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SYNTHESIS AND PRELIMINIARY INVESTIGATION OF METAL NANOPARTICLES FROM THE STEM EXTRACT OF *BACOPA sp.* FOR THE TREATMENT OF LUNG CANCER

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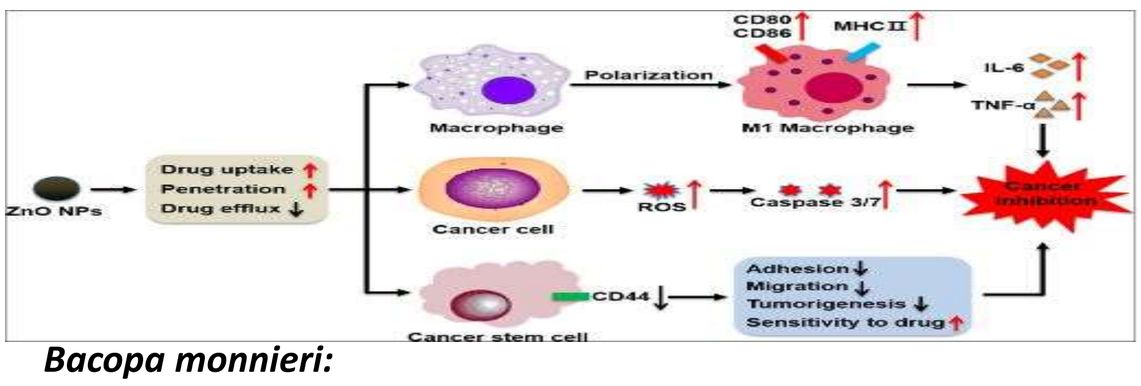
INTRODUCTION

Lung cancer:

Lung cancer is one of the big causes of global morbidity and mortality. It is a highly metastatic condition and is the second most prevalent cancer in men and women [Yang et al., 2023].



Bacopa monnieri:

Bacopa monnieri reported to possess a wide range of pharmacological activities such as anticancer, antiulcer, antibacterial, antifungal, antioxidant etc. The entire plant is used as nerve tonic in indigenous medicinal system [Banerjee et al., 2021].

Lung cancer

Bacopa monnieri

ZnO nanoparticles

AIM

To prepare the ZnO nanoparticles with the stem extract of *Bacopa monnieri and to investigate it* for the treatment of lung cancer.

METHODS

Extraction from stem powder → Phytochemical screening → Nanoparticle synthesis → Characterisation

Collection of plants

- *Bacopa monnieri* plants were collected from the natural ponds, located in Salem, Tamil Nadu, India.

Preparation of stem extract

- Extracted by reflux extraction method.
- Filtered using vacuum rotary evaporator [Ramadas et al., 2016].

Phytochemical screening test

- Tested for presence of saponins, flavonoids, phytosterols, carbohydrates and alkaloids [Prashant T et al., 2011].

Synthesis of Zinc oxide nanoparticles

- Zinc acetate solution at basic pH range.
- Plant extract + Zinc acetate solution = white precipitate is formed [Sabir et al., 2014].

Characterization of Zinc oxide nanoparticles

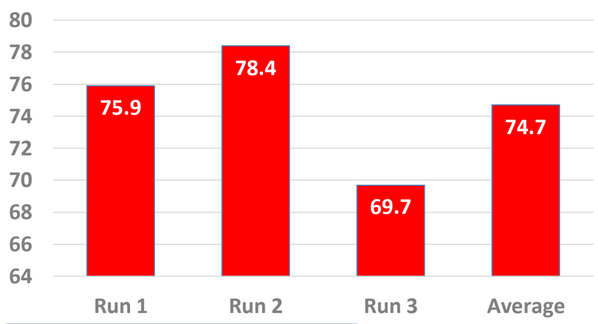
- Particle size
- Zeta potential
- FT-IR
- UV -Vis spectrometer
- SEM
- In vitro study

RESULTS AND DISCUSSION

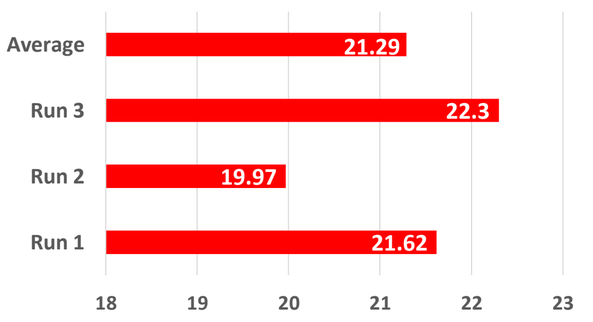
PHYTOCHEMICAL SCREENING TEST

PHYTOCHEMICALS	INFERENCES
Flavonoids	Present
Alkaloids	Present
Proteins	Present
Phytosterols	Present
Carbohydrates	Present

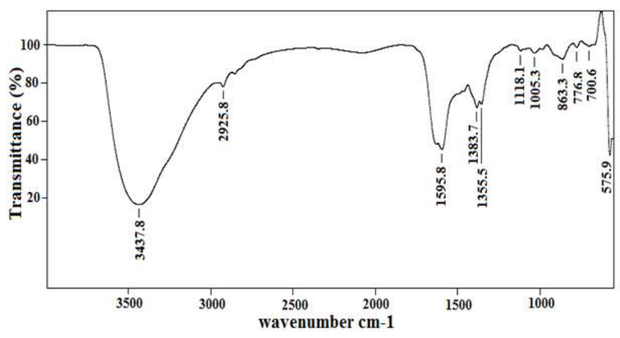
PARTICLE SIZE (nm)



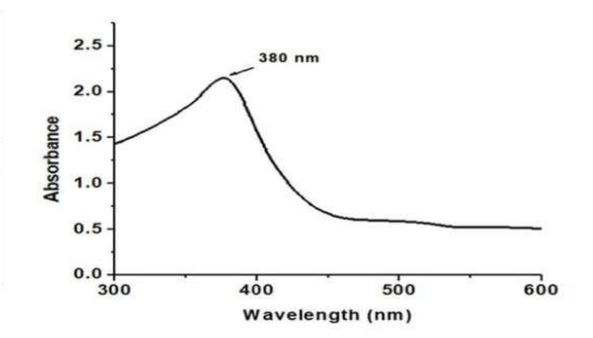
ZETA POTENTIAL (mV)



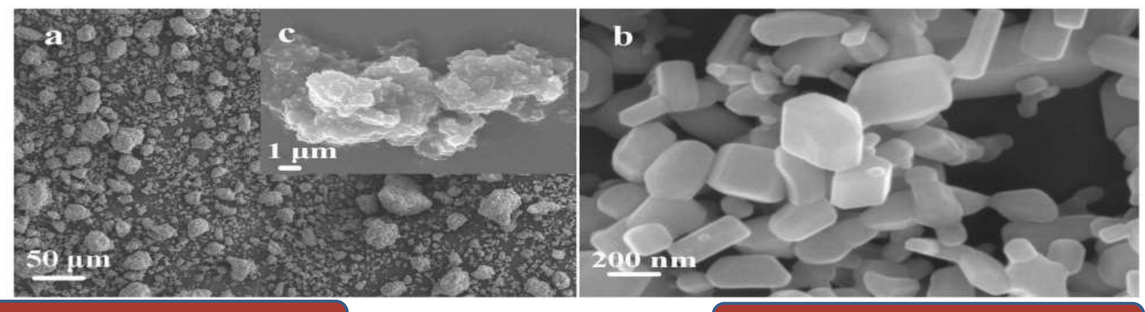
FT-IR SPECTRUM



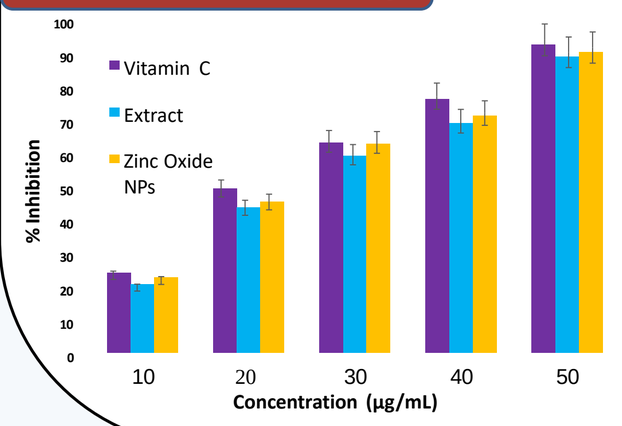
UV-VIS SPECTRUM



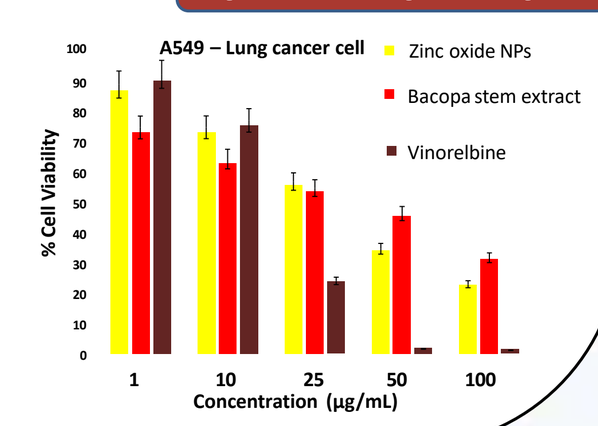
SEM



Antioxidant activity



Cytotoxicity Analysis



CONCLUSION

- Nanoparticles were characterized using Zeta sizer, which estimated the average size of the nanoparticle to be 74.7 nm and Zeta potential to be 21.29 mV. Nearly hexagonal quartzite shaped nanoparticles were visualized through SEM analysis.
- The antioxidant activity of ZnO NPs was found to be comparable to standard vitamin C as estimated through DPPH activity. *In vitro* cytotoxicity studies carried out using the MTT assay depicted dose-dependent activity fluctuations in the cytotoxic activity of ZnO NPs.

FUTURE WORK

Our study requires *in vivo* experiments to better understand ZnO NPs toxicity and future biomedical applications.