

# Exploring the frontiers of drug delivery and pharmaceutical technology: the Pharteco Lab Experience

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The Pharteco Lab, Pharmaceutical Technology and Regulatory Affairs team at the University of Bari Aldo Moro, is dedicated to exploring innovative frontiers in drug delivery and pharmaceutical technology, addressing therapeutic challenges across diverse fields, including paediatrics, oncology, and rare diseases. The group plays a leading role in the design of novel formulation strategies that combine scientific innovation with regulatory compliance and translational feasibility.

A key strength of Pharteco Lab lies in its multidisciplinary expertise in advanced formulation platforms. Prilling technology is employed to generate uniform micro-particulates with tailored properties, suitable for controlled release, taste masking, and dose flexibility [1]. Direct powder extrusion 3D printing enables the production of highly customisable solid dosage forms, opening new possibilities for patient-specific treatments [2]. Cyclodextrins, both pristine and chemically modified, are widely applied to overcome solubility and dissolution limitations of poorly soluble drugs [3]. In addition, microfluidic-assisted synthesis provides a powerful and scalable approach for producing nanosystems with narrow size distribution, high reproducibility, and industrial applicability [4]. These technologies are integrated not only to improve bioavailability and therapeutic efficacy but also to enhance patient adherence by addressing acceptability and usability.

Beyond technological innovation, Pharteco Lab distinguishes itself by combining regulatory expertise with pharmaceutical research, ensuring that outcomes are aligned with quality standards and industrial scalability. The laboratory actively collaborates with international research centres and industrial partners, fostering a dynamic ecosystem that accelerates the transfer of knowledge from bench to bedside.

Overall, the Pharteco Lab experience demonstrates how the synergistic use of cutting-edge technologies - ranging from prilling and 3D printing to cyclodextrin-based systems and microfluidics - can drive the development of the next generation of drug delivery platforms. By bridging scientific innovation, regulatory awareness, and collaborative networks, the Lab contributes to shaping innovative, patient-centred therapeutic solutions with strong translational impact.

## References

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