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(57) Abstract :
The present invention relates to a green method for synthesizing silver nanoparticles using natural gum as a dual reducing and stabilizing agent under microwave irradiation. The method comprises preparing aqueous solutions of silver nitrate and natural gum, mixing under controlled pH, and subjecting the mixture to microwave irradiation at 100–200 °C for 3–10 minutes. The process, optimized through face-centered composite design, yields gum-capped silver nanoparticles with a size range of 50–200 nm, narrow polydispersity, and high colloidal stability. The nanoparticles exhibit antimicrobial activity and are applicable in coatings, wound healing dressings, and drug delivery systems.

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