

IMEenz Bioengineering



For new and improved
applications of **I**ndustrial **M**icro-
organisms and **E**nzymes



Bertus van den Burg

General



- Bringing Science to Application
 - Vast Network in Biotech Science
 - Academia/Biotech companies
 - Dedicated Contract Research
 - Independent
 - Short Communication Lines
 - → Flexible
 - Strict Confidentiality
 - Projects and Customers
- 

Headlines



➤ Bioconversion

- Process Design & Optimization
- Sustainable processes
- Upscaling

➤ Biodiversity Mining

- Strains (micro-organisms)
- Enzymes
- Bioactivities:
 - Antimicrobials
 - Antioxidants
 - Etc.

Bioconversion

➤ Bioconversion & Biodiversity

○ Fermentation

- Strain Screening & Selection
- Process Design
- Optimization
- Parent Production Strain
- Up to 300 L scale

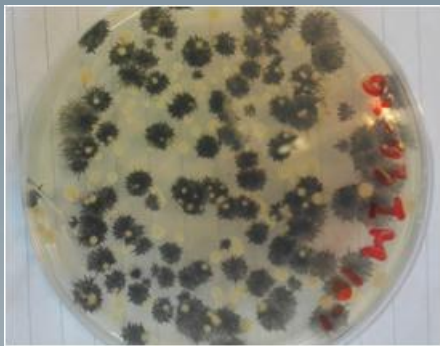
○ Biocatalysis

- Enzyme Screening and Selection
- Enzyme Engineering → improved functionality



Fermentation

Production of a fungus for sustainable wood protection



Bioactivity Screening

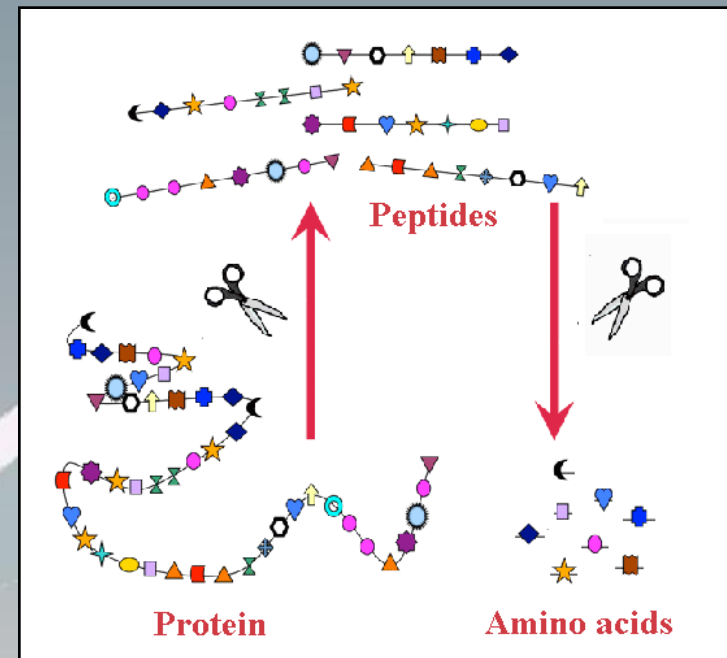
Preparation of protein hydrolysates

➤ Proteins from very diverse (agro-)industrial byproducts

- ➔ Plant
- ➔ Animal
- ➔ Microbial
- ➔ Algae

➤ Hydrolyzing enzymes


- ➔ commercial providers
- ➔ IMEnz collections



Bioactivity Screening



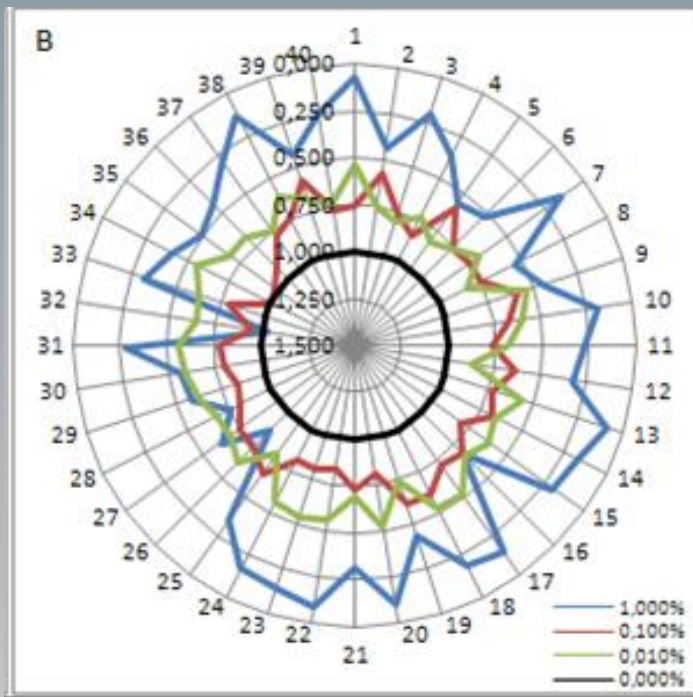
Unique peptides/mixtures

- Valuable N-source in fermentation
 - Antimicrobial activity
 - Antioxidant properties
 - ACE inhibitors
 - Taste characteristics
 - Cosmetics applications, e.g. moisturizing
 - Functional properties in food/feed structure
 - Surface modification; hydrophobic/hydrophilic nature
 - other??
- 

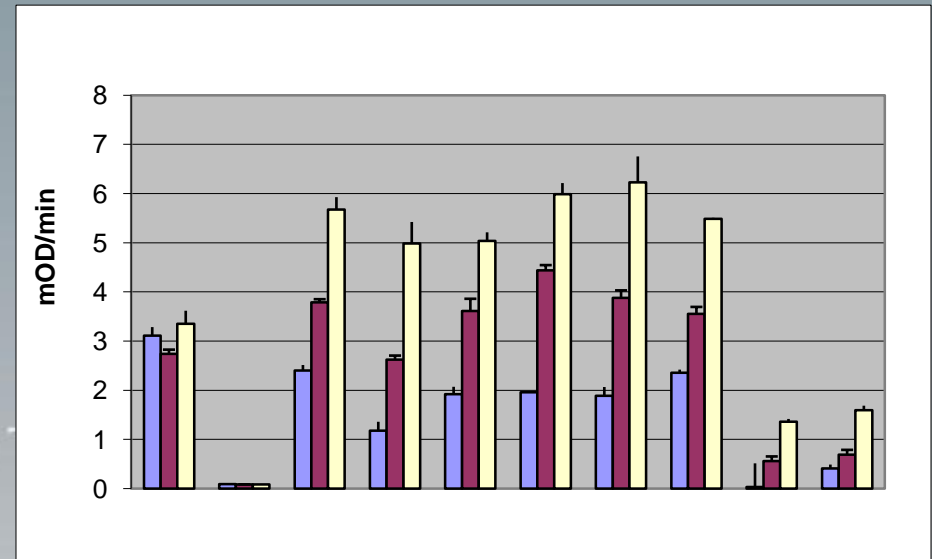
Bioactivity screening

Validation of plant peptide mixtures

Growth of *Escherichia coli*

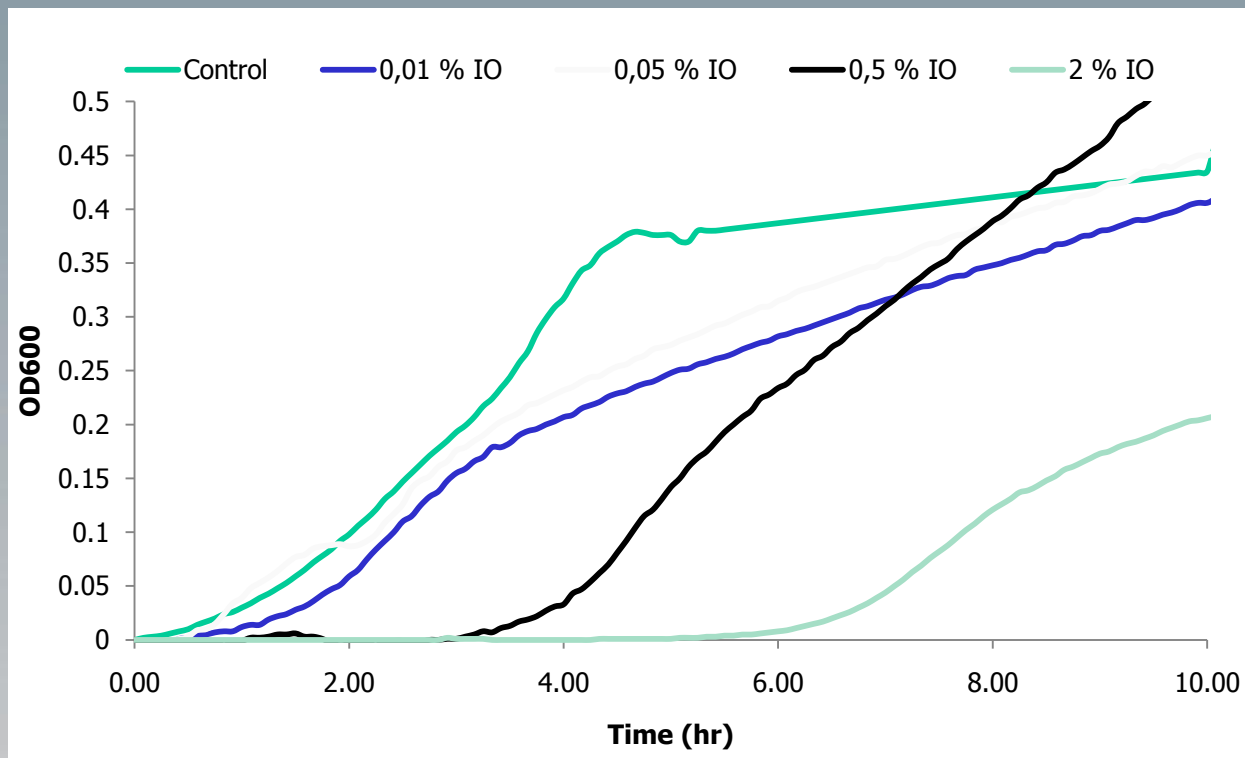


Growth of *Lactococcus lactis*



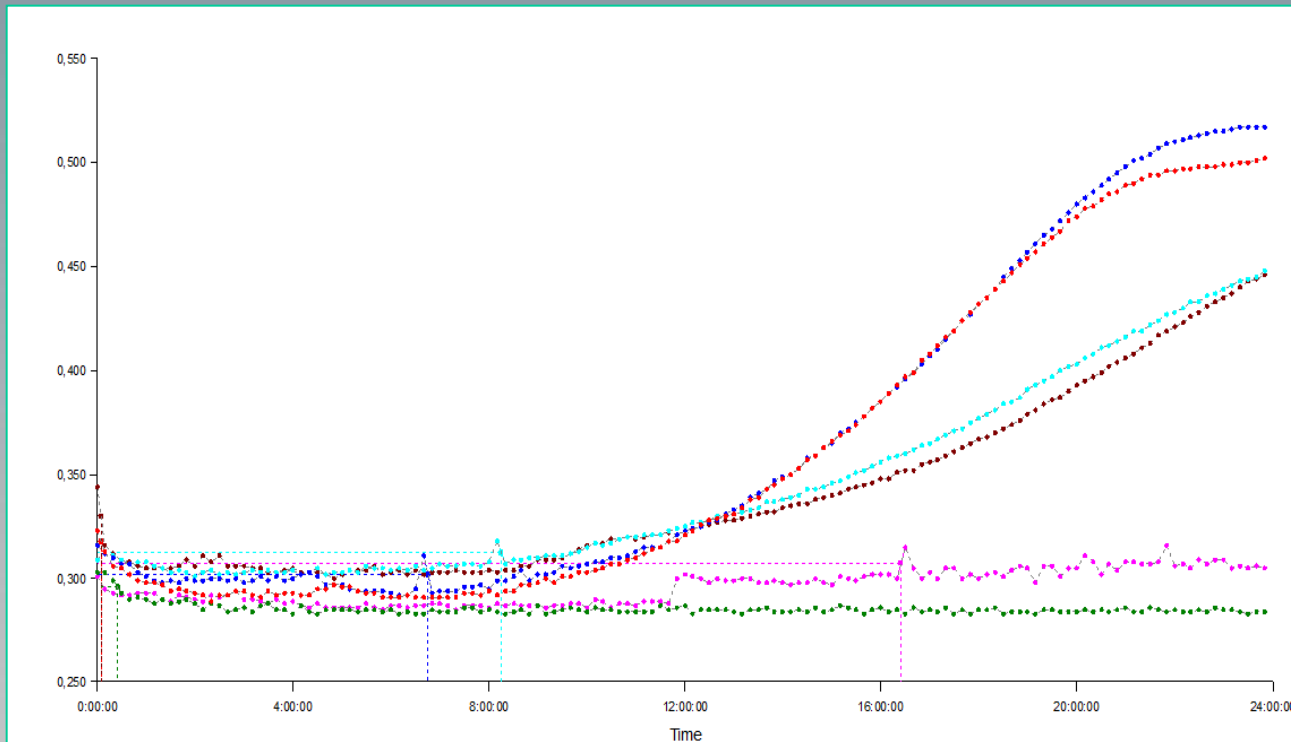
Bioactivity screening

Effect of specific algal protein hydrolysate on growth of a food pathogen



Bioactivity screening

Effect of specific animal protein hydrolysate on growth of halitose related micro-organisms



Antimicrobial Screening

- Effective antimicrobials discovered in extracts of natural (abundant) sources.
 - Inhibition of pathogens in cultivated fish by a natural product?
 - Anti-fouling properties?
- Mix of >2 inhibitors found to be very effective in pre-registered feed additives (synergistic effects)
 - Inhibition of *Clostridia* in feed
- Effective host-specific inhibitors in hydrolysates of agricultural by-products and or algae
 - *Escherichia coli*, *Lactococcus lactis*, food pathogens , halitose related mo's

Offers and opportunities



- Value upgrading of by-products and waste streams
 - Bioconversion by fermentation and or biocatalysis
 - Production, Screening and Selection of bioactives
 - Upscaling of biological processes
 - Market opportunities for novel bioactives
- 