An interdisciplinary research and industrial collaboration centre

Our expertise spans the pharmaceutical sciences, chemistry and polymer engineering disciplines.

We develop innovative pharmaceutical formulation technologies, and help commercial partners overcome challenging formulation problems.

Our pharmaceutical formulation development activities are focused on enhancing the solubility, stability, compatibility and effectiveness of challenging active molecules.

We have capabilities in:

- Pre-formulation analysis
- Enhancing solubility of poorly soluble drugs
- Melt processing technologies
- Novel drug delivery systems
- Process analytical technology and QbD

Our know-how covers a broad spectrum of dosage forms and routes of administration, with access to enabling and proprietary technologies for developing optimised pharmaceutical formulations using a QbD approach:

- Hot melt extrusion
- Melt granulation
- Injection moulding
- Spray drying
- Freeze drying
- Nano-processing

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Work with the Centre for Pharmaceutical Engineering Science

To explore research collaboration projects, or to find out more about our capabilities, please contact:

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UNIVERSITY of BRADFORD

Centre for Pharmaceutical Engineering Science

The Centre for Pharmaceutical Engineering Science

An interdisciplinary research and industrial collaboration centre

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Our Expertise

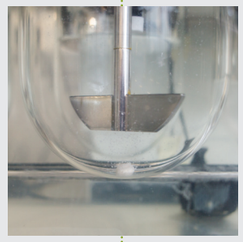
Solubility enhancement

Poor drug solubility creates delivery challenges such as erratic absorption and low oral bioavailability.

We offer expertise in a number of formulation technologies that can be used to design a formulation that will enhance the solubility of your active.

We can investigate a range of approaches, such as:

- Amorphous forms
- Co-crystals and novel polymorphs
- Liquid formulations – micro- and nano-emulsions, surfactant/co-solvent
- Size reduction – micronisation and nano-processing
- Complexation
- Liposomes
- Micelles



Pharmaceutical melt technologies

We are experts in this area, with many years of experience in developing new pharmaceutical formulations.

We have a wide variety of laboratory equipment and a clean room facility:

- Hot melt extrusion (HME)
- Melt granulation
- Moulded tablets
- Micro-moulding

Pharmaceutical melt technologies represent a number of excellent techniques to prepare amorphous API formulations in a number of different solid dosage forms, leading to an increased active dissolution rate and enhanced bioavailability.

We have relationships with CMOs, and can transfer laboratory-optimised processes for clinical manufacture.

Novel drug delivery systems

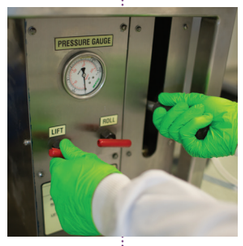
Abuse-resistant systems

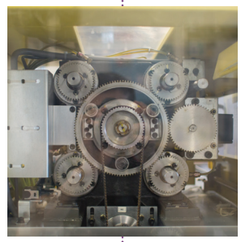
Scientists at the Centre for Pharmaceutical Engineering Science have invented a novel polymer matrix system, comprising materials that are:

- Biocompatible
- Biodegradable
- GRAS status
- Pharmaceutically acceptable
- Readily available
- Inexpensive

It can be used to prepare novel drug delivery systems using readily scalable and efficient HME or micro-moulding processing techniques.

When the matrix is prepared with drug substance, the resultant drug product has the quality attributes required by the FDA for Abuse-Resistant Systems (Tier 1), and has been shown to comply with their required product characteristics in terms of ability to crush and ease of extraction.





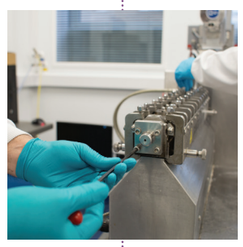
Non-hygroscopic effervescent formulations (PCT/GB2015/051942)

We have developed a non-hygroscopic effervescent formulation which increases the stability of effervescent tablets and powders in the presence of small amounts of moisture in the atmosphere.

The invention, based on the use of co-crystals of citric acid, addresses the challenges in effervescent product manufacturing, packaging and subsequent storage.

Benefits of non-hygroscopic effervescent formulations:

- Allows processing without the need for a humidity-controlled environment
- Significantly reduces the energy costs associated with manufacturing
- Avoids the need for specialised equipment; standard granulating and tableting equipment can be used
- Reduces equipment costs and gives more flexibility to the manufacturing plant
- Negates the need for specialist storage and packaging requirements for final products



Transdermal drug delivery systems

We offer capabilities in the development of novel transdermal formulations.

Centre for Pharmaceutical Engineering scientists have experience in the development of several standard and novel formulations for transdermal drug delivery:

- Transdermal patches
- Lypotropic liquid crystal systems
- Microneedles
- Liposomes

Oral solid dosage forms

We offer expertise and modern laboratory formulation and analytical equipment for the development of conventional solid dosage forms, including:

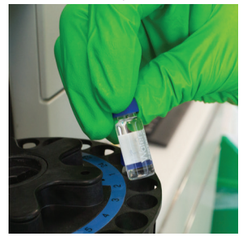
- Granules
- Powders
- Tablets
- Capsules
- Pellets

Laboratory-scale processing techniques

- Blending/mixing – planetary and turbula mixing, sifting
- Particle size reduction/milling-micronisation, nanoprocessing
- Solid dosage form processing – granulation, melt granulation, tableting, coating
- Extrusion technologies – HME tablets and pellets, injection and micro-moulded tablets
- Solids isolation technologies – spray-dried powders, freeze-dried powders

Final dosage form testing

- Physical characterisation
- Disintegration/dissolution studies
- Active purity, content and uniformity analysis
- Stability testing



CASE STUDY

Successful reformulation of a natural product (Propolis) for the export market

CLIENT
UK-based SME.

CHALLENGE
To enhance the solubility and improve the odour of a natural product formulation.

OUTCOME
A technology for water-soluble and de-odourised material was developed, allowing for easy formulation in a number of ways:

- Liquid
- Gel
- Bio-adhesive patch

Patent filed and technology transferred. Product launched in overseas market.

TIMESCALE
6 months.

RELATIONSHIP
A strong relationship was developed with the client, which involved a number of follow-on projects. A Knowledge Transfer Partnership was established.