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PUBLISHER

UK Colloids 2014

VERSION

AM (Accepted Manuscript)

PUBLISHER STATEMENT

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Ekanem, Ekanem E., and Goran T. Vladislavljevic. 2014. "Encapsulation of Drugs in Microparticles Produced in Flow Focussing Glass Microcapillary Devices". figshare. <https://hdl.handle.net/2134/15770>.

# Encapsulation of Drugs in Microparticles Produced in Flow Focussing Glass Microcapillary Devices

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Encapsulation of drugs in biodegradable poly(lactic acid) (PLA) and poly(lactic-co-glycolic acid) (PLGA) particles was achieved by emulsification using axisymmetric flow focusing glass capillary devices and subsequent solvent evaporation. Due to the circular cross section of the orifice of the collection capillary, the dispersed phase was symmetrically surrounded by the continuous phase resulted in the generation of monodispersed droplets without wetting. By varying the orifice size and manipulating the flow rates of the dispersed and continuous phase, size-tuneable droplets were generated that have been transformed into monodispersed particles after droplet evaporation (Vladisavljević et al., 2014). In this work, flow focusing glass capillary devices were exploited to produce drug loaded biodegradable particles. The dispersed phase was a mixture of drug and polymer dissolved in a volatile organic solvent (ethyl acetate or dichloromethane) and the continuous phase was 5% (w/w) aqueous poly(vinyl alcohol) solution. As a result of the presence of nanoclay nanoparticles or a phase change material (2-methylpentane) in the dispersed phase, nanoclay embedded particles or golf ball-like particles (Kim, Lee, Park, & Cho, 2010) were respectively produced. Their microstructural differences were investigated to ascertain its effect on drug encapsulation and *in-vitro* drug release profile. Although glass capillary devices cannot easily be replicated as microfluidic devices made from mouldable polymers such as polydimethylsiloxane (PDMS), glass is chemically and mechanically more robust and offer superior optical properties compared to PDMS.

## References:

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