

Groene Kaskade



WP 2.6. Valorization

Presentation 12 September 2019 Wertle

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Goal:

Biorefinery of byproducts from agri-related processes and isolation of novel microorganisms for bioconversion

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Goal

Extraction of protein from different sources

Horse manure

Sewage plant digestate

Enzymatic modification of protein

Bioactivity

Investigate growth performance of industrial micro organisms

Isolation and characterization of novel microorganisms

Cellulolytic activity

Biobased building block production

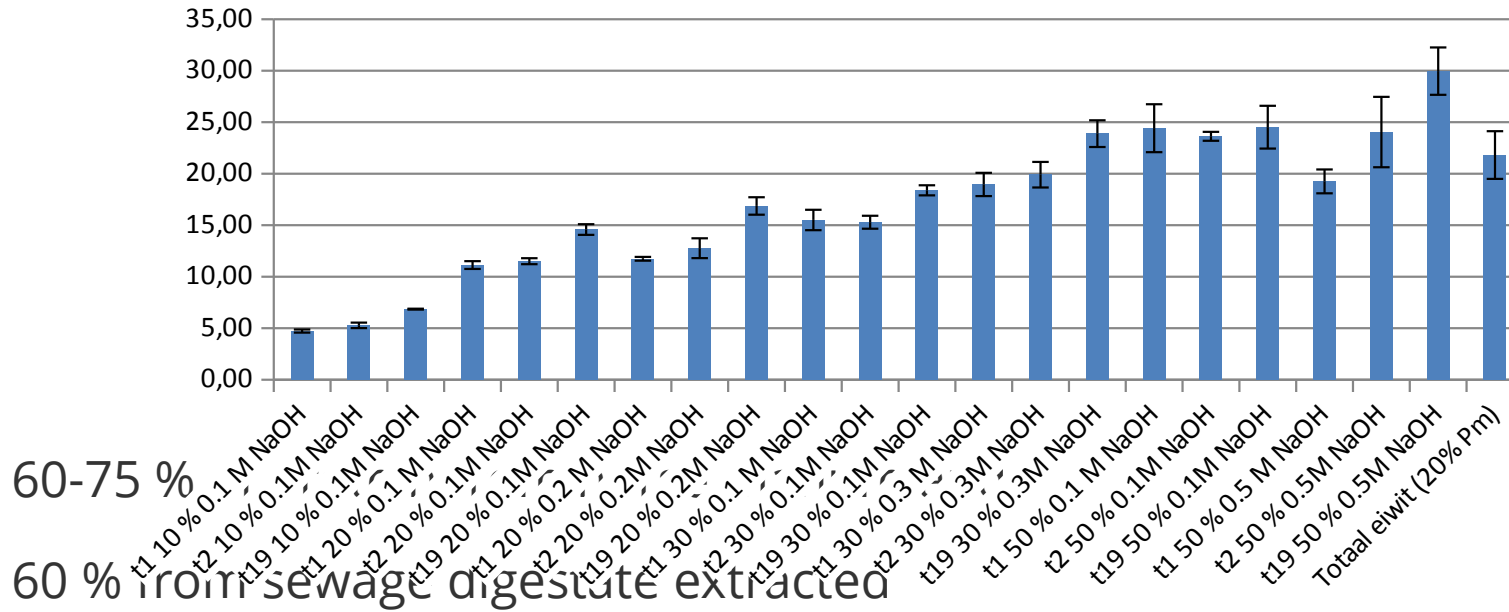
- D-lactic acid

- L-lactic acid

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Results

Protein from different sources

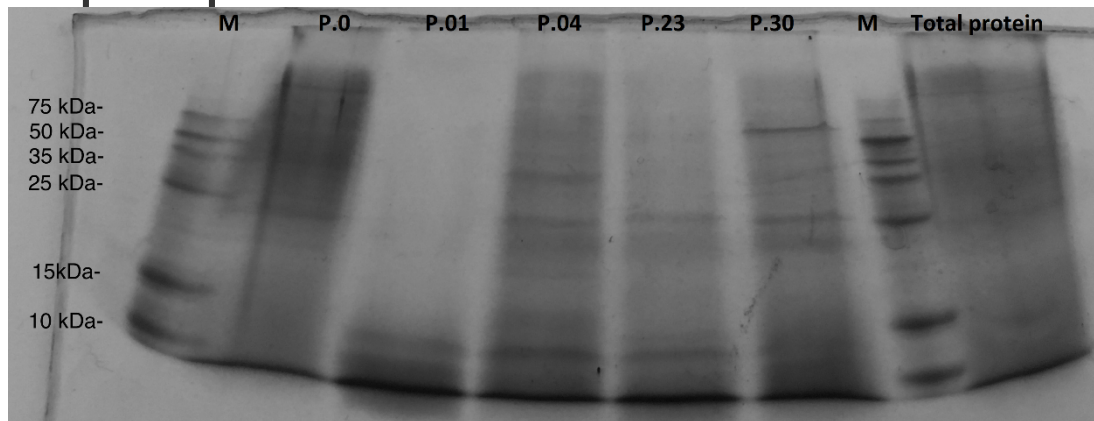


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Results

Hydrolysis and validation of extracted proteins

unique protease collection



bioactivity assays

N-source in fermentations => YEA

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Results

bioactivity assays

inhibition of “pathogenic” mo’s

Bacillus cereus

Listeria monocytogenes

others..

*Derived from manure, so difficult to apply in
food/feed/cosmetics*

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Results

N-source in fermentations

Lactococcus lactis

Lactobacillus spp

Bacillus subtilis

*Sometimes competitive with commercial Yeast
extract*

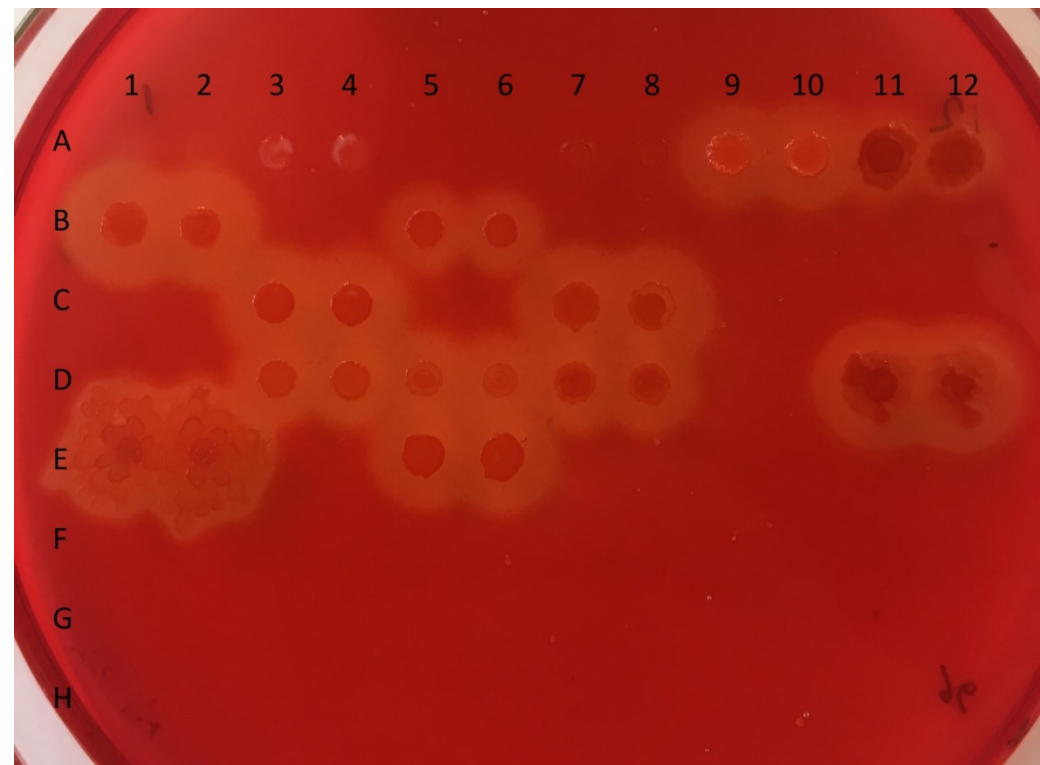
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Results

novel microorganisms from horse manure and
compost

→ 70 new strains

cellulolytic activity:



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Results

sugar requirements

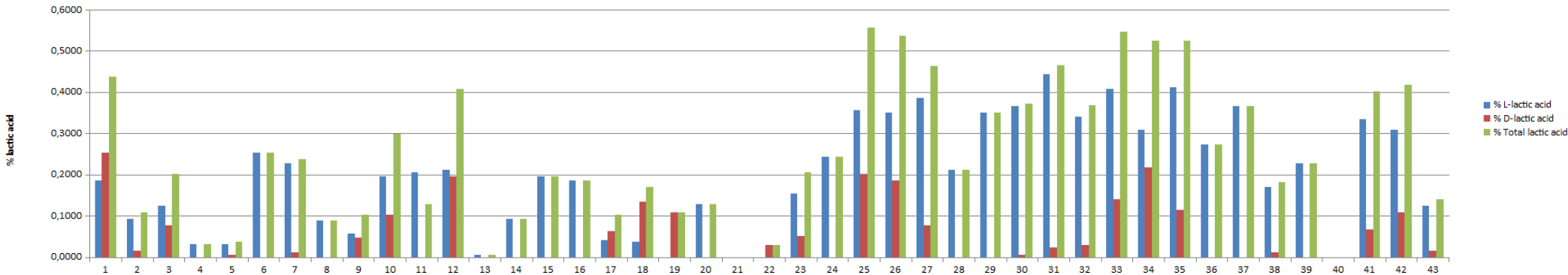
	No carbon source	Glucose	Lactose	Fructose	Sucrose	Maltose	Potato starch	Galactose	Arabinose	Trealose	Cellobiose	Mannitol	Sorbitol	Dextran 10
1	-	x	x	x	x	x	-	x	-	x	x	x	x	-
2	x	x	x	x	x	x	x	x	x	x	x	x	x	x
3	x	x	x	x	x	x	x	x	x	x	x	x	x	x
4	x	x	x	x	x	x	x	x	x	x	x	x	x	x
5	x	x	x	x	x	x	x	x	x	x	x	x	x	x
6	-	-	-	-	-	-	x	-	-	-	x	-	-	-
7	-	-	-	-	-	-	-	-	-	-	x	-	-	-
8	x	x	x	x	x	x	x	x	x	x	x	x	x	x
9	x	x	x	x	x	x	x	x	x	x	x	x	-	x
10	-	-	-	-	-	-	x	-	-	-	x	-	-	-
11	-	-	-	-	-	-	x	x	-	-	x	-	-	x
12	x	-	x	x	-	x	x	-	x	-	x	-	x	-
13	x	x	x	x	x	x	x	x	x	x	x	x	x	x
14	x	x	x	x	x	x	x	x	x	x	x	x	x	x
15	-	-	-	x	-	-	x	x	x	-	x	-	-	x
16	-	x	-	-	x	-	x	x	x	x	x	x	-	x
17	-	-	x	x	x	x	x	x	x	x	x	x	x	x
18	x	x	x	x	x	x	x	x	x	x	x	x	x	x
19	-	-	-	x	-	-	-	x	-	-	x	-	-	x
20	x	x	x	x	x	x	x	x	x	x	x	x	x	x
21	x	x	x	x	x	x	x	x	x	x	x	x	x	x
22	x	x	x	x	x	x	x	x	x	x	x	x	x	x
23	x	x	x	x	x	x	x	x	x	x	x	x	x	x
24	-	x	x	x	x	x	x	x	-	x	x	x	-	-
25	-	x	x	x	x	x	-	x	-	x	x	x	-	x
26	-	x	x	x	x	x	x	x	x	x	x	x	-	x
27	-	x	x	x	x	x	x	x	x	x	x	x	-	x
28	-	-	-	x	-	x	x	-	x	-	x	-	-	x
29	-	x	x	x	x	x	x	x	x	x	x	x	-	x
30	-	x	x	x	x	x	x	x	-	x	x	x	-	-
31	-	x	x	x	x	-	-	x	-	x	x	-	-	x
32	-	x	x	x	x	-	x	x	x	x	x	x	-	x
33	-	x	x	x	x	-	x	x	x	x	x	x	-	x
34	-	x	x	x	x	-	x	x	x	x	x	x	-	x
35	-	x	x	x	x	-	x	x	x	x	x	x	-	x
36	-	-	-	-	-	-	x	-	-	-	x	-	-	-
37	-	x	x	x	-	x	x	x	-	x	x	x	-	-
38	-	-	-	-	-	-	x	-	-	-	x	x	-	-
39	-	x	x	x	x	x	x	x	-	x	x	x	-	-
40	-	-	-	-	-	-	x	-	-	-	x	-	-	-
41	-	-	-	-	-	-	x	-	-	-	x	-	-	-
42	-	-	-	-	-	-	x	-	-	-	x	-	-	-
43	x	x	x	x	x	x	x	x	x	x	x	x	x	x

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Results

lactic acid production

Percentage of lactic acid in overnight cultures

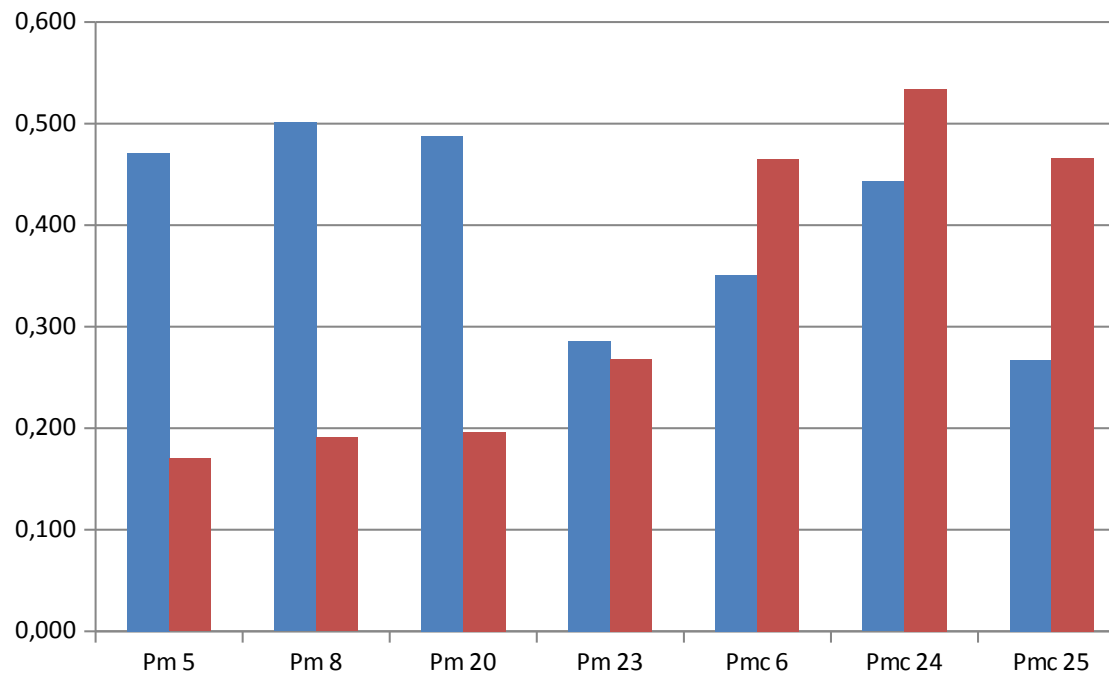


very different D- and/or L-lactic acid production profiles

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Results

Thermophilic lactic acid production



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Conclusion

- | Valuable protein extracted from cheap sources
- | Different applications of hydrolysed protein
- | Interesting novel strains
 - Bioconversion
 - Lactic acid production @ different temperatures

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Plans

Protein/hydrolysates applications?

In-depth analyses of lactic acid producing strains

- Temperature range
- D versus L lactic acid production
- Controlled fermentation experiments