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(57) Abstract :
The present invention relates to the development and characterization of nanocurcumin, a novel nanoscale delivery system designed to overcome the poor solubility and low bioavailability of curcumin. Using an ultrasonication-assisted nanoprecipitation method, curcumin nanoparticles with uniform size and enhanced stability were prepared. Comprehensive physicochemical analyses confirmed successful nanosizing and improved dispersion. The nanocurcumin formulation demonstrated pH-dependent solubility, controlled biphasic drug release, and superior cytotoxicity against multiple cancer cell lines compared to free curcumin. This enhanced therapeutic efficacy is attributed to improved cellular uptake and sustained drug release. The invention provides a cost-effective, scalable platform for efficient curcumin delivery, offering significant potential for improved anticancer treatment outcomes.

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