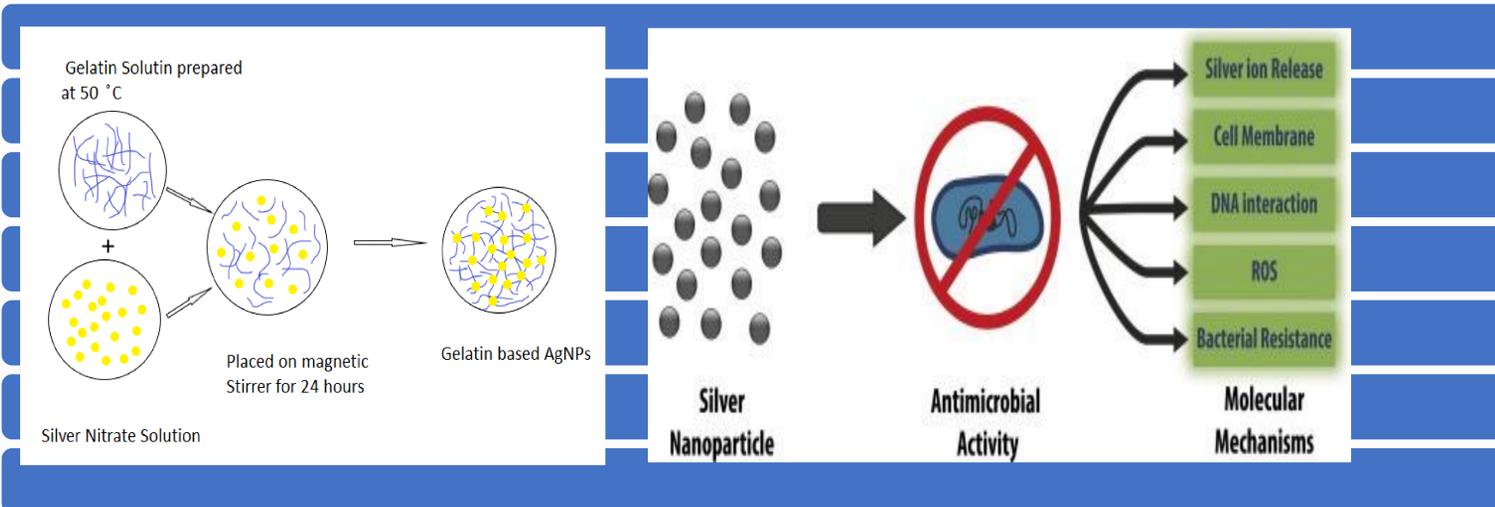


Gelatin Based AgNPs:

Synthesis & Characterization



• Synthesis

Source: <https://ars.els-cdn.com/content/image>

Discussion

- ❖ The small shift to the left (blue-shift) or to the right (red-shift) in the λ_{max} of the SPR peak could be related to obtaining AgNPs at various shapes, sizes or solvent dependencies of formed AgNPs. After reduction of silver nitrate using gelatin, the AgNPs obtained showed a characteristic SPR band for AgNPs centered at about 440 nm and 430 nm for AG-SC and AG-G, respectively (Figure 2). Moreover, for sodium citrate the absorbance intensities was also increased and slightly shifted to 440 nm.
- ❖ This phenomenon indicated that the size of particles was decreased, because the absorbance peak due to the SPR of metallic nanoparticles shows the red-shift with increasing particle size. The absorbance of samples produced with EDTA could not be measured because of very high and fluctuated absorbance values.
- ❖ The TEM size is smaller than the DLS results, this is because DLS gives the hydrodynamic diameter of the particles which is bigger than the actual size of particles when dried.

Methods and Materials

- ❖ This method involves the mixing of silver nitrate solution and gelatin solution on magnetic stirrer for specific time period.
- ❖ Gelatin solution was prepared in a beaker at 50°C.
- ❖ Subsequently different amount of silver nitrate solution was added to gelatin solution with the help of micropipette on magnetic stirrer.
- ❖ The speed of magnetic stirrer was maintained at optimum speed.
- ❖ The glass vial containing the mixed solution was kept for 24 hrs in the presence of light on magnetic stirrer.

Results

- ❖ UV-vis spectroscopy, which requires that AgNPs must display a surface plasmon resonance (SPR) band at around 400 nm can be seen in (Fig. 1).
- ❖ After reduction of silver nitrate using gelatin, the AgNPs obtained showed a characteristic SPR band for AgNPs centered at about 440 nm and 430 nm for AG-SC and AG-G, respectively (Figure 1).
- ❖ Spherical and uniform size particles were observed from TEM images as shown in figure 3.
- ❖ Gelatin based silver NPs also showed antifungal activity when evaluated for "MIC" in 96 well plate against *candida albicans* strains.

Conclusions

- ❖ Gelatin based nanoparticles are more composite and stable.
- ❖ Nanoparticles synthesized using gelatin as reducing and stabilizing agent have all the parameter in range and suit perfectly in the definition of nanoparticles.
- ❖ Gelatin based nanoparticles have antifungal characteristic with suitable Minimal Inhibitory Concentration (MIC) value (Fig 4).
- ❖ This method of synthesis of AgNPs is scalable and can be scaled up to manufacture antifungal drug loaded nanoparticles for effective pharmaceutical formulation.
- ❖ These nanoparticles can be evaluated for synergistic/additive effect with other antifungal drugs.

Figure 1. UV-Vis absorption spectra.

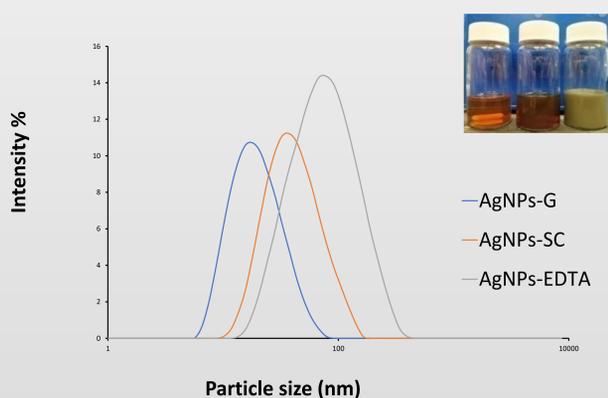


Figure 2. SPR of AgNPs-G & AgNPs-SC

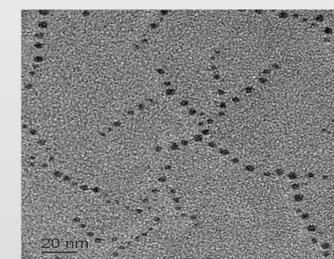
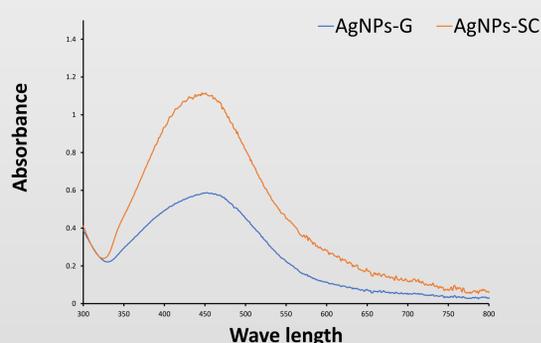


Figure 3. TEM image of AGNPs-G,

Figure 4. MIC of AGNP & Fluconazole (96 well plate).

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