

Formulation Techniques of Multiple Emulsions (W/O/W, O/W/O), their Release Kinetics and Application. A Review

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SUMMARY. Multiple emulsions have a lot of potential as encapsulating systems in food, cosmetics, and pharmaceuticals. However, performing release kinetics in these systems is challenging because of their complicated structure. In personal care products, multiple-phase emulsions are becoming more popular as alternatives to plain emulsions. The gradual and controlled release of the contents is one of the key advantages of complex emulsions over basic emulsions. One-step or two-step emulsification techniques, phase inversion, preparation using microfluidics devices, spontaneous multiple emulsion preparations, preparation using a microporous glass membrane, formulation of shear rate-sensitive multiple emulsions, multiple emulsions by controllable microfluidic production are few of several techniques utilized to prepare emulsions. Two-step emulsification procedures are the most prevalent. A basic strategy produces many results. Emulsifiers or mixtures of emulsifiers with HLB values near the required HLB of the oil phase are optimal for creating stable emulsions. The dissolution paddle apparatus, which explains the percentage of drug release from numerous emulsions, well explains the release kinetics of drug substances from several emulsions.

RESUMEN. Las emulsiones múltiples tienen un gran potencial como sistemas de encapsulación en alimentos, cosméticos y productos farmacéuticos. Sin embargo, realizar la cinética de liberación en estos sistemas es un desafío debido a su estructura complicada. En los productos para el cuidado personal, las emulsiones multifásicas son cada vez más populares como alternativas a las emulsiones simples. La liberación gradual y controlada de los contenidos es una de las principales ventajas de las emulsiones complejas sobre las emulsiones básicas. Técnicas de emulsificación de uno o dos pasos, inversión de fase, preparación con dispositivos de microfluidos, preparaciones de emulsiones múltiples espontáneas, preparación con una membrana de vidrio microporosa, formulación de emulsiones múltiples sensibles a la velocidad de cizallamiento, emulsiones múltiples mediante producción microfluídica controlable son algunas de varias técnicas utilizadas para preparar emulsiones. Los procedimientos de emulsificación en dos pasos son los más frecuentes. Una estrategia básica produce muchos resultados. Los emulsionantes o mezclas de emulsionantes con valores HLB cercanos al HLB requerido de la fase oleosa son óptimos para crear emulsiones estables. El aparato de paletas de disolución, que explica el porcentaje de liberación de fármacos de numerosas emulsiones, explica bien la cinética de liberación de sustancias farmacológicas de varias emulsiones.

KEY WORDS: carrier system, drug release, encapsulation system, microfluidic device, multiple emulsions, preparation methods.

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