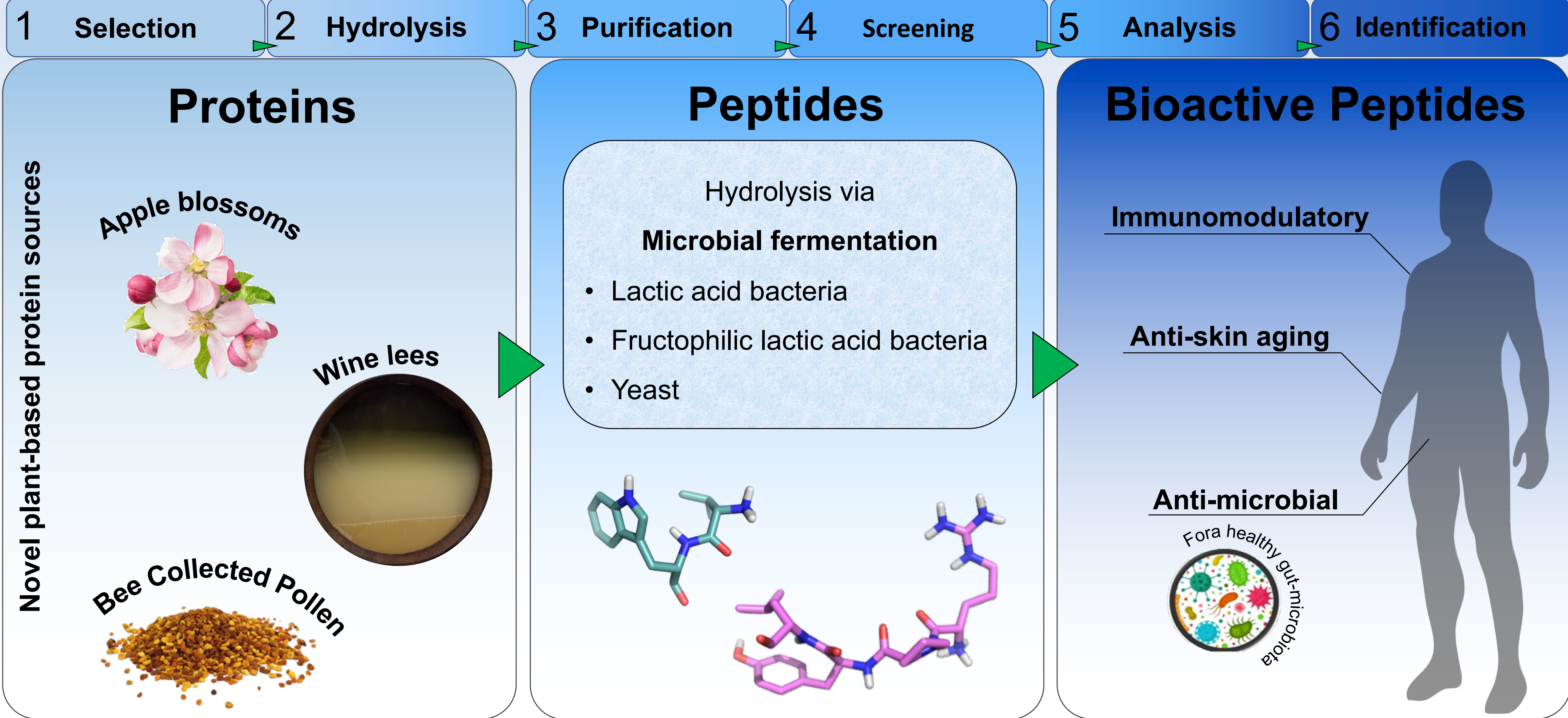


Advancement and prospects of study of bioactive peptides during food fermentation

Stefano Tonini (stonini@unibz.it)
Faculty of Science and Technology, Free University of Bolzano, 39100 Bolzano, Italy

INTRODUCTION

Approach to produce Bioactive Peptides (BPs)



EXPERIMENTAL DESIGN

M 1.1 - Physicochemical characterization

- pH
- TTA
- Sugars
- Organic acids
- Total free amino acids
- Total peptides
- Total proteins
- Confocal laser scanning microscopy



M 1.2 – Samples' pre-treatment

- Sonication

M 1.3 - Characterization of the synthetic community and fermentation process

- Growth and acidification kinetics
- Proteolytic and pectinolytic activity
- Optimization of solid-state fermentation

M 1.4 – *in vitro* bioactivity verification

- Enzymatic assays

M 1.5 – Isolation and purification of target BPs

- Fast Protein Liquid Chromatography (FPLC)

M 2.1 - Proteomics and Peptidomics

- Orbitrap Mass Spectrometry



M 2.2 – Bioactivity cross-validation

- Cross-comparison of the identifies sequences with opensource databases

BIOPEP-UWM

M 2.3 – Bioactivity verification

- Evaluation of bioactivity through specific bioassays for the target physiological functions

M 2.4 – Bioinformatics and data analysis



RESEARCH OBJECTIVES

Given the relevance of bioactive peptides in promoting specific physiological functions, this research aims to investigate the microbial fermentation of novel food matrices such as bee collected pollen (BCP), apple's blossoms and wine lees for the synthesis of bioactive peptides with immunomodulating, antimicrobial and anti-skin aging activity.

	1st year						2nd year						3rd year						
Milestones	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38
Proposal and literature review																			
ACTIVITIES I																			
M1 - Physicochemical characterization																			
M2 - Samples pre-treatment																			
M3 - Selection of the synthetic community & optimization of the fermentation process																			
M4 - Preliminary screening for bioactivity																			
M5 - Isolation and purification of BPs																			
ACTIVITIES II																			
M1 - Proteomics and peptidomics																			
M2 - Bioactivity cross-validation																			
M3 - Bioactivity verification																			
M4 - Bioinformatics & data analysis																			
Thesis and paper preparation																			

EXPECTED OUTCOMES AND CONCLUSIONS

- The selection of a synthetic community composed by LAB, FLAB and yeasts to efficiently hydrolyze the parental proteins
- The integration of proteomics and peptidomics approaches may allow the identification of the hydrolyzed products
- The alignment (cross-validation) of the identified sequences in opensource databases combined with *in vitro* assays may allow to identify bioactive peptides with target physiological functions
- The formulation of a variety of different food products including dietary supplements, nutraceuticals and novel foods can be achieved after the isolation and purification of the targeted BPs

