

पेटेंट कार्यालय  
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पेटेंट कार्यालय का एक प्रकाशन  
PUBLICATION OF THE PATENT OFFICE

(54) Title of the invention : Microneedle-Based Smart Dressing Embedded with Cefixime-Loaded Nanoparticles for Enhanced Diabetic Wound Healing

<p>(51) International classification</p> <p>(31) Priority Document No</p> <p>(32) Priority Date</p> <p>(33) Name of priority country</p> <p>(86) International Application No</p> <p style="padding-left: 20px;">Filing Date</p> <p>(87) International Publication No</p> <p>(61) Patent of Addition to Application Number</p> <p style="padding-left: 20px;">Filing Date</p> <p>(62) Divisional to Application Number</p> <p style="padding-left: 20px;">Filing Date</p>	<p>:A61K 9/51, A61K 9/00, A61K 47/32, A61P 31/04, A61K 47/36</p> <p>:NA</p> <p>:NA</p> <p>:NA</p> <p>:</p> <p>:01/01/1900</p> <p>: NA</p> <p>:NA</p> <p>:NA</p> <p>:NA</p> <p>:NA</p> <p>:NA</p>	<p>(71)Name of Applicant :</p> <p><b>1)Sunil Kumar Tiwari</b> Address of Applicant :Assistant Professor, School of Pharmaceutical Sciences, Faculty of Pharmacy, IFTM University, Moradabad, Uttar Pradesh, India 244102 Uttar Pradesh India</p> <p><b>2)Ms. Varsha Chaudhary</b> <b>3)Dr. Deepika Sharma</b> <b>4)Phool Kanwar Singh Brar</b> <b>5)Dr. Nitika Anand</b> <b>6)Rabeya</b> <b>7)Pallvi Thapar</b> <b>8)Dr. Sukhjashanpreet Singh</b> <b>9)Dr.Navin Puttum</b> <b>10)Dr. Anusheela Howlader</b> <b>11)Dr. Gitanjali Kothiyal</b> <b>12)Ms. Mandeep Kaur</b></p> <p>(72)Name of Inventor :</p> <p><b>1)Sunil Kumar Tiwari</b> <b>2)Ms. Varsha Chaudhary</b> <b>3)Dr. Deepika Sharma</b> <b>4)Phool Kanwar Singh Brar</b> <b>5)Dr. Nitika Anand</b> <b>6)Rabeya</b> <b>7)Pallvi Thapar</b> <b>8)Dr. Sukhjashanpreet Singh</b> <b>9)Dr.Navin Puttum</b> <b>10)Dr. Anusheela Howlader</b> <b>11)Dr. Gitanjali Kothiyal</b> <b>12)Ms. Mandeep Kaur</b></p>
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(57) Abstract :

DETAILED DESCRIPTION OF THE INVENTION 1. Microneedle Structure • Length: 300–800 μm • Shape: مخروط-shaped (conical or pyramidal) • Material: Biodegradable polymers (e.g., hyaluronic acid, PVP, PLGA) • Function: Penetrates epidermis without reaching pain receptors 2. Nanoparticle Composition • Type: Polymeric nanoparticles / lipid nanoparticles • Size: 50–300 nm • Encapsulation efficiency: 70–95% • Drug: Cefixime trihydrate Preparation methods: • Emulsion-solvent evaporation • Nanoprecipitation • Ionic gelation 3. Integration of Nanoparticles into Microneedles • Nanoparticles are uniformly dispersed within the microneedle matrix • Fabrication via micro-molding technique • Drying under controlled conditions to preserve drug stability 4. Mechanism of Action 1. Microneedles penetrate the wound tissue 2. Needles dissolve in interstitial fluid 3. Nanoparticles are released into wound bed 4. Cefixime is released in a sustained manner 5. Antibacterial activity reduces infection 6. Promotes tissue regeneration and healing 5. Additional Functional Layers • Hydrogel base layer: Maintains moist environment • Protective film: Prevents contamination • Optional sensors: For pH or glucose monitoring ADVANTAGES OF THE INVENTION • Minimally invasive and painless application • Sustained and controlled drug release • Reduced frequency of dressing changes • Targeted antibacterial action • Improved patient compliance • Enhanced wound healing in diabetic patients • Reduction in antibiotic resistance risk

No. of Pages : 7 No. of Claims : 8