PLGA nanoparticles loaded with cinnamon extract and coated with PVA/poloxamer188

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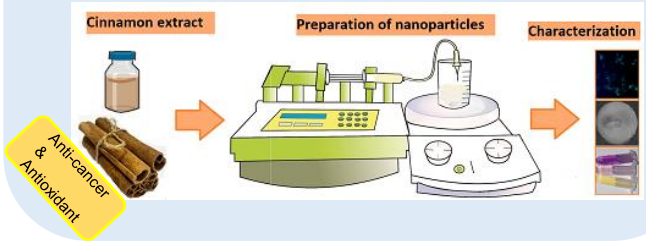
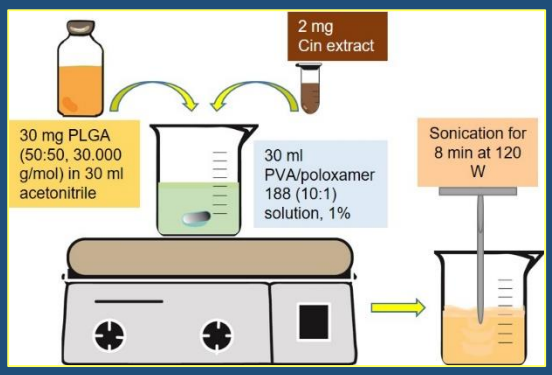
Introduction

Polymeric nanoparticles hold promise as therapeutic drug delivery vehicles (1). **PLGA** is famous because of its biodegradability, biocompatibility, stability, and sustained drug release (2). **Cinnamon extract (Cin)** has received a lot of attention due to its significant properties such as antibacterial, antifungal, antioxidant, and even anti-cancer properties (3). The purpose of this study was to create cinnamon extract-loaded PLGA nanoparticles coated with **PVA** and **poloxamer188 (Cin/PLGA NPs)** and evaluate their physiochemical characteristics and cytotoxicity against the C6 cell line.



Methodology

Nanoparticle preparation: Emulsion solvent evaporation



Characterizations:
SEM, FTIR, Drug release, DPPH, Hemolysis, Cell uptake, MTT

Results

The mean diameter of nanoparticle was 120±24 nm (Fig1a), with the zeta potential of -3.66±1.8 mV (table1).

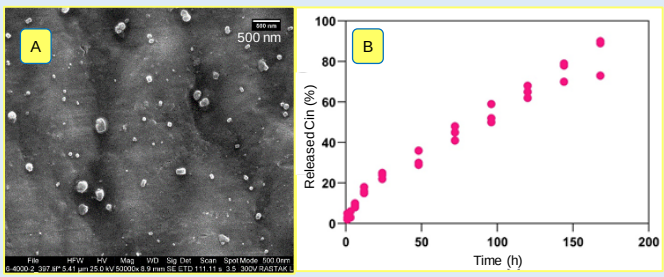


Fig 1 a) SEM image of NPs and b) in vitro release profile of Cin from NPs

Results (Cont.)

Drug loading and encapsulation efficiency of Cin were 4.2±0.7 % and 51±5 % , respectively (table1). 44.6% of Cin was released during the 72 h and it was extended until more than 7 days (fig1b). Hemolysis of PLGA NPs vs. Cin/PLGA NPs showed no significant difference under 500 µg/ml (fig2a). FTIR analysis confirmed the encapsulation of the Cin in nanoparticles (fig2b).

Table1) characteristics of Cin/PLGA NPs

NPs	Diameter	Zeta potential	DL %	EE %
Cin/PLGA	120 nm	-3.66 mV	4.2	51

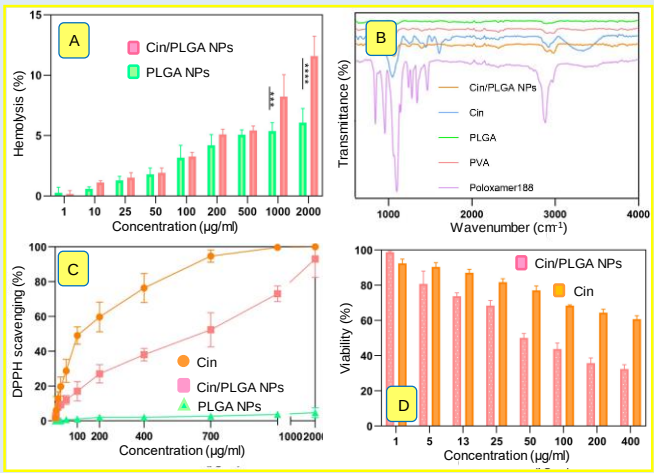


Fig 2 a) hemolysis assay, b) FTIR results, c)DPPH activity & d)MTT results

DPPH assay was done and it was observed that antioxidant activity of Cin was mostly preserved in Cin/PLGA NPs(fig2c & fig3b). Nanoparticles were uptake by C6 cells (fig3a) and had concentration dependent toxicity on C6 cells after 72 h of treatment (fig2d).

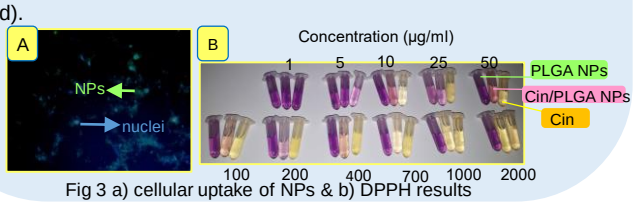


Fig 3 a) cellular uptake of NPs & b) DPPH results

Conclusion

The findings of this study indicate that Cin/PLGA NPs could be a promising adjuvant treatment for GBM.

References

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