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(57) Abstract :

The present invention relates to a novel transdermal patch system incorporating curcumin nanoparticles for sustained insulin delivery in diabetic patients. The invention provides a synergistic approach combining the hypoglycemic properties of curcumin with the therapeutic benefits of insulin through a nanoparticulate delivery system. The transdermal patch comprises a backing layer, an adhesive layer containing curcumin nanoparticles with entrapped insulin, a permeation enhancer matrix, and a release liner. The curcumin nanoparticles, ranging from 50 to 300 nanometers, facilitate enhanced skin permeation while providing antidiabetic, antioxidant, and anti-inflammatory effects. The patch ensures controlled release of insulin over 24 to 72 hours, maintaining steady plasma glucose levels while avoiding painful injections and first-pass metabolism. This invention offers improved patient compliance, reduced dosing frequency, and enhanced therapeutic efficacy through dual-action mechanism involving both curcumin and insulin for comprehensive diabetes management

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