Interactions between poly(ethylene glycol) and protein in dichloromethane/water emulsions. 2. Conditions required to obtain spontaneous emulsification allowing the formation of bioresorbable poly(D,L lactic acid) microparticles

Titre	Interactions between poly(ethylene glycol) and protein in dichloromethane/water emulsions. 2. Conditions required to obtain spontaneous emulsification allowing the formation of bioresorbable poly(D,L lactic acid) microparticles
Type de publication	Article de revue
Auteur	Malzert-Freon, A. [1], Schonhammer, K. [2], Benoît, Jean-Pierre [3], Boury, Frank [4]
Editeur	Elsevier
Type	Article scientifique dans une revue à comité de lecture
Année	2009
Langue	Anglais
Date	09/2009
Numéro	1
Pagination	66-73
Volume	73
Titre de la revue	European Journal of Pharmaceutics and Biopharmaceutics
ISSN	1873-3441
Résumé en anglais	From microscopic observations, it was established that an oil-in-water emulsion with droplets of a size in the micrometer range can spontaneously form at room temperature without additional external stirring as soon as a solvent that is only partly miscible to water-like dichloromethane (DCM) is put in contact with an aqueous mixture of polyethylene glycol (PEG) and a protein. Experimental results show that emulsification only occurs if the system simultaneously includes PEG with middle chain, an organic solvent partly miscible to water and for which PEG affinity is sufficiently high, and a protein. From adsorption kinetics, it appears that this spontaneous emulsification process is related to the rapid diffusion of DCM towards water through the formation of interfacial turbulences, once the accumulation of PEG close to the DCM/water interface occurs. The oil droplets formed would be then stabilized by adsorbed protein molecules. Since the presence of polylactic acid in the organic phase did not prevent the emulsion formation, we studied the feasibility of formulating microparticles using this polymer. From results, it appears that microcapsules with a polymeric shell, with a homogeneous size of about 50 microm and able to encapsulate a model hydrophobic drug, such as amiodarone, can be obtained by using this spontaneous emulsification method.
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