

Microwaves make for faster, greener pharma manufacturing

May 30 2013

Microwave radiation could provide a faster, greener way to manufacture drugs, according to researchers at the University of Bradford.

Published in the [Royal Society of Chemistry](#) journal, *CrystEngComm*, the research is the first to show that microwave radiation can be effectively used for co-crystallisation, a process which creates single crystals constructed from two compounds. Drugs manufactured from these 'co-crystals' can have improved properties such as longer shelf-life, improved solubility and easier absorption into a patient's bloodstream.

Using caffeine and maleic acid as example compounds, the researchers achieved 100 per cent crystallisation in just one minute using very little solvent, making the process faster and more environmentally friendly than conventional methods.

Professor Paradkar, Director of the University of Bradford's Centre for Pharmaceutical Engineering, explains: "We chose caffeine and maleic acid as these compounds have different levels of solubility which is a common problem in pharmaceutical manufacturing. Conventional methods of co-crystallisation aren't effective when you're working with two compounds that dissolve differently, but we found that by using microwave radiation we could still get excellent results."

The team worked with five different solvents, of which water and methanol produced the best results. These two solvents were able to transmit the heat from microwave radiation more effectively than the

others tested: [acetone](#), [ethyl acetate](#) and toluene.

The experiments have only, to date, been carried out at laboratory scale, but Professor Paradkar believes that, if the process can be scaled up, it could offer significant benefits to the [pharmaceutical industry](#):

"Other methods of co-crystallisation, such as solvent [crystallisation](#), grinding or ultrasound, all have associated problems, for example increased use of solvents or lack of purity in the resulting co-crystals," he says. "Our research shows that [microwave radiation](#) is a very promising alternative for producing pure co-crystals quickly, with limited use of solvents."

More information: Pagire, S. et al. Microwave assisted synthesis of caffeine/maleic acid co-crystals: the role of the dielectric and physicochemical properties of the solvent, *CrystEngComm*, 2013. [DOI: 10.1039/C3CE40292D](#)

Provided by University of Bradford

Citation: Microwaves make for faster, greener pharma manufacturing (2013, May 30) retrieved 23 June 2024 from <https://phys.org/news/2013-05-microwaves-faster-greener-pharma.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.