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Double Emulsion Technique for Preparation of Microparticle as Controlled Drug Delivery System

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Several methods and techniques are potentially useful for the preparation of Microparticles in the field of controlled drug delivery. The type and the size of the microparticles, the entrapment, release characteristics and stability of drug in microparticles in the formulations are dependent on the method used. One of the most common methods of preparing microparticles is the single emulsion technique. Poorly soluble, lipophilic drugs are successfully retained within the microparticles prepared by this method. However, the encapsulation of highly water soluble compounds including protein and peptides presents formidable challenges to the researchers. The successful encapsulation of such compounds requires high drug loading in the microparticles, prevention of protein and peptide degradation by the encapsulation method involved and predictable release, both rate and extent, of the drug compound from the microparticles. The above mentioned problems can be overcome by using the double emulsion technique, alternatively called as multiple emulsion technique. Aiming to achieve this various techniques have been examined to prepare stable formulations utilizing w/o/w, s/o/w, w/o/o, and s/o/o type double emulsion methods. This article reviews the current state of the art in double emulsion based technologies for the preparation of microparticles including the investigation of various classes of substances that are pharmaceutically and biopharmaceutically active.