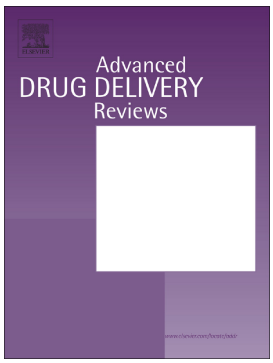

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Supercritical carbon dioxide-based technologies for the production of drug nanoparticles/nanocrystals – a comprehensive review

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Abstract (3572 characters, with spaces)

Low drug bioavailability, which is mostly a result of poor aqueous drug solubilities and of inadequate drug dissolution rates, is one of the most significant challenges that pharmaceutical companies are currently facing, since this may limit the therapeutic efficacy of marketed drugs, or even result in the discard of potential highly effective drug candidates during developmental stages. Two of the main approaches that have been implemented in recent years to overcome poor drug solubility/dissolution issues have frequently involved drug particle size reduction (i.e., micronization/nanonization) and/or the modification of some of the physicochemical and structural properties of poorly water soluble drugs. A large number of particle engineering methodologies have been developed, tested, and applied in the synthesis and control of particle size/particle-size distributions, crystallinities, and polymorphic purities of drug micro- and nano-particles/crystals. In recent years pharmaceutical processing using supercritical fluids (SCF), in general, and supercritical carbon dioxide ($scCO_2$), in particular, have attracted