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PREPARATION AND IRRADIATION OF PLURONIC F127-BASED THERMOREVERSIBLE AND MUCOADHESIVE HYDROGEL FOR LOCAL DELIVERY

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ABSTRACT

To improve physical properties and modulate the mucoadhesive hydrogel formulation via cross-linking by radiation, hydrogels were prepared using thermoreversible polymer Pluronic F127 (PF127) and mucoadhesive polymer carbopol 934P (C934P). Sol-gel transition temperatures of hydrogels were measured by an inverting method. The mucoadhesive potential of each formulation was determined by measuring the force required to detach the formulation from oral mucosal tissue. To strengthen the mechanical properties, the formulations were irradiated using an electronic beam. Drug release from the hydrogels and the cytotoxicity of each formulation were investigated. Sol-gel transition temperatures of the formulations were decreased by the addition of carbopol and were close to body temperature. The mucoadhesive force of the PF127 formulation was increased by addition of carbopol. *In vitro* release was sustained and the release rate was reduced by the addition of carbopol. After irradiation, the mucoadhesive force was increased about 5-fold especially in the case of PF127 23% (9.7 kPa) and *in vitro* release was not sustained further. In conclusion, the use of a PF127 formulation incorporating a mucoadhesive polymer could effectively and safely improve oral residence time and absorption of naproxen. Irradiated formulations showed permanent cross-linking and improved properties.

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