UNIVERSITY OF LIMERICK
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Technology Transfer Office

Licensing Opportunity

# CM NANO: Nanoparticle Solution for Insoluble Drugs

## Overview

Annual global spending on pharmaceutical research and development exceeds $190 Billion. However, despite this significant investment, 90% of drugs put forward for clinical trials will fail. Key reasons for failure at this stage include poor bioavailability, low efficacy, and poor solubility. Poor solubility represents a significant problem during pre-clinical trials with up to 90% of new drugs being poorly soluble. Nanoparticles of active pharmaceutical ingredients (API) provide advantageous properties such as improved solubility, dissolution rate and bioavailability when compared to conventional larger API particles.

## Technology

CM Nanotechnology offers a solution to poorly soluble drugs while also addressing poor bioavailability and low efficacy. Scientists at the University of Limerick, Ireland, have developed novel batch and continuous combination nano-spraying/ fluidized bed drying technologies. These processes, through a single step, allow for the control of nanoparticle size and collection of directly compressible solid nanodispersions, telescoping through multiple steps in a manufacturing footprint.

The technology includes:

- Novel nozzles which control particle size and solid-state form
- A new mechanism to atomize, spray dry and trap/capture the spray-dried nanoparticles (with/without encapsulation) in one single step
- Integrates novel methods to convert nanoparticles to micron-sized solid nanodispersions

## Benefits

This technology will produce:

- Highly soluble Active Pharmaceutical Ingredients (APIs)
- Greater bioavailability (effectiveness in API achieving the desired goal)
- Accurate nanoparticles size control (lowest size 90 nm), increased batch consistency
- Higher collection yields (average yield 70%, max yield 90%)
- Adaptable to Batch and Continuous and scalable production
- Reduction of environmental footprint through reduced use of organic solvents
- Improved flowability, tabletability
- Reduced production costs
- Reduced time to market
- Patent expansion opportunities

## Applications

- For use in the batch or continuous manufacture of active pharmaceutical ingredients (API) to improve the bioavailability and solubility of API.

## Commercial Opportunity

The University of Limerick is seeking partners to exploit the commercial potential of these technologies by entering into licensing agreements.

☐Development partner

☐Commercial partner

☒Licensing

☒University spin-out

☐Seeking investment

**Patent Filings:**

EPO:

- "Method for isolation of nanoparticles using spray coating", Application 20158366.3 - Notice of grant received.
- "Particle coating method" Application 21708163.7

US:

- "Method for isolation of nanoparticles using spray: Application 17/904511
- "Particle coating" Application 17/904525

**Publications:**

- International Journal of Pharmaceutics 592 (2021) 120032. DOI: 10.1016/j.ijpharm.2020.120032
- The Journal of Supercritical Fluids 192 (2023) 105788. DOI: 10.1016/j.supflu.2022.105788

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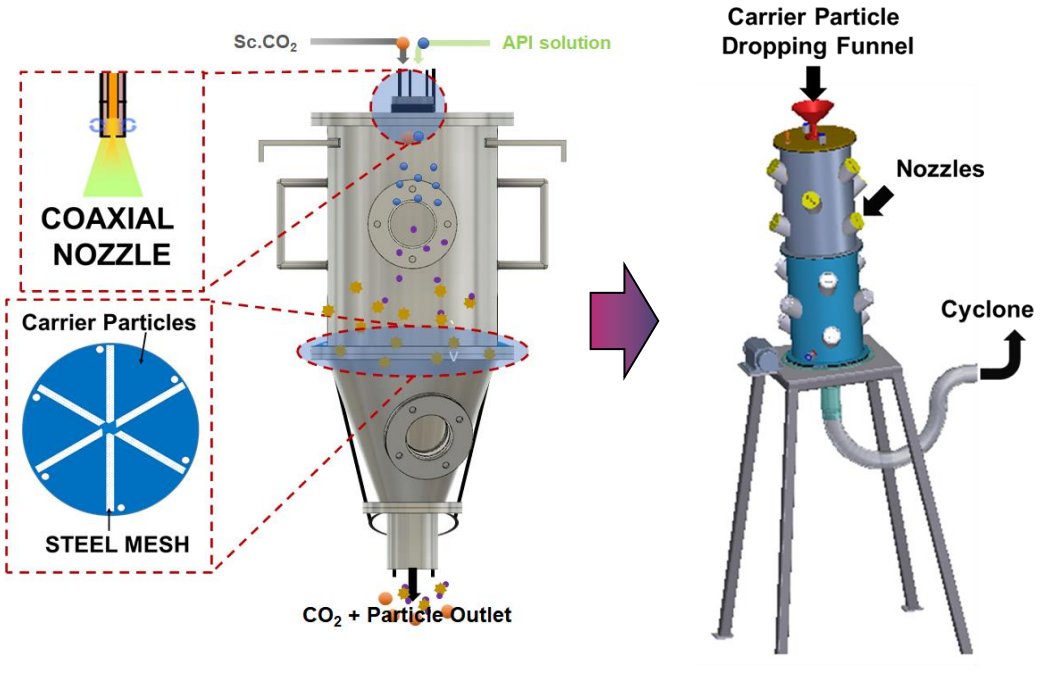
## Figures

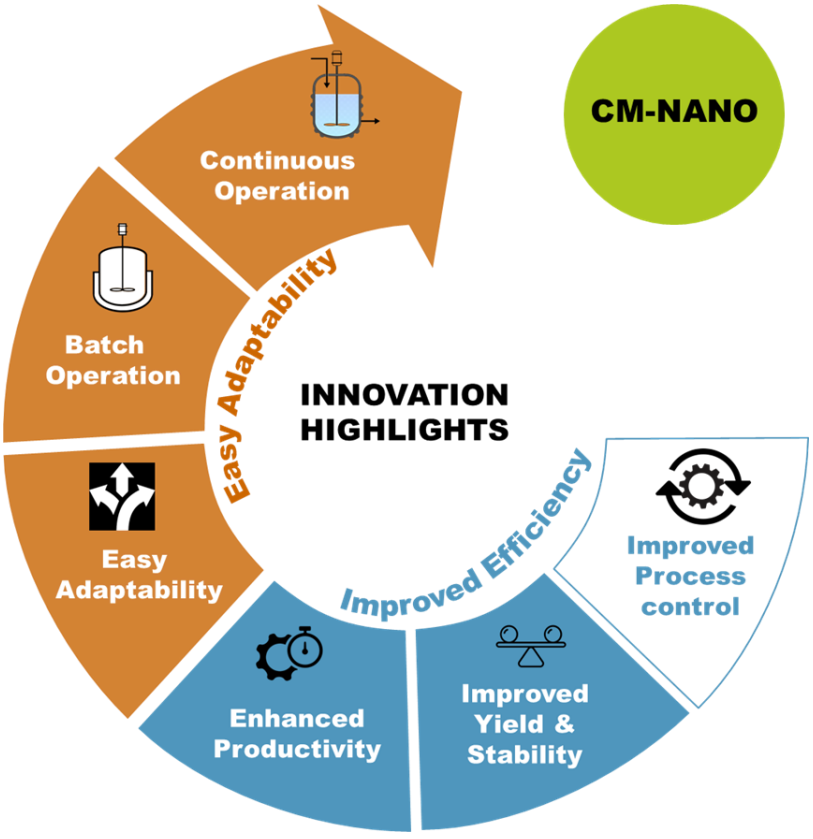
Fig 1 Characteristics of CM-Nano

| | Spray Drying w/ CM-Nano Applications | Nano-Spray Drying | Conventional Spray Drying |
|---|---|---|---|
| **Average Particle Size** | Down to 90 nm | Down to 300 nm | Down to 1000 nm |
| **Particle formation** | Controlled crystalline or amorphous and stable | Amorphous (unstable without excipients) | Amorphous (unstable without excipients) |
| **Ease of formulation** | ✓ | ✗ | ✗ |
| **Ease of loading** | ✓ | ✗ | ✗ |
| **Yield** | Up to 90% | ~10-30% | ~60% |

Fig 2: CM-Nano in Batch and Continuous mode




**Batch CM-Nano** **Continuous CM-Nano**


CM-NANO
Continuous Operation
Batch Operation
Easy Adaptability
INNOVATION HIGHLIGHTS
Easy Adaptability
Improved Efficiency
Improved Process control
Enhanced Productivity
Improved Yield & Stability