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Applications of supercritical fluids in the pharmaceutical industry

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The advantageous and tunable properties of supercritical fluids being high densities, high diffusivities, low viscosities and near zero surface tension, make them unique and applicable in many areas. In this presentation, new promising applications of supercritical carbon dioxide in the pharmaceutical industry will be demonstrated, with the focus on the development of novel drug delivery systems. Besides incorporation of drugs into polymers and composites, supercritical fluid applications offer possibilities of tailoring the properties of the final product (e.g., pore size distribution), control of the active substance loading and consequently obtaining diverse drug release kinetics. Examples of development of polymer-based materials for the controlled release of active components by supercritical solvent impregnation of polymers with pure compounds or plant extracts, polymer foaming and impregnation in supercritical carbon dioxide and fabrication of solid dispersions of drugs in polymers by processing with supercritical carbon dioxide will be presented. A brief overview of other applications of interest for the pharmaceutical industry, like fractionation of natural bioactive components, particle design and drug formulation will be provided as well.

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