

#### Extractive Fermentation to produce biobased molecules Marwen Moussa

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# **Extractive Fermentation** to produce biobased molecules

UNIVERSITÉ PARIS-SACLAY

### This research is part of the TRANSFeRMentation research group in INRAE's TRANSFORM department

Fermentation processes are a cornerstone of the bioeconomy. In order to develop robust processes for full scale industrial implementation, these must be combined with other pre/post-treatment steps and optimized within a multi-criteria approach. In the case of the bioproduction of a compound of interest by microbial routes, a recurring obstacle concerns the inhibitory effect induced by this compound and/or by its co-product on the producing microorganism. The integration of fermentation with extraction (extractive fermentation) aims to tackle these limitations and intensify the bioproduction.



## **Process engineering and integration**



Characterize the biobased substrates and products Characterize the physiological and bio-physical responses of microorganisms Ounderstand, operate, optimize and eco-design the process Model the biological mechanisms, the separation mechanisms and their integrated process

### **MULTI-SCALE APPROACHES, TOWARDS A MULTICRITERIA OPTIMIZATION**



Study selective separation processes, understand and model the mechanisms that govern them, in order to optimize their performance.

Study extractive fermentation as a strategy for intensifying the bioprocesses, while minimizing utility consumption (energy, solvents, water), within a global approach of sustainable engineering.

AgroParisTech / SayFoöd





## INNOVATION PROSPECTS THROUGH EXTRACTIVE **FERMENTATION**

- Exploring the potential of new microorganisms and new bioreactor operations
- Valuing a wider range of bio-resources
- Better mastery of process integration towards a genericity of the developed methods
- Producing new biobased molecules





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