ABSTRACT

In the present study an attempt was made to develop a controlled release *in situ* gel for the treatment of periodontal diseases. Periodontitis is an inflammatory condition that leads to destruction of periodontum, resorption of the alveolar bone and frequent tooth loss. *In situ* gel formulations (F0-F7) were developed for the treatment of periodontitis by temperature induced gelation technique. Thermoreversible Pluronic F127 was used as the main gelling agent, chitosan as the mucoadhesive agent and HPMC as the viscosifying agent. In the formulations HPMC 12-18 cps and HPMC 50 cps were used in various ratios in order to obtain the controlled drug release and other desired properties. Levofloxacin hemihydrate IP was used as the model drug. The formulations were analysed for pH, syringeability, gelation time and gelation temperature, rheological characteristics and *in vitro* drug release. All the developed formulations were syringeable through 21G needle. Gelation temperature was found to be 28°C. The gelation time of all the formulations ranged from few minutes to seconds. All the formulations exhibited thixotropic behaviour with pseudoplastic flow. Viscosity of the formulations was found to have a direct influence on the drug release. An increase in the viscosity of the formulations, prolonged the drug release from 18 to 24h. The formulation F3 showed a maximum drug release in 24h following zero order kinetics with high regression co-efficient (r^2=0.997) value. Stability study of the optimised formulation (F3) performed at 4-8°C for one month indicated no significant changes in the evaluated parameters.

Keywords: Periodontitis; *in situ* gel; Pluronic F127; gelation time; thixotropy; pseudoplastic flow.