# UV Imaging Studies on Pluronic F127-based Hydrogel Formulations of Ibuprofen

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**Purpose**

The aim of the project was to prepare Pluronic F127 gel formulations containing ibuprofen and correlate their rheological and drug release properties. The effects of variation of Pluronic F127 concentration (15%, 20% and 25%) and ibuprofen (1% and 5%) concentration were investigated.

**Methods**

Pluronic F127 gels containing 1% or 5% w/w ibuprofen were prepared on a weight basis using the cold method at 15%, 20% and 25% w/w Pluronic concentrations. Propylene glycol was used as a co-solvent. Saturation concentration of ibuprofen in each gel was determined using an Olympus BH2 microscope fitted with a camera (AxioCam MRc-Zeiss, UK) and AxioVision vs4.4 software. Viscometry was performed at 32°C to characterise the flow behaviour of the gels, using a sunblasted stainless steel cone-plate (4°/40 mm) with 150 μm gap size. UV Imaging of ibuprofen diffusion from the gels in PBS buffer was examined using an Actipix SDI300 dissolution system at 214 nm.

**Results**

Polarised microscopy confirmed that gels (15%, 20% and 25%) containing 1% ibuprofen were unsaturated. The rate of ibuprofen release from the gels was found to decrease in response to increasing gel viscosity as the polymer content increased from 15 to 25% w/w.

The presence of crystals in the 5% w/w ibuprofen (15% w/w) gel indicated that ibuprofen was present above its solubility limit within the gel matrix. The 5% w/w ibuprofen gel had higher viscosity compared to the 1% w/w ibuprofen (15% w/w) gel, yet the rate of drug release from the 5% ibuprofen gel was higher when compared to the 1% ibuprofen gel. The effect of supersaturation seemed to outweigh the effect of gel viscosity in terms of drug release.

**Conclusion**

Gels where ibuprofen was present below its solubility limit demonstrated a correlation between gel viscosity and drug release, whereby an increase in gel viscosity retarded ibuprofen release from the gels.