

# 9<sup>th</sup> Workshop on Artificial Organs, Biomaterials and Tissue Engineering

OBI - ARARAQUARA



## Biomaterials Processing Techniques

The short course “**Biomaterials Processing Techniques**” aims to provide an applied and integrated overview of different strategies used for the production and modification of materials with controlled properties. Fundamental principles of materials engineering and processing technologies widely employed in the fabrication of particles, films, capsules, and polymeric structures will be presented, with applications in areas such as agriculture, food science, biomaterials, and controlled-release systems.

Throughout the course, participants will explore the conceptual foundations, operational parameters, and major applications of the following processing techniques:

- Spray Drying;
- Fluidized Bed Processing;
- Solution Blow Spinning (SBS);
- Extrusion;
- Ionic Gelation;
- Film Casting.

Particular emphasis will be placed on the advantages, limitations, and potential of these techniques for the development of functional materials.

The content will be contextualized through current technological applications, including:

- Encapsulation of microorganisms;
- Production of controlled-release fertilizers;
- Fabrication of micro- and nanostructured polymeric systems;
- Protection and delivery of bioactive compounds.

The course adopts an approach focused on understanding the physicochemical mechanisms involved in structure formation, as well as the relationship between processing conditions and the final properties of the resulting material.

By integrating fundamental concepts with practical applications, the course seeks to provide participants with a comprehensive understanding of how different processing technologies can be selected, optimized, and adapted according to specific technological objectives and application requirements.

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## Learning Outcomes

Upon completion of the course, participants are expected to:

- Understand the fundamental principles underlying major materials processing techniques;
- Identify the advantages and limitations of different processing approaches;
- Correlate processing parameters with the structural and functional properties of materials;
- Evaluate the suitability of specific techniques for applications involving biomaterials, bioactive compounds, and controlled-release systems;
- Develop an integrated perspective on the design and production of functional materials for technological and biomedical applications.