

## Preparation, Characterization, and *In vitro* Releasing of Microcapsules Loaded with *Bridelia Retusa* Aqueous Bark Extract for Treatment of Rheumatoid Arthritis

PCR Peiris<sup>1</sup>, BAUN Wijayawickrema<sup>1</sup>, BLC Samanmali<sup>1</sup> and DC Manatunga<sup>2,3#</sup>

<sup>1</sup>Department of Pharmacy, Faculty of Allied Health Sciences, Sir John Kotelawala Defence University

<sup>2</sup>Department of Bio Systems Technology, Faculty of Technology, University of Sri Jayewardenepura

<sup>3</sup>CAMD Research Laboratory, Department of Chemistry, Faculty of Science, University of Colombo

#danushi@sjp.ac.lk

*Bridelia retusa* (Ketakela) is a plant widely used in the treatment of Rheumatoid Arthritis (RA). Currently, microencapsulation is used to formulate prolonged release dosage forms by using plant extracts. The main objectives of this study were to prepare, characterize and evaluate the *in vitro* release profile of aqueous bark extract (ABE) of *Bridelia retusa* loaded microcapsules for the treatment of RA. In this study, ABE of *Bridelia retusa* was encapsulated into calcium alginate microcapsules by a single emulsion method and the prepared microcapsules were characterized by scanning electron microscopic analysis and Fourier Transform Infra-red (FT-IR) analysis. Also, the encapsulation efficiency was determined in an aqueous medium. The release profile was studied in a phosphate buffered solution and *in vitro* anti-arthritic activity of the microcapsules was evaluated by *in vitro* heat induced protein denaturation method after 2 hours of releasing ABE. Prepared microcapsules had a relatively spherical, rough, and scraggly appearance with an average size of 1  $\mu\text{m}$ . The respective peaks that appeared in the FT-IR revealed the presence of ABE within the microcapsules while confirming the cross-linking of the polymers. Prepared microcapsules showed a maximum encapsulation efficiency of  $8.34 \pm 0.01\%$ . The cumulative release profile of ABE loaded microcapsules showed a prolonged releasing behaviour for 8 hours and the anti-arthritic activity in terms of percentage inhibition of protein denaturation was  $10.09 \pm 0.08\%$  after two hours of release. In conclusion, this study revealed that the slow release of ABE from microcapsules could promote prolonged anti-arthritic activity for the treatment of rheumatoid arthritis.

**Keywords:** *Bridelia retusa*, aqueous bark extract, microcapsules, rheumatoid arthritis