Reversible protein precipitation to ensure stability during encapsulation within PLGA microspheres

Titre	Reversible protein precipitation to ensure stability during encapsulation within PLGA microspheres
Type de publication	Article de revue
Auteur	Giteau, A. [1], Venier-Julienne, Marie-Claire [2], Marchal, S. [3], Courthaudon, Jean-Luc [4], Sergent, M. [5], Montero-Menei, Claudia [6], Verdier, J. M [7], Benoît, Jean-Pierre [8]
Editeur	Elsevier
Type	Article scientifique dans une revue à comité de lecture
Année	2008
Langue	Anglais
Date	16/03/2008
Pagination	127-136.
Volume	70
Titre de la revue	European Journal of Pharmaceutics and Biopharmaceutics
ISSN	0939-6411
Résumé en anglais	Proteins were precipitated to ensure their stability upon subsequent encapsulation within PLGA microspheres. Spherical, nanosized protein particles were formed by the addition of a salt (sodium chloride) and a water-miscible organic solvent (glycofurol) to protein solutions. Various process parameters were modified to optimize the precipitation efficiency of four model proteins: lysozyme, alpha-chymotrypsin, peroxidase and beta-galactosidase. As monitored by enzymatic activity measurement of the rehydrated particles, conditions to obtain more than 95% of reversible precipitates were defined for each protein. The study of the structure of the rehydrated particles by absorbance spectroscopy, fluorescence spectroscopy and circular dichroism showed an absence of structural-perturbation after precipitation. Protein particles were then microencapsulated within PLGA microspheres using s/o/w technique. The average encapsulation yield was around 80% and no loss of protein activity occurred after the encapsulation step. Additionally, a lysozyme in vitro release study showed that all of the released lysozyme was biologically active. This method of protein precipitation is appropriate for the encapsulation in PLGA microspheres of various proteins without inactivation.
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