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Chemical Engineering and Processing: Process Intensification
Volume 86, December 01, 2014, Pages 47-52

Particle formation and micronization using non-conventional techniques - review (Review)

Fahim, T.K.[a], Zaidul, I.S.M.[a], Abu Bakar, M.R.[a], Salim, U.M.[a], Awang, M.B.[b], Sahena, F.[c], Jalal, K.C.A.[c], Sharif, K.M.[a], Sohrab, M.H.[c]

[a]Faculty of Pharmacy, International Islamic University Malaysia, Kuantan Campus, Kuantan Pahang, Malaysia
[b]Faculty of Pharmacy, Cyberjaya University College of Medical Sciences, Cyberjaya Selangor Darul Ehsan, Malaysia
[c]School of Industrial Technology, Universiti Sains Malaysia, Pulau Pinang, Malaysia

Abstract

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Due to growing concerns regarding health, safety and the environment, non-conventional methods for particle formation and micronization that are either solvent-less or use environmentally acceptable solvents such as carbon dioxide have come into favor. Supercritical CO_2 (sc CO_2) (T>31.1°C, P>7.3MPa) has been used in food and pharmaceutical industries to minimize the use of organic solvents, produce new food products, produce environmentally superior food products and to process and micronize (0.1-5μm) pharmaceuticals. Control of particle size increases the dissolution rate of drugs into the body. Techniques that use sc CO_2 eliminate inherent drawbacks of conventional methods such as thermal or mechanical degradation of the product, poor control of the particle size and morphology, lack of brittleness of some polymers and low encapsulation efficiency. Several techniques have been reported for the particle formation and micronization using supercritical fluids that have been successfully scaled up for commercial use. Supercritical CO_2 has also been used to develop applications for medicines, essential oils, vitamins, food grade polymers, catalysts and pigments. This review highlights the process mechanism of supercritical fluid based techniques as well as some applications on particle formation and micronization. © 2014.

Author keywords

Dissolution rate Encapsulation efficiency Micronization Particle formation Supercritical fluid

Indexed keywords

Conventional techniques
Dissolution rates
Encapsulation efficiency
Micronizations
Particle formations

Engineering main heading: Supercritical fluids

ISSN: 02552701
CODEN: CENPE
Source Type: Journal
Original language: English
DOI: 10.1016/j.cep.2014.10.009
Document Type: Review
Publisher: Elsevier

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Zaidul, I.S.M.; Faculty of Pharmacy, International Islamic University Malaysia, Kuantan Campus, Kuantan Pahang, Malaysia

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