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Surfactant free emulsions stabilized by in situ aggregates formed from natural components

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Currently, there is an increasing attention to produce biodegradable pharmaceuticals using safe solvents during their manufacturing as well as biodegradable ingredients to minimize the amount of byproducts and wastes. Accordingly, we attempted to apply the main principles of green production/chemistry to pharmaceutical formulation in order to obtain drug loaded eco-friendly emulsions devoid of any solvents/cosolvents or synthetic surfactants. In the proposed emulsions, the synthetic emulsifiers that are frequently used to prepare pharmaceutical emulsions, were replaced by in situ inclusion complexes formed between native cyclodextrins and vegetable oil obtained from plant origin. In absence of surfactants, it is expected that the common toxicities and environmental concerns were not problematic. A complete factorial design was employed to study the effect of different formulation variables on emulsions properties that included globule size, drug solubility, zeta potential and polydispersity index. Formulations optimization was conducted using Design-Expert® software. Results revealed the possibility of obtaining stable drug loaded environmental friendly emulsions using an easily scaled up process.

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