueous extracts

• Conclusion

Considering observed selective cytotoxicity of LSR-AgNPs on normal and cancer cells, obtained nanoparticles deserve further research to find potential mechanisms of their selective cytotoxicity. Also, further research will be focused on decreasing size and increasing the selectivity of synthesized nanoparticles and their potential use for the incorporation of some drugs into their structure.



References:

1. H.P. Borase, B.K. Salunke, R.B. Salunkhe, C.D. Patil, J.E. Hallsworth, B.S. Kim, S. V. Patil, Plant extract: A promising biomatrix for ecofriendly, controlled synthesis of silver nanoparticles, Appl. Biochem. Biotechnol. 173 (2014) 1–29. https://doi.org/10.1007/s12010-014-0831-4.

2. N. Srećković, J.S. Katanić Stanković, S. Matić, N.R. Mihailović, P. Imbimbo, D.M. Monti, V. Mihailović, *Lythrum salicaria* L. (Lythraceae) as a promising source of phenolic compounds in the modulation of oxidative stress: Comparison between aerial parts and root extracts, Ind. Crops Prod. 155 (2020). https://doi.org/10.1016/j.indcrop.2020.112781.

Acknowledgments

This work was supported by the Ministry of Education, Science and Technological Development of the Republic of Serbia (Agreements No. 451-03-68/2020-14/200122 and 451-03-68/2020-14/200378).