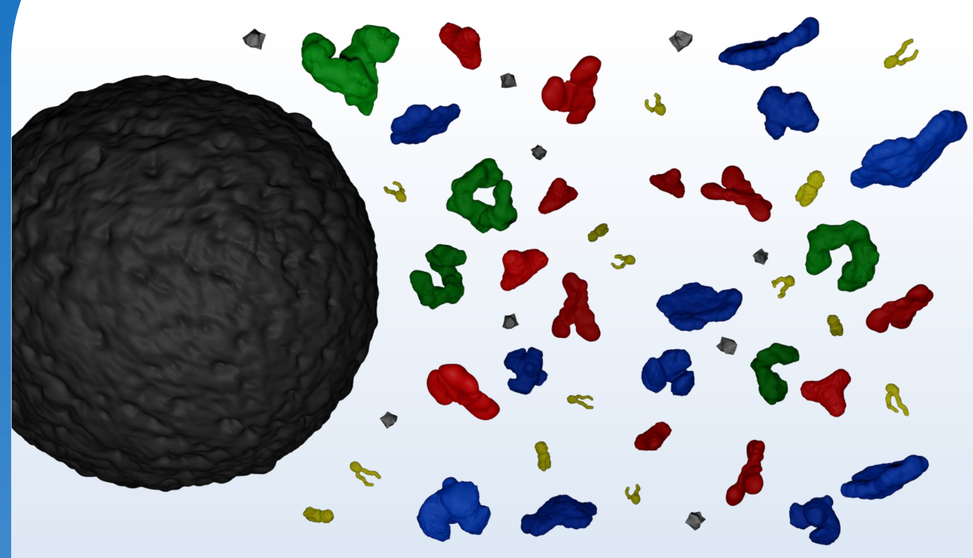
Technische Universität München – Fakultät Maschinenwesen – Bioseparation Engineering Group

Bachelor´s / Master´s / Semester thesis:

Magnetic separation of proteins, lipids and carbohydrates from biotechnological lysates: from analytical to technical scale.

Keywords: magnetic nanoparticles, macromolecules, adsorption/desorption, biocorona, bio-nano interface

Project description



This project consists in executing adsorption and desorption studies to characterize the different macromolecules in biotechnological lysates that interact with superparamagnetic nanoparticles, and in understanding how they compete to have a place at the nanoparticle surface. After iron oxide nanoparticles are placed in a solution, different molecules are attracted to the metal surface, forming a halo, commonly called biocorona. Therefore, nanoparticles are a promising bioseparation tool. Adsorption studies are then performed to identify the conditions to have certain selectivity and to separate a specific molecule or group of molecules in lab and technical scale.

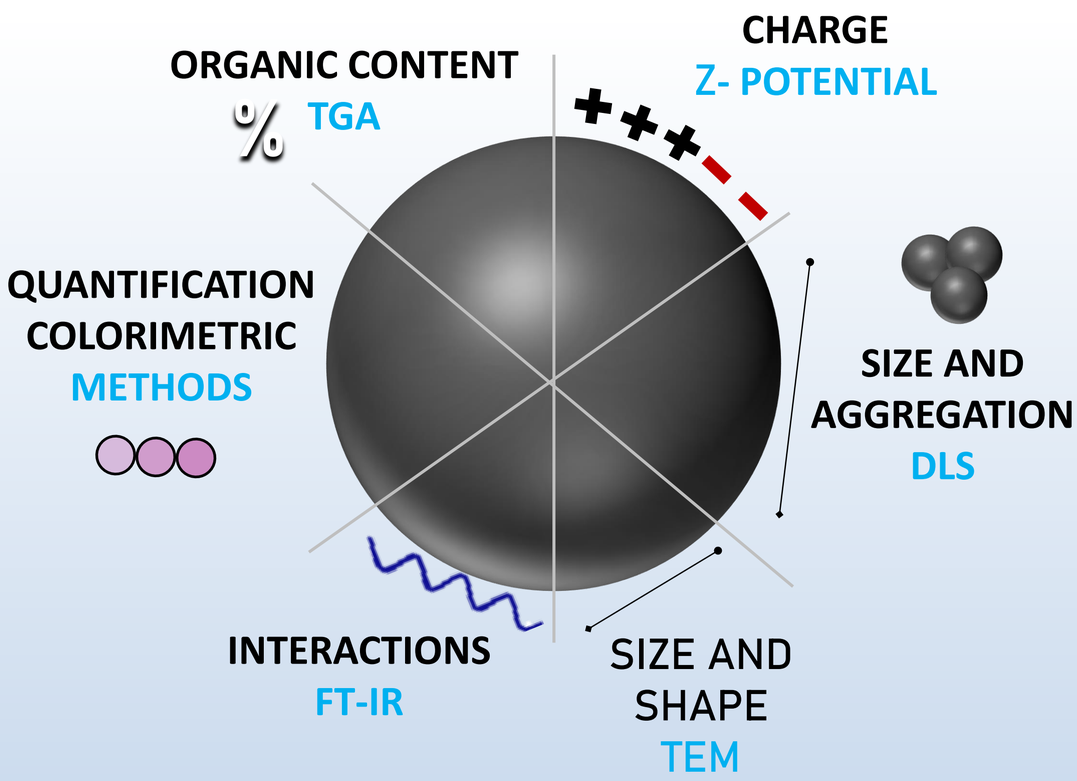
Requirements

- Students from biochemistry, chemical engineering, biotechnology and similar.
- Interest for learning a variety of analytical methods.
- Able to work independently and desire to explore the bio nano world!

Tasks

- Synthesize and characterize iron oxide magnetic nanoparticles.
- Quantify the biomacromolecules adsorbed into/ desorbed from the surface under different conditions in biotechnological mixtures.
- Characterize the nanoparticle surface after adsorption/desorption.
- Perform a scale-up in the HGMS.

Methods to be used



+ FERMENTATION, HIGH GRADIENT MAGNETIC SEPARATOR

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To start on March/April