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Intellectual Property Portfolio

WO2016038356

Print your own medicine: 3D printing of oral tablets for personalised medicine

The University of Central Lancashire is proud to present its portfolio of Intellectual Propertywhich covers a wide range of categories, including: Biomedical Sciences, Electrical and Electronic Engineering, Mechanical Engineering, Forensic Sciences, Nuclear Sciences, Materials and Nano-Materials Technologies, Tribology Technologies, Pharmacy and 3D Printing Technologies.

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Print your own medicine: 3D printing of oral tablets for personalised medicine

Details

Title of the patent: Solid dosage form production

Legal Status:

China:	Granted
China (Div)	Pending
Europe:	Opposed
Europe (Div)	Pending
US:	Pending

Published as:	WO2016038356
Status:	Available for exploitation
Priority date:	8th December 2014

Introduction

UCLan research has developed a production method for solid dosage forms using a widely available desktop 3D printer.

The development utilises 3D printing technology, specifically fused filament fabrication (FFF) 3D printing, to produce solid dosage forms, such as pharmaceutical tablets. The production process utilises novel printing filaments, typically on a spool, which contain the active ingredient. Such active-containing filaments have proved to be extremely robust and the principles outlined in the present disclosure provide access to a variety of viable formulations directly from a 3D printer. This, for the first time, affords a viable means for the in situ (e.g. within a pharmacy) 3D printing of personalised medicines tailored to a patient's needs. The system also includes to purpose-built software for operating a printing apparatus, as well as local, national and global systems for monitoring the real time operation of a plurality of printing apparatuses to enable detection of malfunctions, thereby making regulatory approval viable and facilitating regulatory compliance.

Description

UCLan research has developed a solid dosage form printing apparatus for tablets including an active ingredient. This may be a pharmaceutical, a nutraceutical or a food supplement.

The apparatus includes an FFF 3D printer which prints onto a build platform where the solid dosage form is printed. An active ingredient-containing printing filament including the active ingredient and an active ingredient carrier is required as well as one or more extrusion nozzles through which the printing filament can be extruded. The apparatus requires a computer to control the FFF 3D printer and potentially the build platform.

UCLan research has a suite of patents which relate to the principal of 3D printing of solid dosage forms. The patents are available individually, or in a package. This case is the key patent in the suite which may be required to practice some of the other patents. Due to this, UCLan can't license this patent exclusively alone. This research enables the production of solid dosage forms on demand, rather than in standard forms, which can lead to splitting of tablets or in some cases 'specials' to be made by pharmacists.

Being able to produce solid dosage forms on demand will enable particular requirements to be considered when the solid dosage forms are produced. This may be particularly useful in paediatric medicine, where patients require significantly differing dosages.

This may also be useful where a patient needs several active ingredients (printing all the active ingredients in one solid dosage form) or where patients can't swallow large items- increasing the concentration of the active ingredient to allow smaller solid dosage forms.

Core Advantages

The methods allow the production of customisable solid dosage forms. This enables the variation of dosages of actives, reduced input and output variables, reduced input ingredients or elements, minimal complexity, and maximum storage stability for both input materials and products.

The apparatus is suitable for regulatory approval and may be used in pharmacies or other approved customised drug manufacturing facilities. It also allows aesthetic customisation of solid dosage forms without loss of functional and structural integrity. This may be particularly attractive for children and may facilitate patient compliance.

The method may allow production of solid dosage forms to facilitate prototyping and formulation research and development in the pharmaceutical industry.

Application

The technology can be the base for a complete service where pharmacist can tailor the dose and drug release to suit a patient. The pharmacist could control of the dose and release pattern through software.

The product could accelerate the R&D process for solid dosage forms. The filament allows for a high level of variation for dose, volume, shape, coating thickness. This allows for experimental solid dosage forms to be produced rapidly with minimal expertise.

The full patent submission can be seen at:

https://worldwide.espacenet.com/publicationDetails/biblio?CC=WO&NR=2016038356A1&KC=A1&FT=D

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For more details about a specific UCLan technology and answers to general questions about thispatent or collaborating with us or licensing our Intellectual Property, please contact

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