

# Nanoparticles Derived from *Rhazya Stricta*: Promising Advances for Anti-Cancer/Anti-Bacterial Treatment - In Vitro Studies

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## Introduction :

- Cancer remains a significant global health concern, necessitating the exploration of novel anti-cancer treatments.
- Extensive research supports the potential of using plant extracts and silver nanoparticles (AgNPs) as a safer and more effective alternative treatment for cancer patients.
- Our study specifically investigates the antibacterial and anticancer properties of silver nanoparticles and bio-components from *Rhazya Stricta* (*R.S.*) extract, synthesized using silver nitrate ( $AgNO_3$ ).



Source: Globocan 2020  
 Figure 1 WHO Statistic of Cancer in Saudi Arabia in 2020.

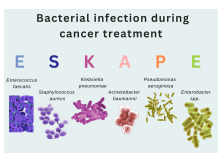


Figure 2 The most common bacterial species that cause bacterial infections during cancer therapy.

## 2- Characterization:

A) FTIR:

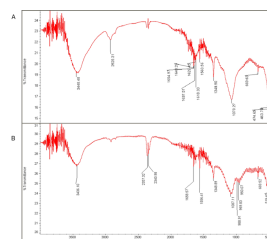


Figure 5 FTIR analysis of *R.S.* extract (A) and (B) *R.S.*-AgNPs.

B) TEM:

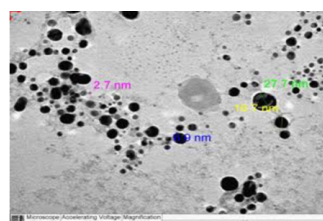


Figure 6 Spherical shape and distribution of *R.S.*-AgNPs (N=3).

## Methods :

### AgNPs Journey

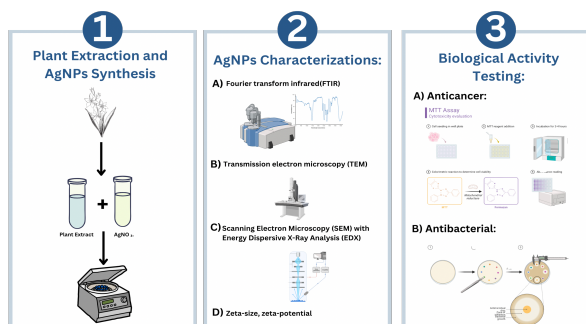


Figure 3 Experimental Protocol of The Study.

C) SEM and EDX:

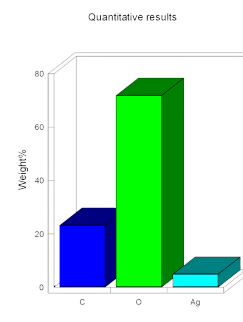
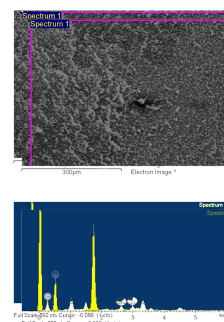


Figure 7 (A) SEM image (B) EDS spectrum (C) percentage relative composition of elements in *R.S.*-AgNPs (N=3).

## Results:

### 1- Biogenic Silver Nanoparticles (AgNPs):

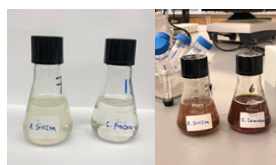


Figure 4 A color change from colorless to dark brown was observed after optimizing reaction conditions, and this indicated the formation of AgNPs.

A) Anticancer:

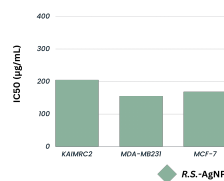


Figure 8 Summary of the anticancer ability of *R.S.*-AgNPs on cancer cell lines treated for 24 hrs (N=3).

B) Antibacterial:

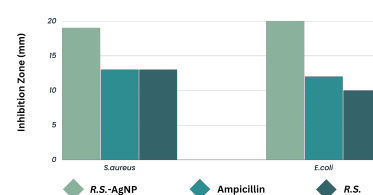


Figure 10 Anti-bacterial activity represented as inhibition zones of *R.S.*-AgNPs against *E. coli* and *S. aureus* bacterial strains (N=3).

## Conclusion:

The utilization of *R.S.* extract in the synthesis of AgNPs demonstrated promising cytotoxic activity against various cancer cell lines. Moreover, such AgNPs treated with plant extracts enhanced antimicrobial activity against pathogenic strains, particularly *S. aureus*, and *E. coli*.

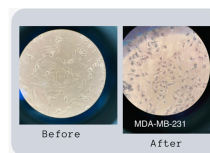


Figure 9 MDA-MB-231 cell line under the microscope before and after had been treated with *R.S.*-AgNPs.

Reference:



The 9th International Electronic Conference on Medicinal Chemistry  
 01-30 November 2023 | Online

