



Cytotoxicity of *Annona glabra* mediated silver nanoparticles on human acute monocytic leukemia cells

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Abstract

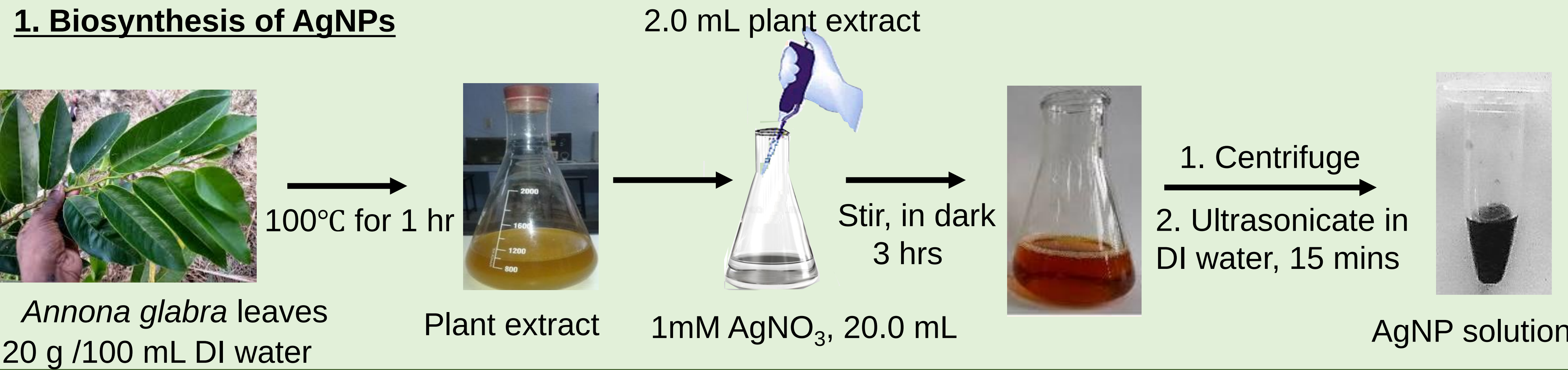
Amidst being viewed as a frontier in the medical sector with potential anti-cancer activity, AgNPs can also exert negative impacts on living systems. Thus, the cellular toxicity of AgNPs and the resulting adverse effects on human health need to be considered when developing AgNPs. Moreover, much attention is drawn towards the green synthesis of nanoparticles as an eco-friendly alternative to minimize the environmental impact of chemical synthesis. As a step towards achieving one of the sustainable development goals of good health and wellbeing of the people, the current investigation was carried out with the aim of comparing the cytotoxicity of biosynthesized and chemically synthesized AgNPs towards human acute monocytic leukemia cells (THP-1 cells).

Introduction

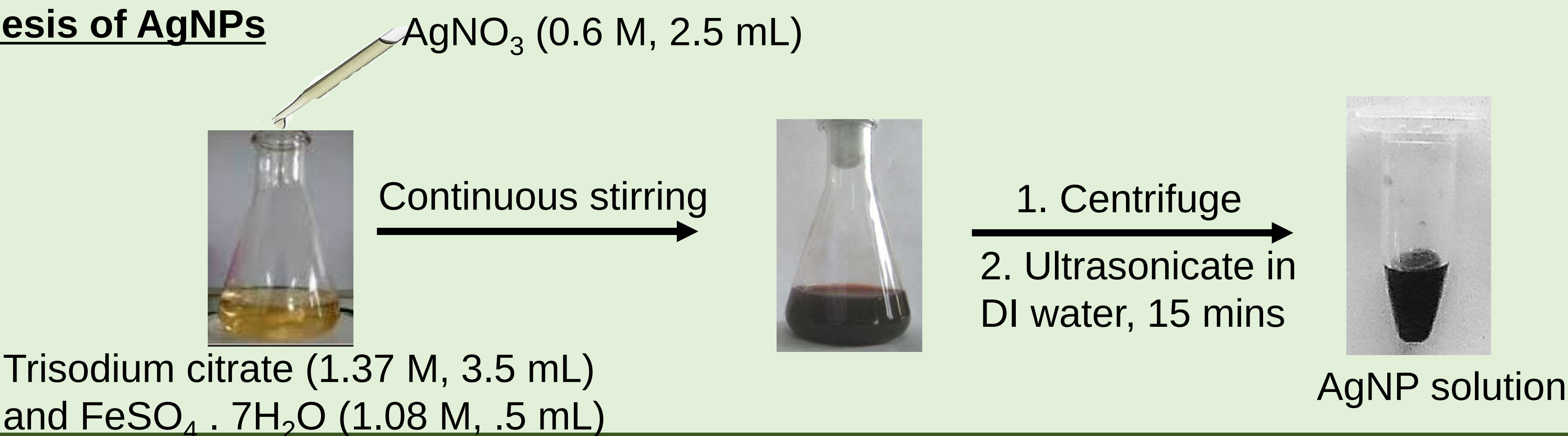
- Antimicrobial and disinfectant activities of silver nanoparticles (AgNPs) have gained popularity in many industrial sectors and is hence incorporated into many day-to-day consumer products.
- Unfortunately, AgNPs have the ability to pass the blood brain barrier and easily enter into other tissues within biological systems.
- The oxidative ability of AgNPs release Ag⁺ ions which leads to cytotoxicity, genotoxicity and even cell death, thus, leading to negative impacts on human health.
- Studies have reported that toxicity levels exerted by AgNPs depend on their physicochemical properties.
- Green synthesis produces biologically and cytologically compatible metallic NPs.

Methodology

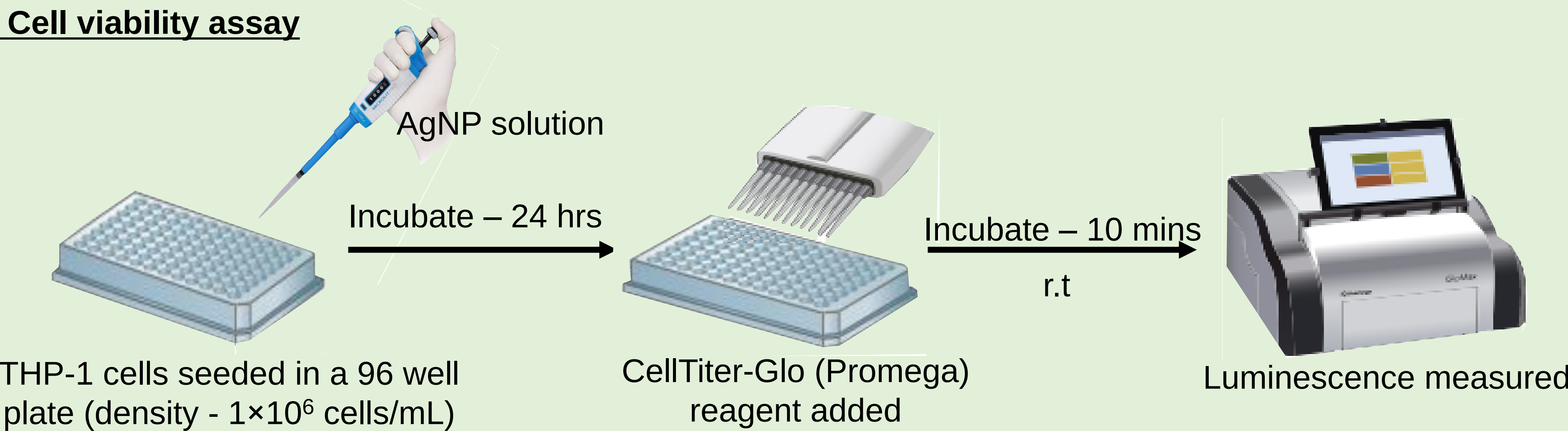
1. Biosynthesis of AgNPs



2. Chemical synthesis of AgNPs



3. Cell viability assay



4. Characterization of AgNPs

 - TEM and SEM images of biosynthesized AgNPs were obtained.

Results and Discussion

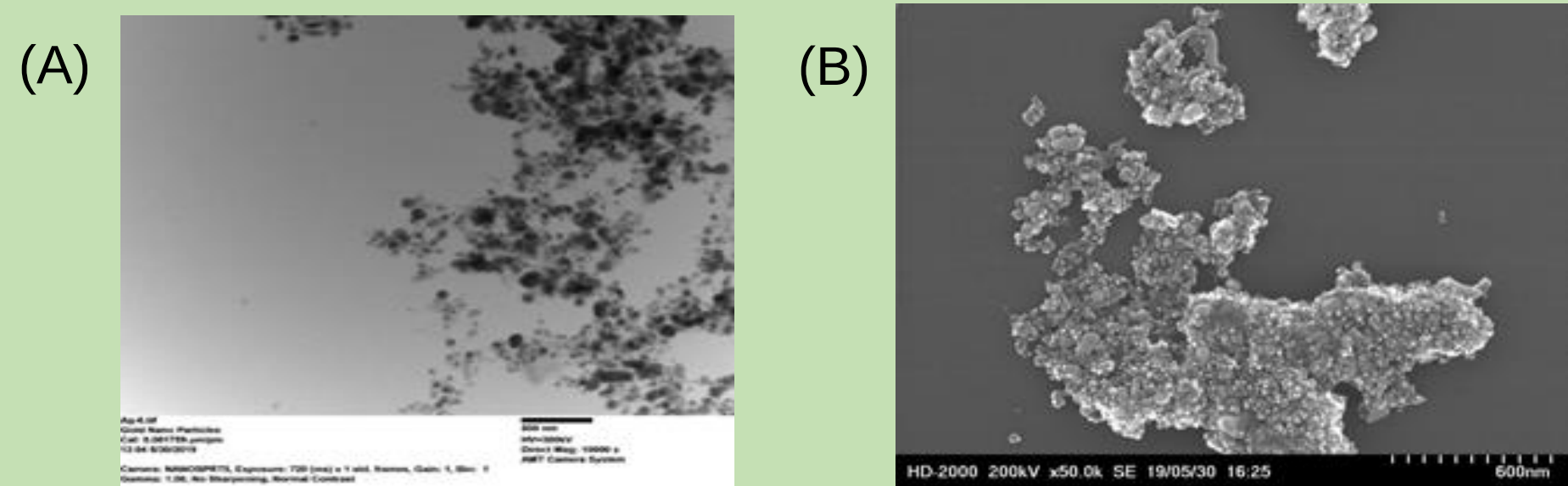


Fig 1.0: Electron microscopic images of biosynthesized AgNPs; (A) TEM image, (B) SEM image

Sample	Concentration (µg/mL)	Percentage of viability (%)
Biosynthesized AgNPs	200	84.7
	100	95.5
Chemically synthesized AgNPs	200	49.7
	100	67.3

- Biosynthesized AgNPs showed a higher percentage of cell viability (84.7% and 95.5%) compared to the chemically synthesized AgNPs (49.7% and 67.3%) at 200 and 100 µg/mL respectively.
- A low level of cytotoxicity is observed in biosynthesized AgNPs.
- Therefore, capping the AgNPs with phytochemicals decrease the cytotoxicity.

Conclusion

- The study concludes that biosynthesized AgNPs are much safer towards human health over chemically synthesized AgNPs.

References

1. Akter, M.; Sikder, M. T.; Rahman, M. M.; Ullah, A. K. M. A.; Hossain, K. F.; Banik, S.; Hosokawa, T.; Saito, T.; Kurasaki, M. A Systematic Review on Silver Nanoparticles-Induced Cytotoxicity: Physicochemical Properties and Perspectives. *Journal of Advanced Research* **2018**, 9, 1–16.