Innovative polysaccharides as matrices for encapsulation of lactic acid bacteria and antimicrobial peptides

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Exopolysaccharides and gelling

Exopolysaccharide (EPS):

Polymer of sugar units (polyoside), excreted outside cell, soluble in aqueous solutions

Gelling:

Convert EPS into a semi-solid matrix (gel) using chemical or physical factors

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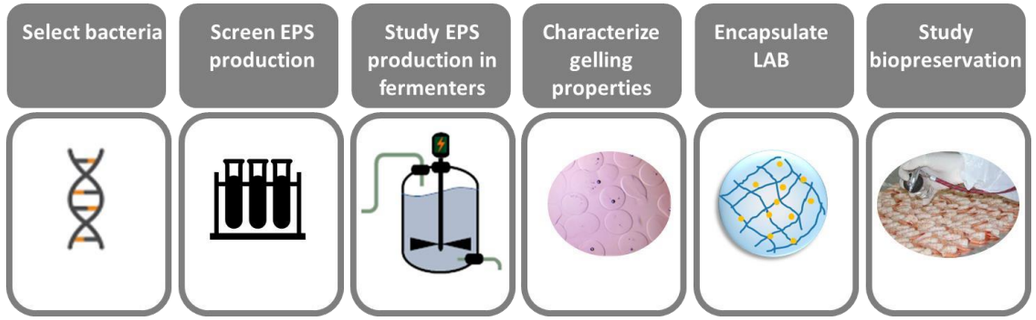
Gelling:

Convert EPS into a semi-solid matrix (gel) using chemical or physical factors

- Isolate innovative bacterial EPS
- Encapsulate lactic acid bacteria (LAB) and allow the release of bacteriocin
- Apply LAB-microgels in food biopreservation

BlueRemediomics



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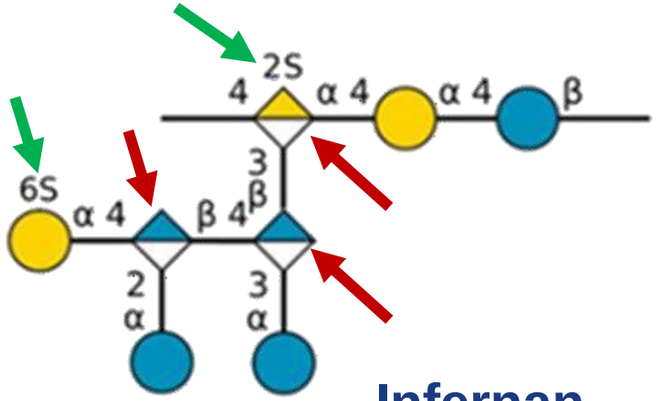
Exopolysaccharides and gelling

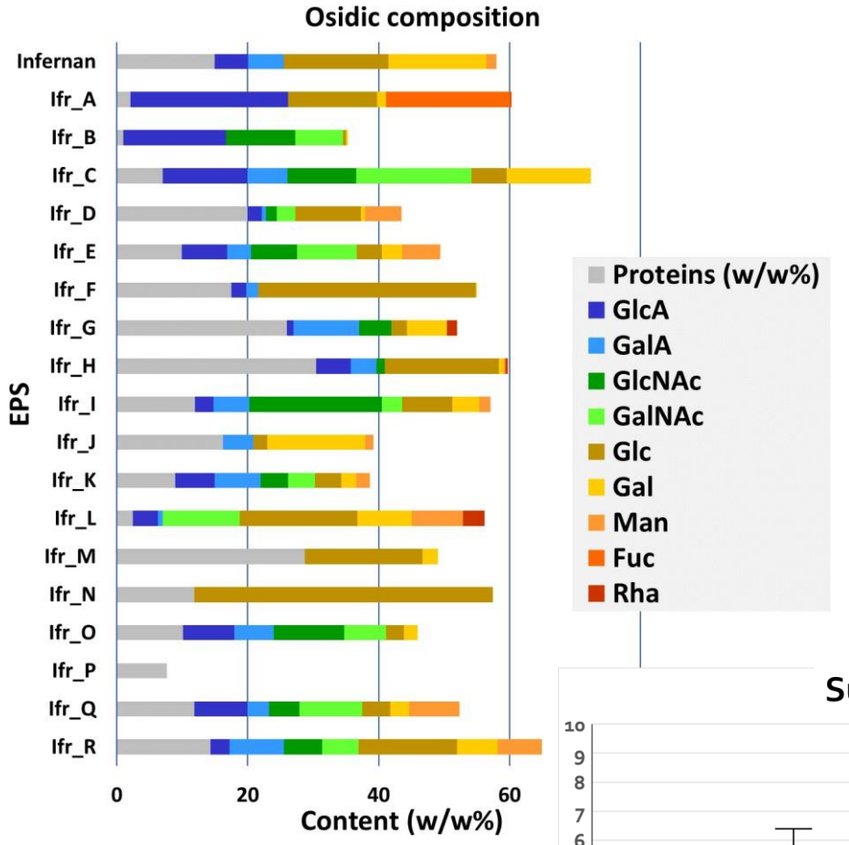
Alteromonas infernus

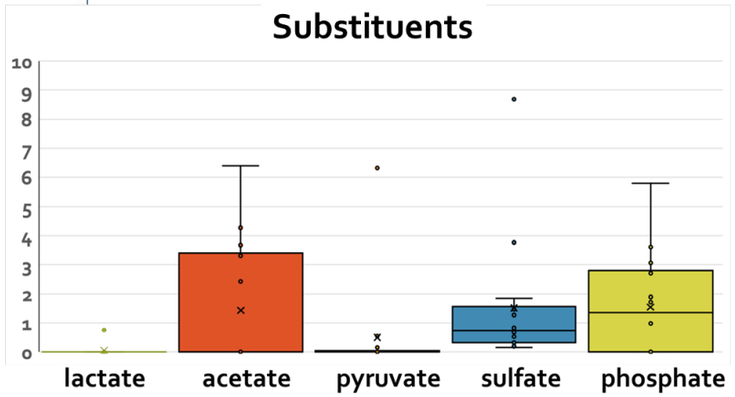
Glc
GlcA
GlcNAc
Gal
GalA
GalNAc



Infernan

Exopolysaccharides and gelling





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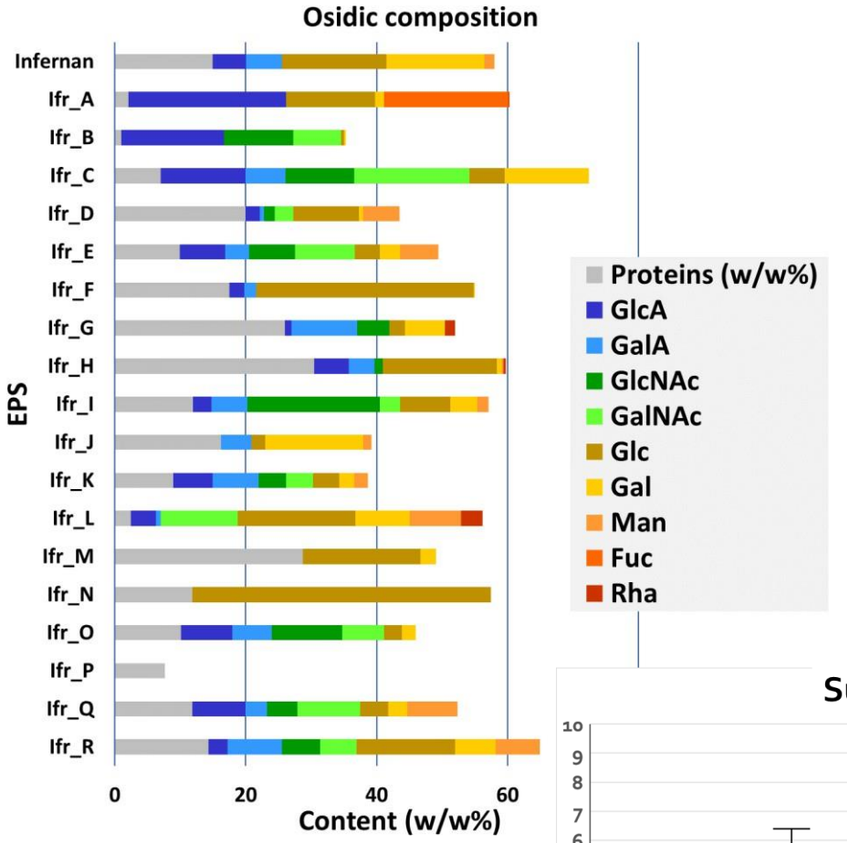

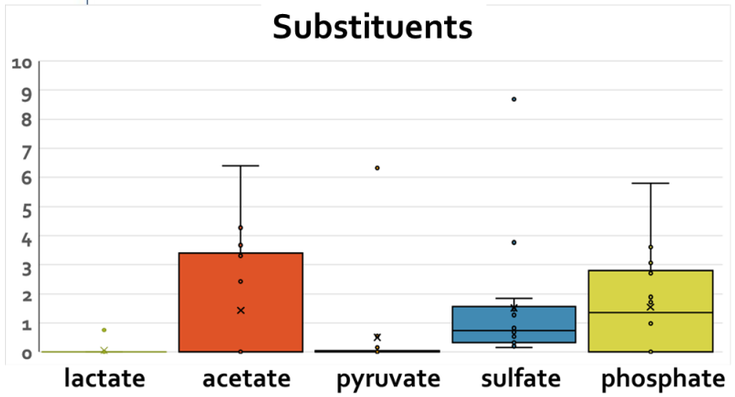

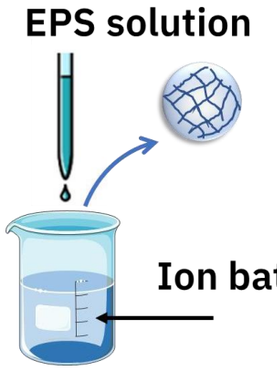

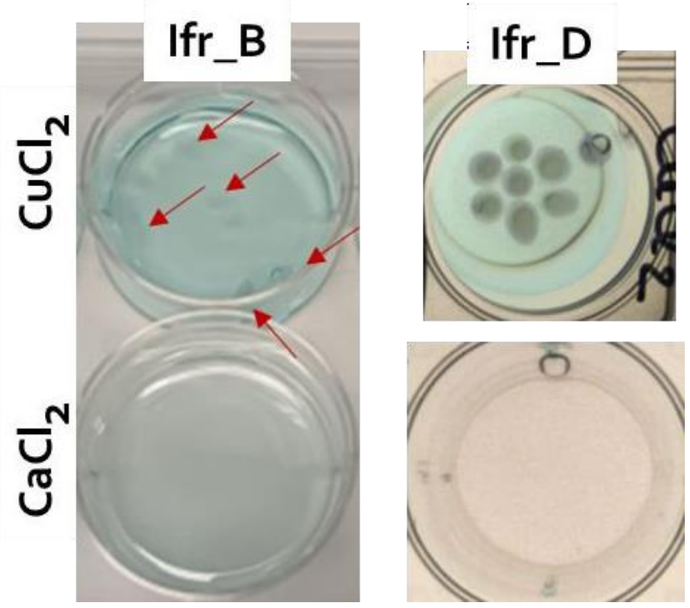

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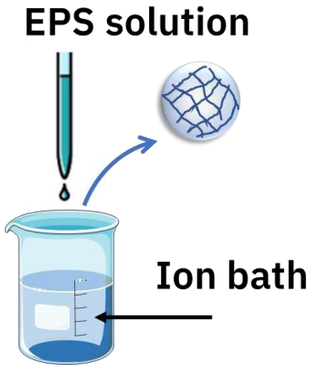
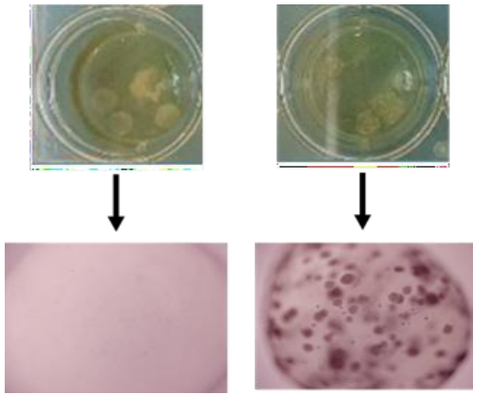


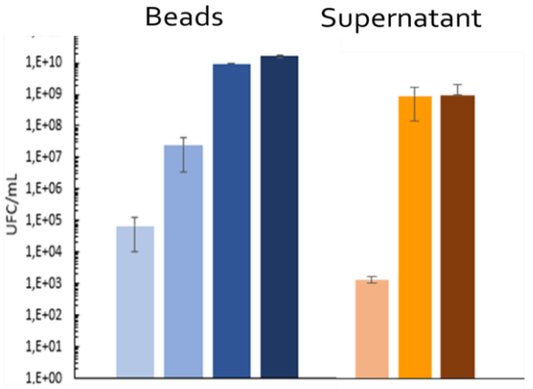
Control without LAB

Beads with LAB

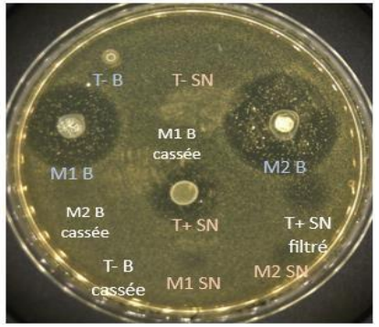


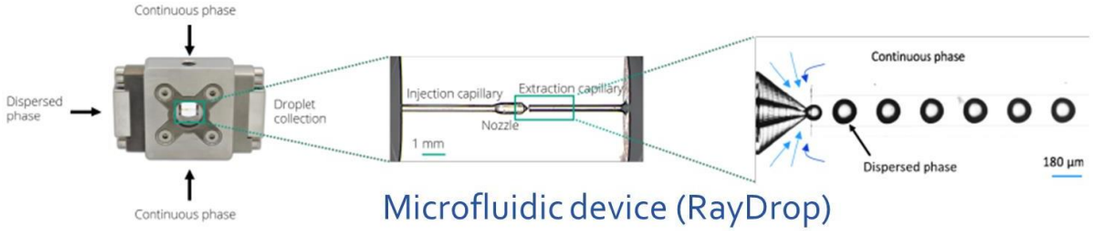
Microscopic observation: beads ~4 mm in diameter

Enumeration of LAB in beads at 0, 6, 24 and 48 hours



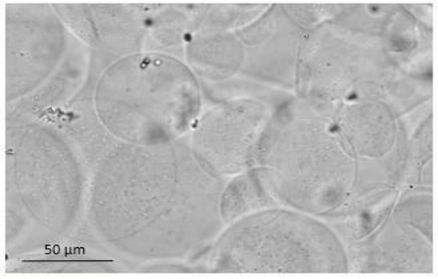
Inhibition of *Listeria innocua* by LAB encapsulated in beads at 24h





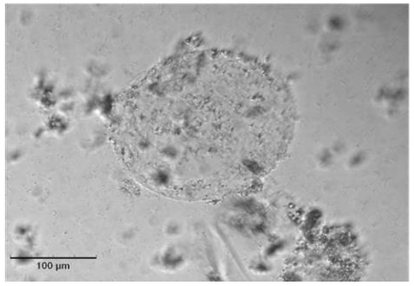
Microfluidic device (RayDrop)

Control

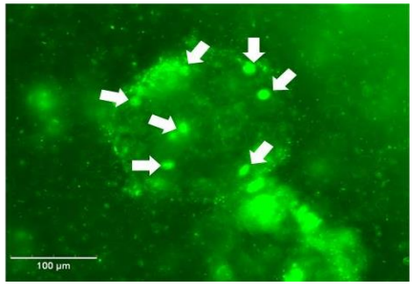


Monodispersed gels: 60 µm ± 13 µm (n=50)

With encaspulated LAB at 48h



Microgels



Live LAB cells (SYTO9)

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Future work

- Screen other EPS for gelling
- Cross-linking with different types of ions and ion mixtures, co-gelling with alginate
- Decrease molecular weight to improve gelling

- Detection of bacteriocin (tricine PAGE, growth inhibition quantification in liquid broth)
- Applications in food preservation (challenge tests)

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Thank you for your attention!

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