Department of Food and Nutritional Sciences

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Antimicrobial activity of *Lactobacillus plantarum* LP_{LDL}® grown on different carbohydrates

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Background

Lactobacillus plantarum LP_{LDL}® is a probiotic with established cholesterol reducing activity in normal to mildly hypercholesterolaemic adults.

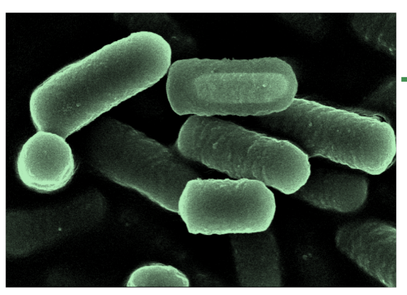
Objectives

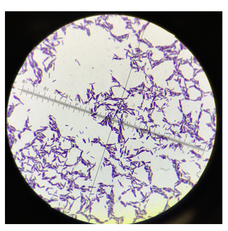
Investigate the antimicrobial activity of *L. plantarum* LP_{LDL}®, pre-grown on different carbohydrates, against a selection of pathogens of clinical relevance.

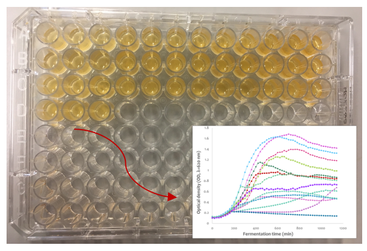
Methods

- Growth of *L. plantarum* LP_{LDL}® on 27 oligo/polysaccharides in pure culture.
- Carbohydrates supporting growth were further tested for their antimicrobial activity against several pathogens.
- The antimicrobial activity of cell free supernatants and whole culture preparations was assessed using the disk diffusion and the well diffusion assays .

***Lactobacillus plantarum* LP_{LDL} ®**



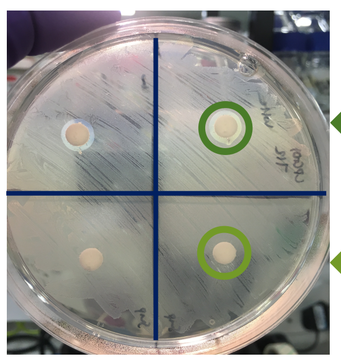




Results

L. plantarum LP_{LDL}® demonstrated highest growth rates on cellobiose, fructo-oligosaccharides, gentiooligosaccharides and LP-GOS.

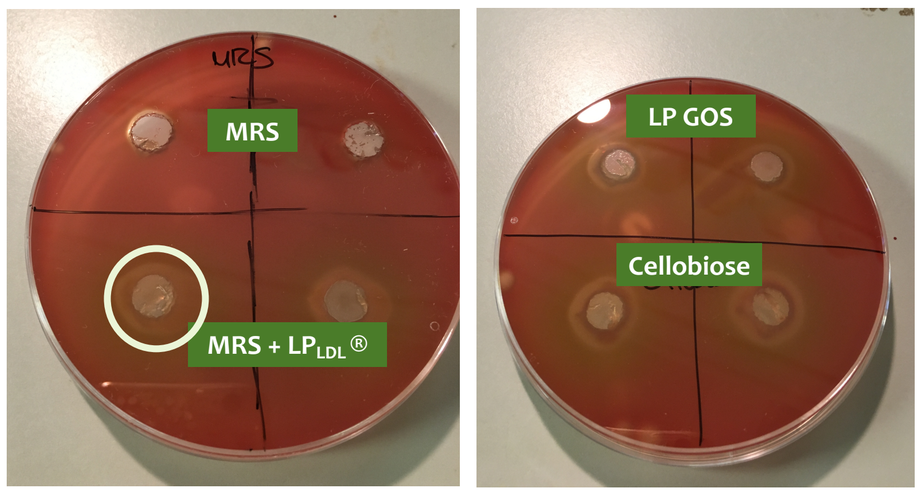
Disk diffusion assay using supernatants and whole cell cultures of *L. plantarum* LP_{LDL}®:



- Supernatants show no antimicrobial activity
- Effect may be cell associated

Culture supernatants did not demonstrate antimicrobial activity against any of the test pathogens.

Antimicrobial activity of *L. plantarum* LP_{LDL}® on *C. difficile* DSMZ 27147 using the well diffusion assay



Whole cell preparations displayed distinct clearance zones against *C. difficile* and all test pathogenic strains.

Antimicrobial activity of *L. plantarum* LP_{LDL}® on pathogens using the well diffusion assay

Strain / Substrate	*Candida albicans* DSMZ 11949	*Shigella sonnei* DSMZ 25715	*Salmonella* typhimurium	*Escherichia coli* VT- 0157:H7 VT-	*Escherichia coli* DSMZ 1103	*Enterococcus faecalis* DSMZ 2570	*Campylobacter jejuni* NCTC 11168H	*Campylobacter jejun* NCTC 11828	*Campylobacter jejun* Dg105	*Clostridium difficile* DSMZ 27147
Negative control	x	x	x	x	x	x	x	x	x	x
LP-GOS	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cellobiose	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
GeOS	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
scFOS	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

LP-GOS: galactooligosaccharides synthesized using β-galactosidases from *L. plantarum* LP_{LDL}®; GeOS: gentiooligosaccharides

Future Research

The antimicrobial potential of *L. plantarum* LP_{LDL}® will be further evaluated against a selection of pathogens in complex models of the human colon.

Study Highlights

L. plantarum LP_{LDL}® demonstrated antimicrobial activity against both Gram negative and Gram positive pathogens of clinical importance:

- Activity was not pH associated
- Activity may be cell associated

L. plantarum LP_{LDL}® may have additional biological activities to cholesterol reduction

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