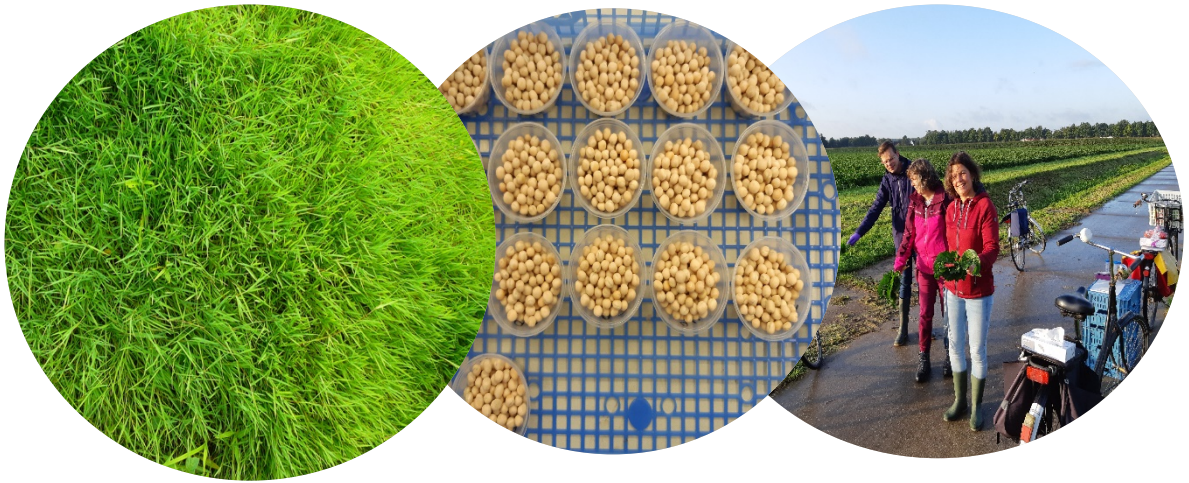
Effects of storage conditions on plant proteins

13 April 2021 Esther Hogeveen, with support from many more..



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Ministerie van Landbouw,
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Introduction

- MSc Plant Biology WUR
- Project lead and researcher at Wageningen Food & Biobased Research
- Post-Harvest Technology group

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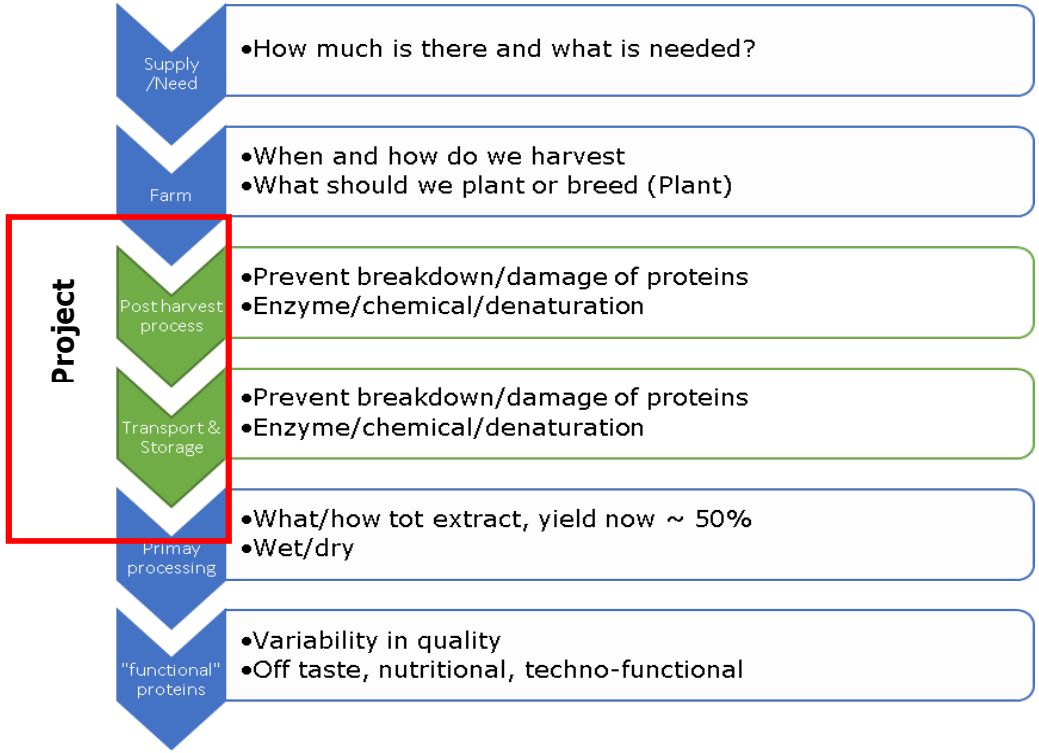
Motivation

- Need for robust plant-based proteins supply chains in Europe
- Development methods to extract proteins to be used as food/feed ingredients, from:
    - new protein crops
    - side streams
    - non-food crops

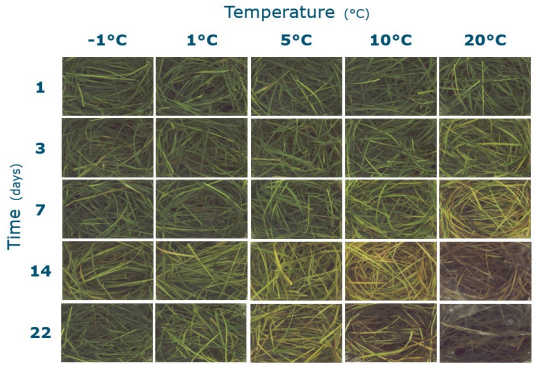
Many questions at each step of the chain

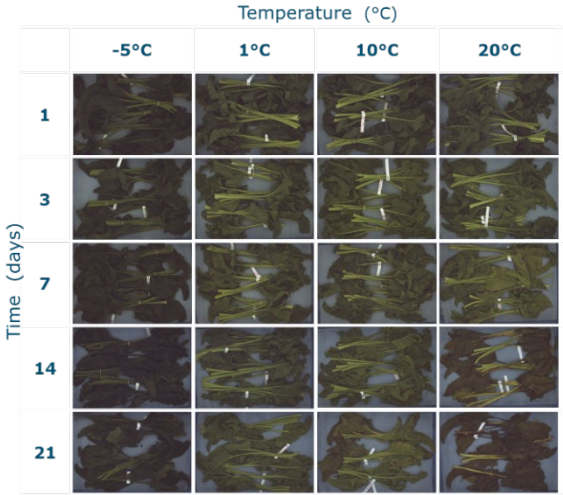


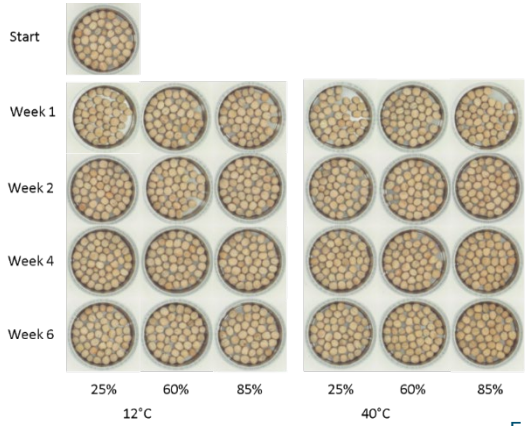
Post-harvest phase is still a blind spot

Questions we focused on

- What is the effect of **post harvest conditions** on protein contents, yield, quality proteins?
    - Crops selected: Italian ryegrass, sugar beet leaves, dried yellow peas
    - Main conditions: Temperature, storage time, relative humidity (RH)







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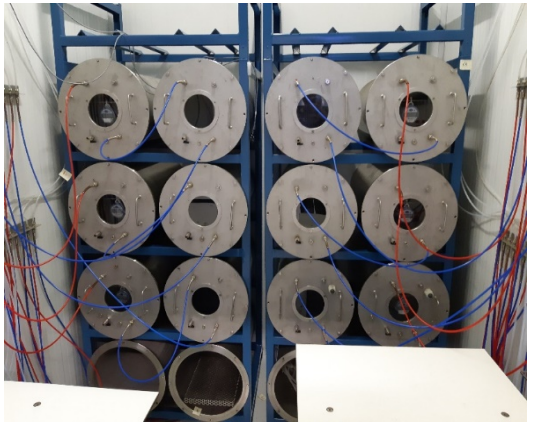
Impression experiments

Harvest material and bring to lab asap



Storage in controlled climate rooms

Freezing samples for protein extraction and analysis

Pressing the juice for protein extraction

NIR measurements to develop method to predict protein contents

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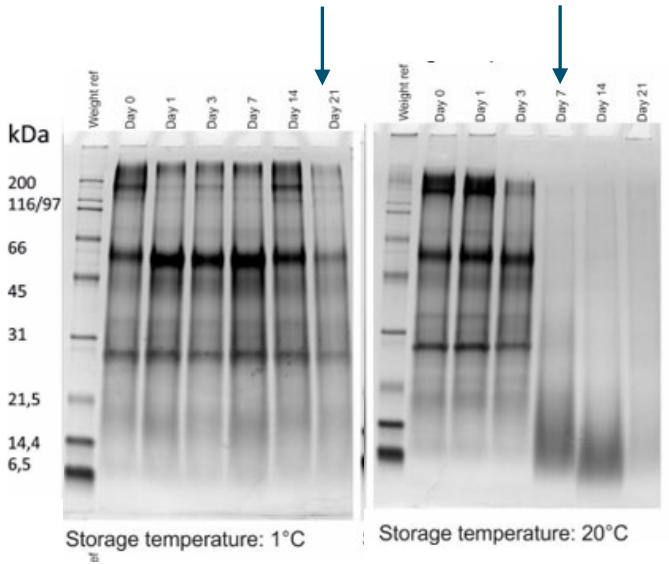
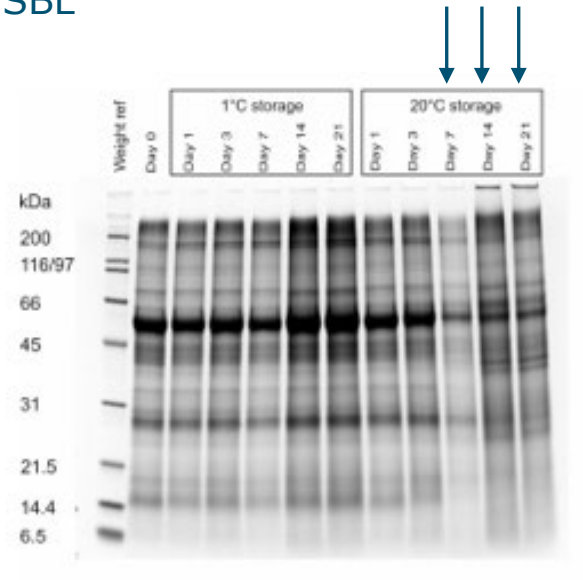
Results grass & sugar beet leaves

- Low storage temperature can preserve proteins in the biomass (levels and quality)
- Proteins in sugar beet leaves seem longer stable than ryegrass
- No effect of dehydration level (short term) on proteins in SBL



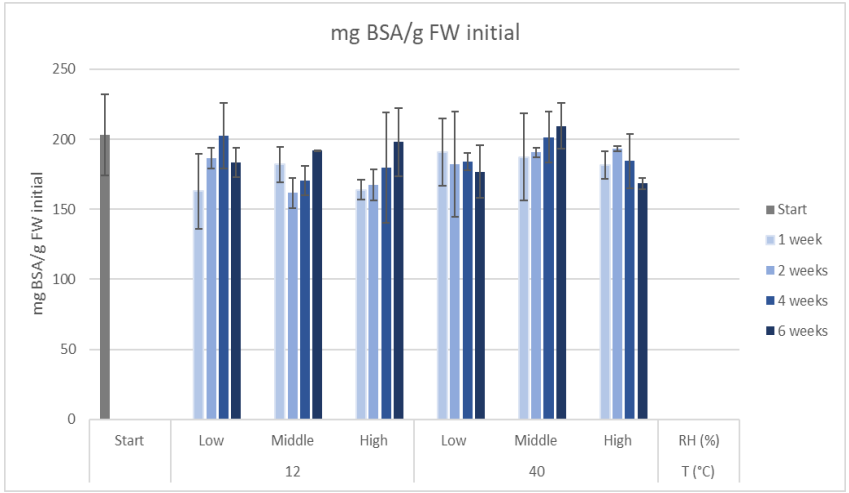
Rye grass-SDS Page



Sugarbeet leaves – SDS Page

Results yellow pea

- Yellow pea protein levels are very stable to different T/RH combinations
- No effects of temperature on components like hexanal, saponins in peas



Protein content (BCA-analysis) in yellow pea samples stored for 1-6 weeks at 12-40ºC and 3 levels RH between 25% to 85%

Topics to follow up

- Further research effects of conditions in practice:
  - Higher volumes/pressure/more wounding and effects on proteins, also incl. extraction
  - Evaluating different chain scenario’s incl. different cooling methods
- Easy measurement/prediction of protein levels/quality
- Other crops/chains

(531) Collecting Sugar Beet Leaf for making Green Protein | Hack Harvest - YouTube

Thanks for your interest

For more information please contact
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Or please visit the project site:

https://www.wur.nl/en/Research-Results/Onderzoeksprojecten-LNV/Expertisegebieden/kennisonline/Optimizing-plant-based-protein-yield-and-quality-in-the-post-harvest-chain-1.htm

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