Introduction
The Sirius SDI has been shown to provide real-time information of the dissolution process at the surface of drug compacts (1, 2). Here, the release mechanism of Carvedilol (CAR), a BCS class II drug, with either HPMC or Eudragit EPO was investigated.

Materials and Methods
Compacts of Carvedilol (CAR), HPMC (Benecel E3, Ashland) and Eudragit EPO (EPO) (Evonik) and mixtures thereof were exposed to simulated gastric fluid (SGF, pH 1.2) in a flow cell suitable for UV imaging. Dissolution assays for CAR only compacts were also performed using SGF buffer containing 1% and 5% of HPMC or EPO, respectively.

Results
To assess dissolution of polymer only compacts only, analysis was performed using a visible wavelength range. HPMC showed swelling behaviour, whereas EPO did not (Figure 3).

Physical mixtures of CAR with HPMC showed a steady release of the drug, whereas mixtures with EPO showed drug release in small ‘bursts’ (Figure 4). The presence of polymer increased the amount of drug released.

Discussion and Conclusion
UV imaging was used to characterise dissolution behaviour of CAR in the presence of excipients, showing ‘bursts’ of CAR released from physical mixtures with Eudragit EPO during the dissolution assay, whereas HPMC showed a steady swelling/erosion release behaviour.

In experiments with excipient modified SGF buffers, only 1% EPO showed an increase in drug dissolution. The altered viscosities/densities of modified buffers, may decrease the concentration gradient in the buffer system and therefore reducing dissolution rates. It may also indicate that the interaction between the polymer and drug requires a non-hydrated polymer, or a higher polymer concentration at the drug surface in concurrence with a low viscosity buffer to drive dissolution via a concentration gradient.

Future Work
Further characterisation of compact surface are required to determine the impact of polymers on release behaviour of CAR. Rheological assessment of modified dissolution buffers. Analysis of processed formulations including Raman monitoring of potential phase transitions during the dissolution assay.

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References: