

Polymeric Sustained Biodegradable Patch Formulation for Wound Healing

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Abstract : It's the patient compliance and stability in combination with controlled drug delivery and biocompatibility that forms the core feature in present research and development of sustained biodegradable patch formulation intended for wound healing. The aim was to impart sustained degradation, sterile formulation, significant folding endurance, elasticity, biodegradability, bio-acceptability and strength. The optimized formulation was developed using component including polymers including Hydroxypropyl methyl cellulose, Ethylcellulose, and Gelatin, and Citric Acid PEG Citric acid (CPEGC) triblock dendrimers and active Curcumin. Polymeric mixture dissolved in geometric order in suitable medium through continuous stirring under ambient conditions. With continued stirring Curcumin was added with aid of DCM and Methanol in optimized ratio to get homogenous dispersion. The dispersion was sonicated with optimum frequency and for given time and later casted to form a patch form. All steps were carried out under strict aseptic conditions. The formulations obtained in the acceptable working range were decided based on thickness, uniformity of drug content, smooth texture and flexibility and brittleness. The patch kept on stability using butter paper in sterile pack displayed folding endurance in range of 20 to 23 times without any evidence of crack in an optimized formulation at room temperature (RT) ($24 \pm 2^\circ\text{C}$). The patch displayed acceptable parameters after stability study conducted in refrigerated conditions ($8 \pm 0.2^\circ\text{C}$) and at RT ($24 \pm 2^\circ\text{C}$) upto 90 days. Further, no significant changes were observed in critical parameters such as elasticity, biodegradability, drug release and drug content during stability study conducted at RT $24 \pm 2^\circ\text{C}$ for 45 and 90 days. The drug content was in range 95 to 102%, moisture content didn't exceeded 19.2% and patch passed the content uniformity test. Percentage cumulative drug release was found to be 80% in 12h and matched the biodegradation rate as drug release with correlation factor $R^2 > 0.9$. The biodegradable patch based formulation developed shows promising results in terms of stability and release profiles.

Keywords : sustained biodegradation, wound healing, polymers, stability

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