

Zelena sinteza nanočestica srebra upotrebom vodenog ekstrakta gljive *Fomes fomentarius* (L.)

Green synthesis of silver nanoparticles using the aqueous extract of *Fomes fomentarius* (L.)

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Fomes fomentarius (L.) is a woody, perennial fungus which develops as a parasite or saprophyte on the beech and other deciduous species¹. Previous studies have shown that *Fomes fomentarius* has hypoglycemic, anti-inflammatory, anti-infective and anti-tumour activities¹. Green synthesis of nanoparticles from botanical sources gained great attention because they offer many advantages such as eco-friendly and low-cost synthesis compared with chemical analysis methods. Although there are many studies reporting the synthesis of various nanoparticles using plant extracts, those reporting green synthesis of AgNPs particles using aqueous extract of *Fomes fomentarius* are practically nonexistent. In this investigation we report the green synthesis of AgNPs by *Fomes fomentarius* as a reducing agent at ambient temperature.

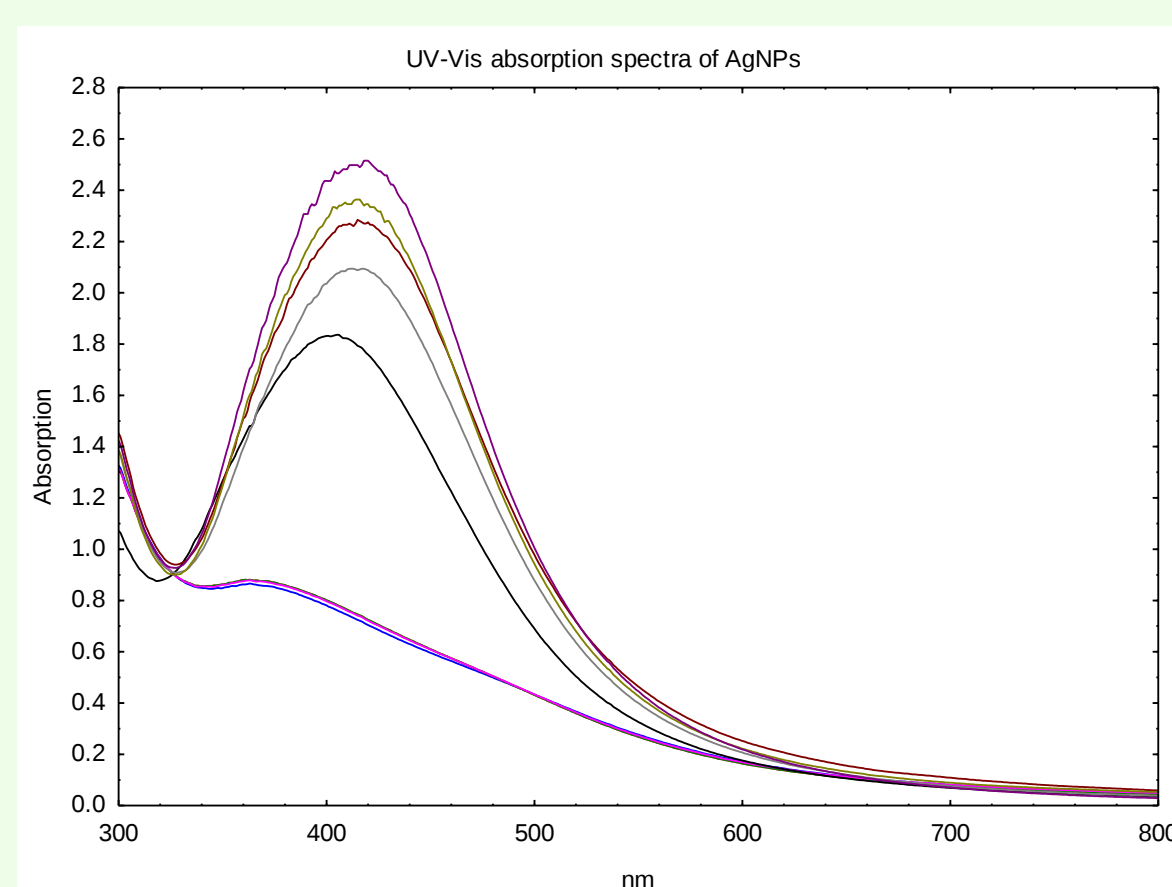


Figure 1. UV absorption spectra

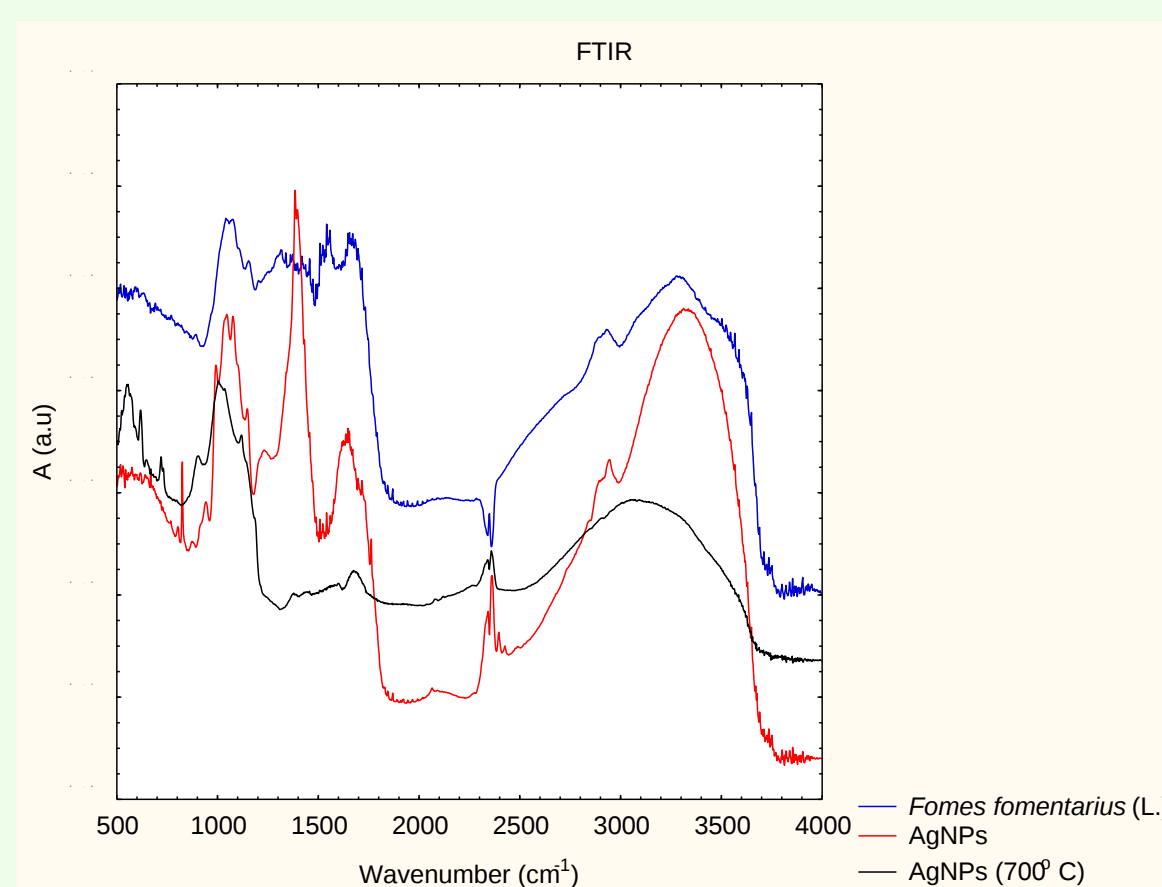


Figure 2. FTIR spectra of *Fomes fomentarius*, AgNPs and AgNPs after calcination

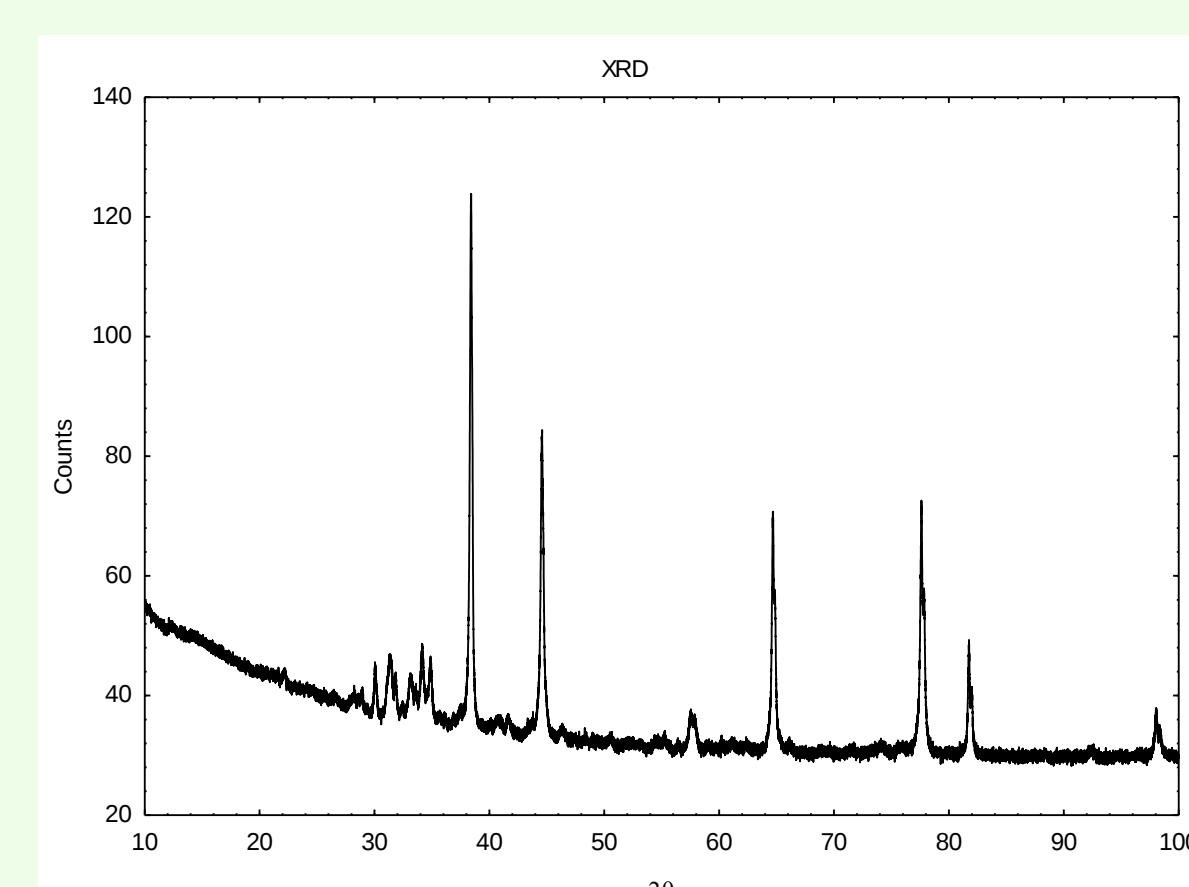


Figure 3. XRD pattern of AgNPs

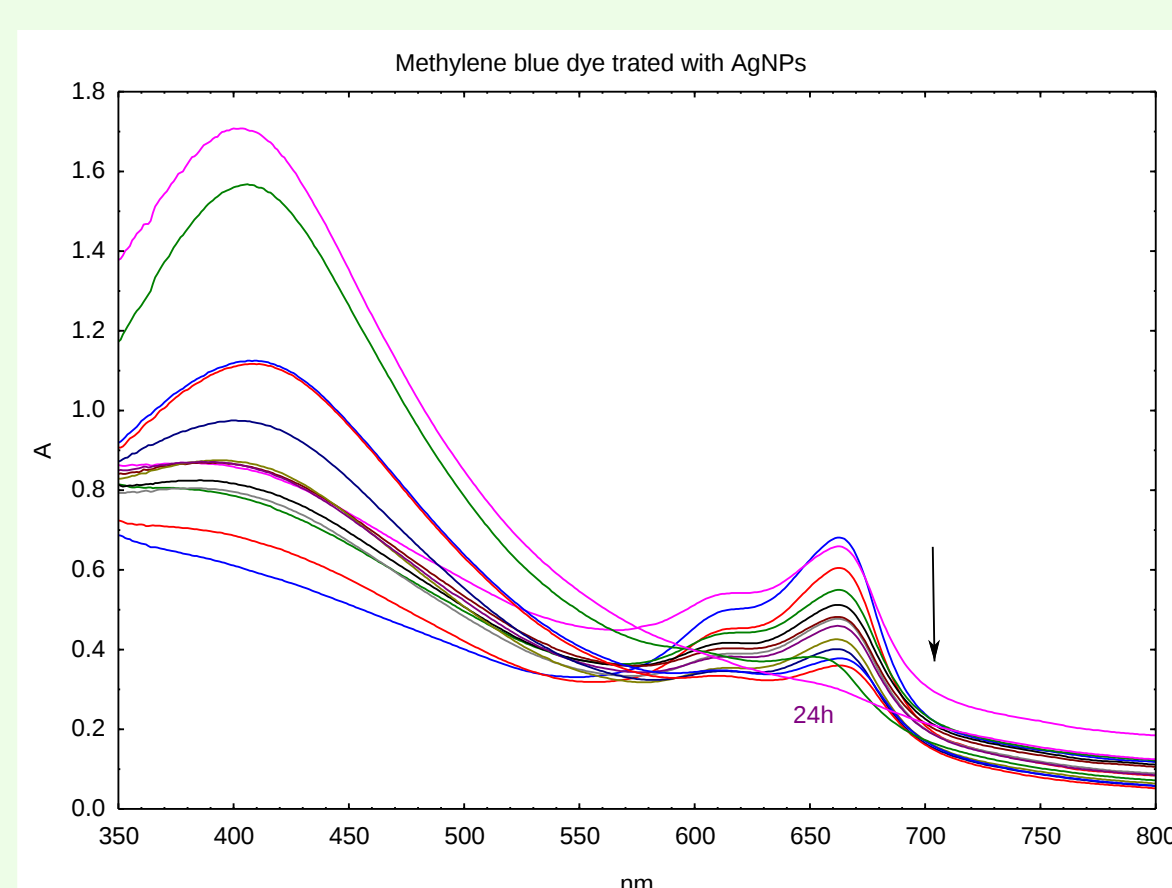


Figure 4. Absorption spectra of methylene blue dye treated with AgNPs

Table 1. Minimum inhibitory concentrations (MIC) of AgNPs particles synthesized using aqueous extract of *Fomes fomentarius* against *Escherichia coli*, *Pseudomonas aeruginosa*, *Bacillus subtilis*, and *Staphylococcus aureus* (mg mL⁻¹).

MIC (mg mL ⁻¹)			
<i>B. subtilis</i>	<i>S. aureus</i>	<i>E. coli</i>	<i>P. aeruginosa</i>
0.050	0.0125	0.0125	0.100

Conclusions

The absorption band that is characteristic of monodispersed spherical AgNPs was observed at 414 nm. From XRD data, the AgNPs crystallite diameter of 31 nm was obtained using the Scherrer equation. The investigation displayed the good catalytic activity of nanoparticles on the degradation of methylene blue dye. The results showed that methylene blue has been degraded after 24 hours.

The AgNPs particles synthesized using aqueous extract of *Fomes fomentarius* showed good antibacterial activities against *E. coli*, *P. aeruginosa*, *B. subtilis* and *S. aureus* (**Table 1**). The best antibacterial activity was seen against *S. aureus* and *E. coli*. The lowest activity was seen against *P. aeruginosa*. *P. aeruginosa* displays resistance to a variety of antibiotics, including aminoglycosides, quinolones and β -lactams². Generally, the major mechanisms of *P. aeruginosa* used to counter antibiotic attack can be classified into intrinsic, acquired and adaptive resistance.