

Preparation and characterization of protein nanospheres prepared by high pressure homogenization

Ana Loureiro^{1,2}, Andreia C Gomes², Artur Cavaco-Paulo¹

¹IBB-Institute for Biotechnology and Bioengineering, Centre of Biological Engineering, University of Minho, Campus of Gualtar, 4710-057 Braga, Portugal, artur@deb.uminho.pt

²Molecular and Environmental Research Centre (CBMA)/ Department of Biology, University of Minho, Braga, Portugal

Contact e-mail: aloureiro@bio.uminho.pt

Abstract

Protein nanospheres have a huge potential as drug carriers due to their proven biocompatibility and biodegradability. Nanospheres can be used for controlled drug release, thus reducing dosage and frequency of drug administration, and therefore of treatment associated toxicity. In this study, nanospheres of bovine serum albumin (BSA) were produced by subjecting a biphasic system, consisting of an aqueous protein solution and an organic solvent, to high pressure homogenization. The effect of BSA concentration and ratio of protein solution/oil was studied in order to determine how these factors affect particle properties. Size, polydispersity and stability of the nanospheres were analyzed with a dynamic light scattering instrument and their morphology was examined by microscopy. As these nanospheres are intended for intravenous injection, size is a key factor. The obtained nanospheres presented adequate small sizes and polydispersity, and demonstrated stability over time. Hence, these proteinaceous particles exhibit characteristics compatible with a potential application as drug delivery systems.