Clostridium difficile specific bacteriophage microencapsulation within porous Eudragit particles and pH dependent controlled release for colon targeted delivery [Abstract]

This item was submitted to Loughborough University’s Institutional Repository by the/an author.

Citation: VINNER, G.K. ... et al., 2016. Clostridium difficile specific bacteriophage microencapsulation within porous Eudragit particles and pH dependent controlled release for colon targeted delivery. Presented at the 2nd Annual InterPore UK Chapter Conference, Loughborough, 5-6th. September, pp. 43.

Additional Information:

- This is an abstract of a conference poster. This was a joint meeting with the Particle Characterisation Interest Group of the Royal Society of Chemistry)

Metadata Record: https://dspace.lboro.ac.uk/2134/22588

Version: Accepted for publication

Publisher: © the Authors

Rights: This work is made available according to the conditions of the Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International (CC BY-NC-ND 4.0) licence. Full details of this licence are available at: https://creativecommons.org/licenses/by-nc-nd/4.0/

Please cite the published version.
**Clostridium difficile** specific bacteriophage microencapsulation within porous Eudragit particles and pH dependent controlled release for colon targeted delivery

Gurinder K. Vinner¹, Goran T. Vladisavljević¹*, Martha R.J. Clokie², Danish J. Malik¹

¹Chemical Engineering Department, Loughborough University, LE11 3TU, UK.
²Department of Infection, Immunity and Inflammation, University of Leicester, University Road, Leicester, LE1 7RH, UK

The global threat to human health from antimicrobial resistance in infection causing bacteria has led to renewed interest in the potential of phages as therapeutic agents. In *Clostridium difficile* infections of the colon, targeted delivery of viable phages to the site of infection is important. The punitive environment of the gastrointestinal tract can potentially render free phages inactive prior to reaching the site of infection. Here, we describe the encapsulation and release kinetics *in vitro* of a model *C. difficile* specific myoviridae bacteriophage, Phi9CD-KM. The phages were encapsulated in Eudragit® S100 which is a methacrylic acid / methyl methacrylate copolymer; it is insoluble at low pH levels and soluble at the pH of the colon (pH ≥7), making it a suitable encapsulation agent for protecting acid-sensitive phages. Core-shell droplets were produced using a two-phase glass capillary device with counter-current flow focusing (Figure 1). In the absence of encapsulation, phages were rendered inactive within minutes upon exposure to a pH 2 solution mimicking simulated gastric fluid. Release kinetics of the encapsulated phage was studied in different pH solutions. A burst release of phage occurred at pH 7. Slow controlled release over several hours was observed at pH 6.

![Figure 1](image-url)