

# Oral Presentations

## Application of Packed-Bed Emulsification System for preparation of Polymer Microcapsules and Double Emulsion

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### Abstract

Polymer microcapsules and double emulsions (emulsion in an emulsion) are widely applied as micro drugs vehicles for controlled release of drugs and bioactive compounds in the body. Several emulsification techniques can be used for preparation of microcapsules and emulsions including high pressure homogenizers, sonication and membrane emulsification. In the present study, the microcapsules and double emulsions are prepared using relatively new premix emulsification method that consists of a packed bed column loaded with glass beads of different sizes (30-90  $\mu\text{m}$ ) at various bed heights (2-20 mm). The emulsification procedure starts with preparing a coarse and polydisperse premix emulsion that is then pressurized through the porous media of the packed bed several times. The passage of the large droplets through the pores breaks them up into smaller and more uniform droplets. The transmembrane fluxes recorded with this technique (100-1000  $\text{m}^3/\text{m}^2 \cdot \text{h}$ ) were much higher than other membrane emulsification techniques. The size of the microcapsules were 2-10 times smaller than the interstitial voids of the bed with an average microcapsules size of about 2-8  $\mu\text{m}$  with an average span of  $\sim 1$ . Besides, the effect of the transmembrane pressure, bead size and bed height on the size and span of the microcapsules and droplets was investigated. The results showed that the size of the microcapsules and droplets decreases with increasing the bed height and bead size.

### References:

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- 2- Sahin, S.; Sawalha, H.; Schroën, K., Food Research International 66, 78, 2014