



Melissa Officinalis L. leaf extract mediated synthesis of silver and gold nanoparticles



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Introduction

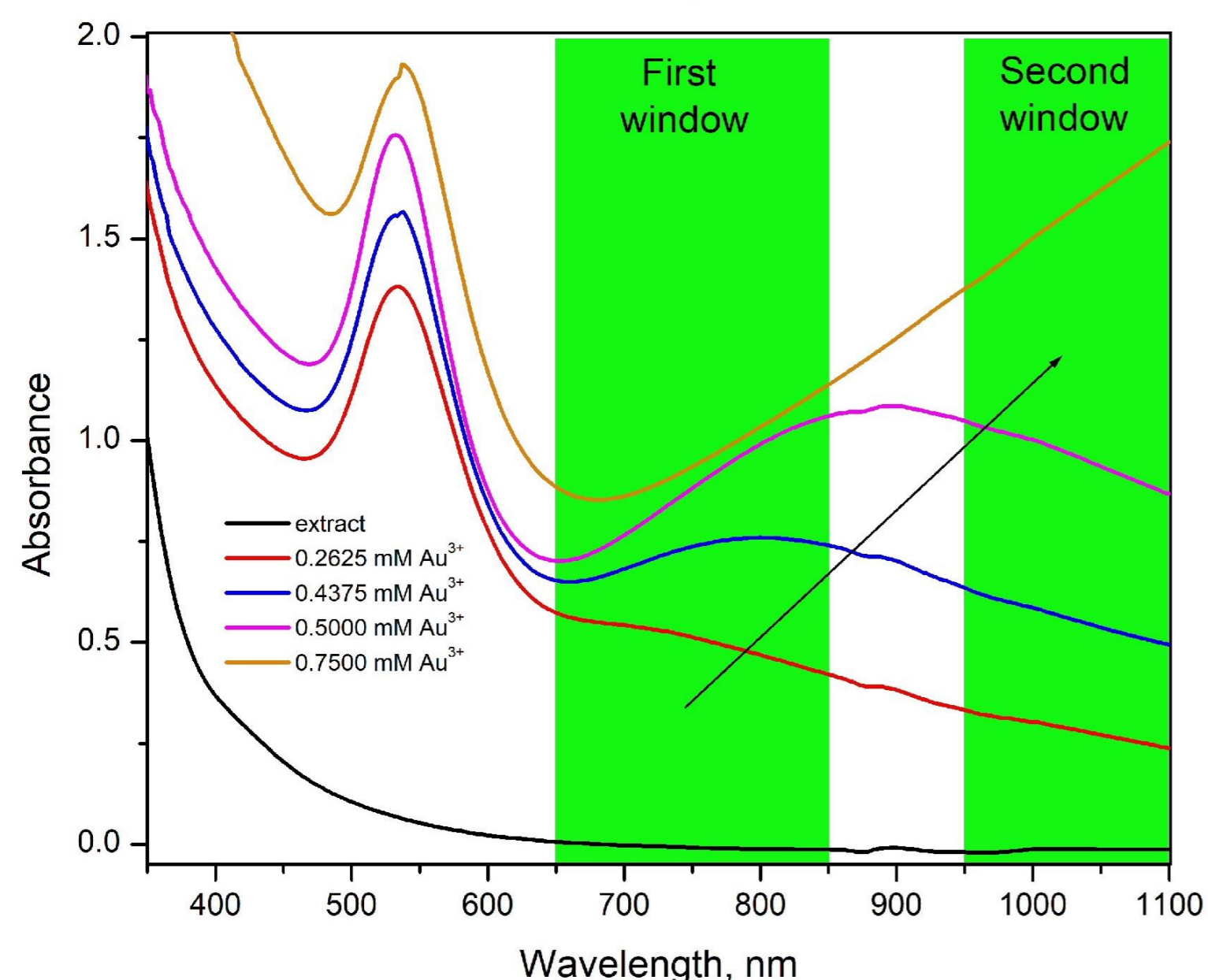
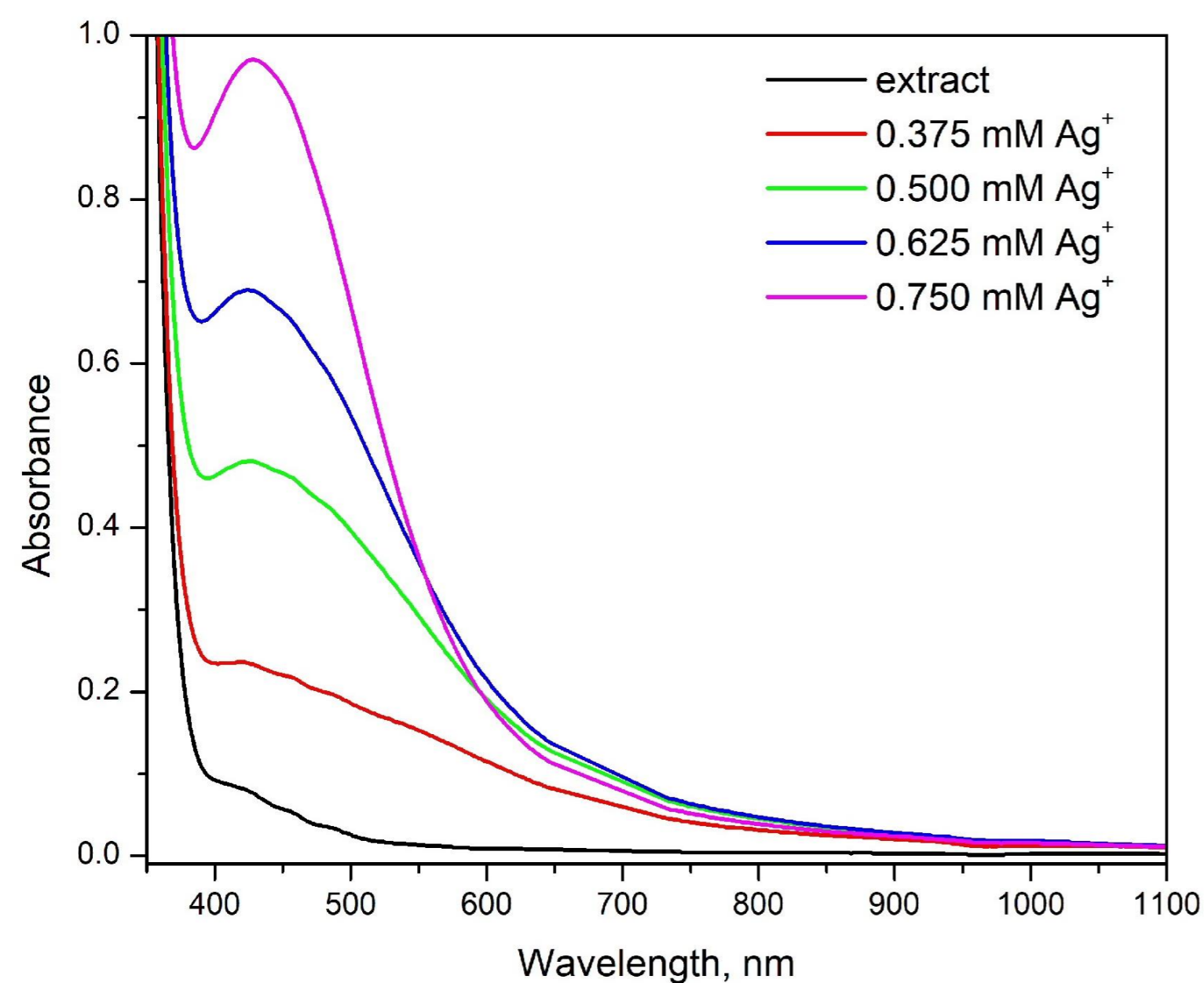
Plant extracts are extensively involved in the synthesis of various nanoparticles as a mild, renewable, and non-toxic reducing agent and efficient stabilizer in the absence of toxic and hazardous compounds. The complex composition of plant extracts opens the possibility of controlling the shape of the resulting nanoparticles (NPs) by directing their growth.

Silver and gold NPs have been synthesized using *Melissa Officinalis* L. leaf extracts prepared using different extraction conditions (composition of solvent and temperature).

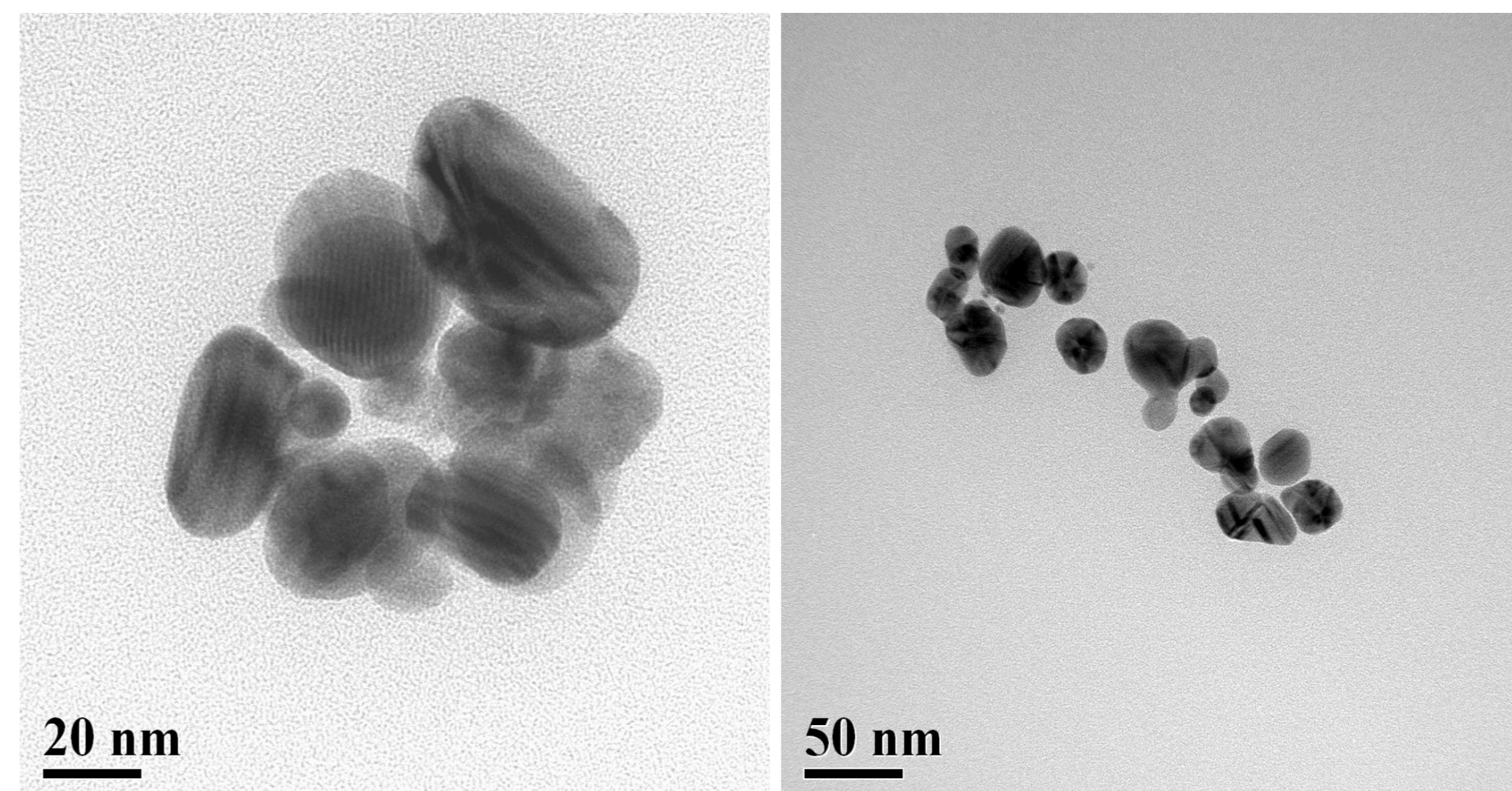
The aim of the study:

The research is focused on the preparation of biocompatible gold NPs with surface plasmon resonance absorbance maximum within the biological transparency window of 650-1350 nm, which is divided into two optical near-infrared ranges, at $\lambda = 650$ -850 nm and 950-1350 nm, respectively [1].

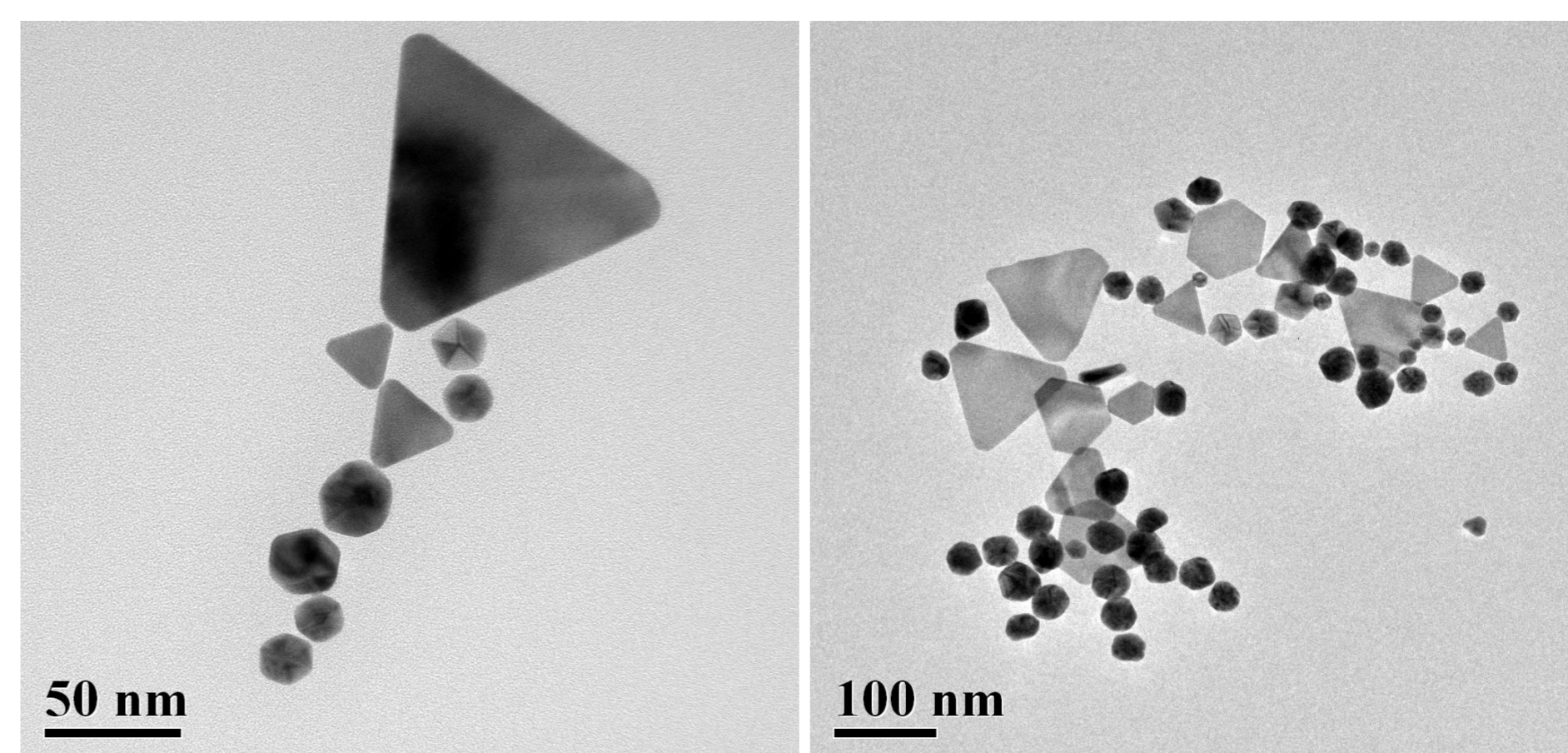
UV-Vis spectroscopy



TEM of silver nanoparticles



TEM of gold nanoparticles



Conclusions

1. The *Melissa Officinalis* L. leaf extract is chosen because this plant is known as a medical plant and the resulting NPs are expected to be biocompatible.
2. According to TEM, phytosynthesised silver and gold NPs have irregular shapes – pseudo-spherical silver and triangular gold. The results of UV-Vis spectroscopy are in agreement with the results of TEM.
3. The position of surface plasmon resonance maximum in near infrared range for gold NPs is a function of size and shape. This opens the possibilities for preparation of gold NPs for therapeutic aims. However, special attention must be paid to protocols for separation of NPs with different shapes.

References

1. Smith A., Mancini M., Nie S., Second window for in vivo imaging, *Nature Nanotechnology*, vol. 4, pp 710-711, 2009.

Acknowledgements

The study is supported by project "Development of protocols for fully "green" synthesis of non-spherical gold nanoparticles with response to near infrared radiation for biomedical applications" VEGA 1/0882/21, supported by the Scientific Grant Agency of the Ministry of Education, science, research and sport of the Slovak Republic and the Slovak Academy of Sciences.

