Meet the presenter

andreeadianakerezsi@gmail.com

adkerezsi@uliege.be

Recent developments in soybean protein structure using high-shear treatment

Andreea Diana KEREZSI[a], Nicolas JACQUET[a], Oana Lelia POP[b], Ines OTHMENI[a,c], Antoine FIGULA[a], Frédéric FRANCIS[a], Gaoussou KARAMOKO[c], Romdhane KAROUI[c], Christophe BLECKER[a]

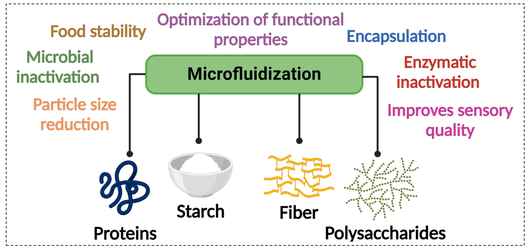
[a]Gembloux Agro-Bio Tech, University of Liège, Gembloux 5030, Belgium

[b]University of Agricultural Sciences and Veterinary Medicine, Cluj-Napoca, 400372, Romania

[c]University of Artois, Arras, 62030, France

Background

Microfluidization is a **non-thermal** technique that **combines** various forces such as **high pressure** and **high shear forces** to **modify** the **structure** of **macromolecules**.



Objective: ***to check the impact of microfluidization on soybean protein structure.***

Methods

Process

- Microfluidization treatment (**1, 3, 5 cycles**) ***with*** and ***without*** **temperature-controlled**

Protein structure characterization

- Primary structure → **SDS-PAGE** under reducing conditions
- Secondary structure → **FTIR**
- Tertiary structure → **Fluorescence spectroscopy**

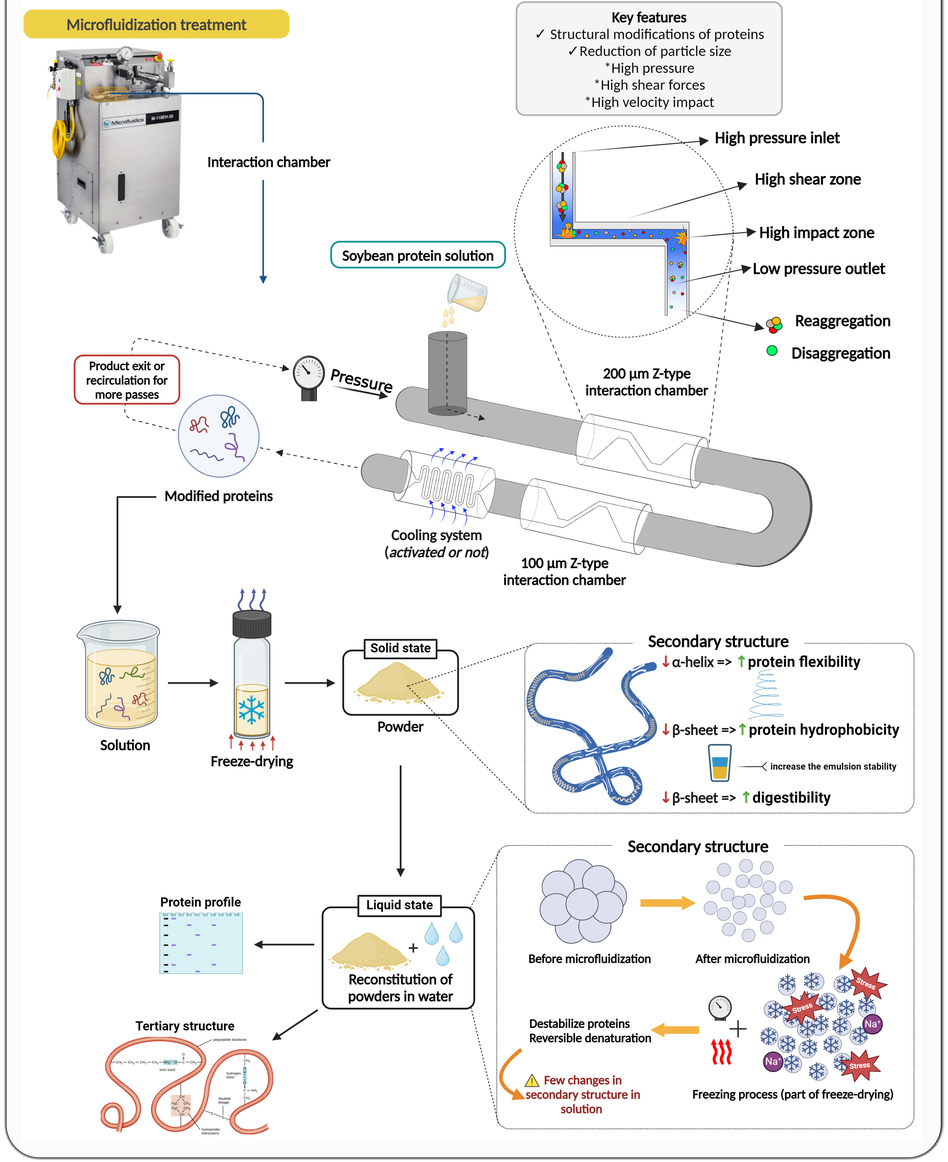
Results and Conclusions

- **Microfluidization** did **not impact** the **primary structure** of soy **protein.**
- **Microfluidization** modified the **protein secondary structure** of **powder** samples.
- **Significant impact** is noticed on **β-sheet** (↓ from 20.03 % to 3.87 %), **random coil** (from ↓ 11.87 % to 8.37 %), **β-turn** (from ↑ 38.67 % to 46.03 %), **A1**, and **A2.**
- After **reconstituting** the MF-treated powders **in water**, changes were observed **mostly** in **α-helix**, **β-sheet** and **β-turn.**
- **Microfluidization** treatment impacted tertiary structure -↑ the **surface hydrophobicity** (from 1307.54 to 1986.29 if/g × µM).

Discussion

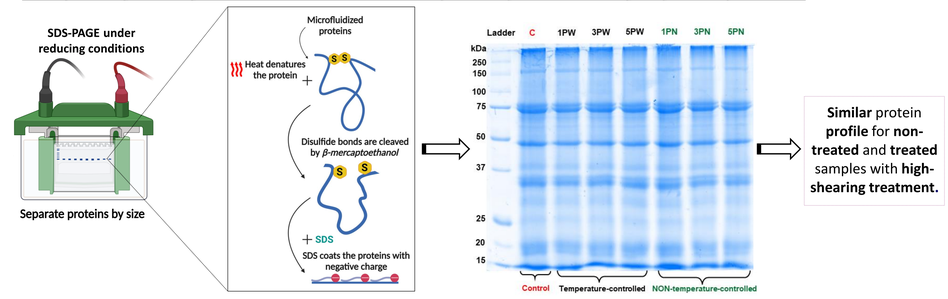
This work is **part of** the poster entitled: "*Challenges in exploring microfluidization and enzymatic methods to mitigate soybean allergenicity*".

Microfluidized soy **proteins** have **different behavior** in **solid** and **liquid** states.



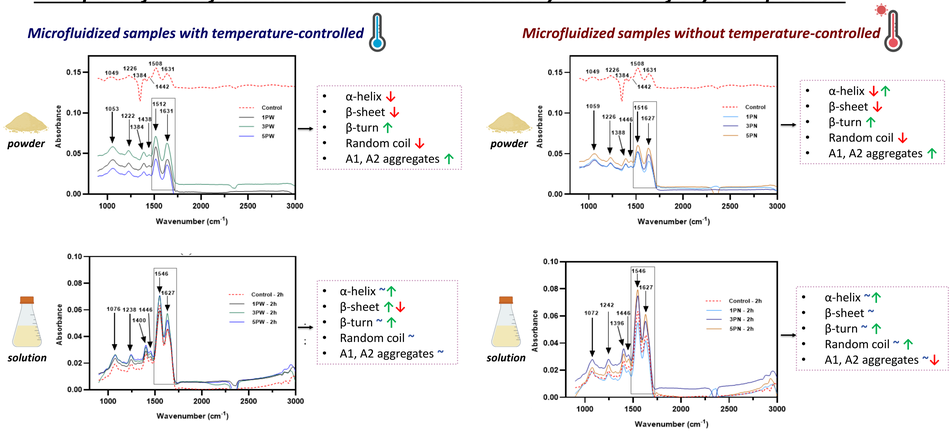
Results

I. Impact of microfluidization treatment on primary structure of soybean proteins



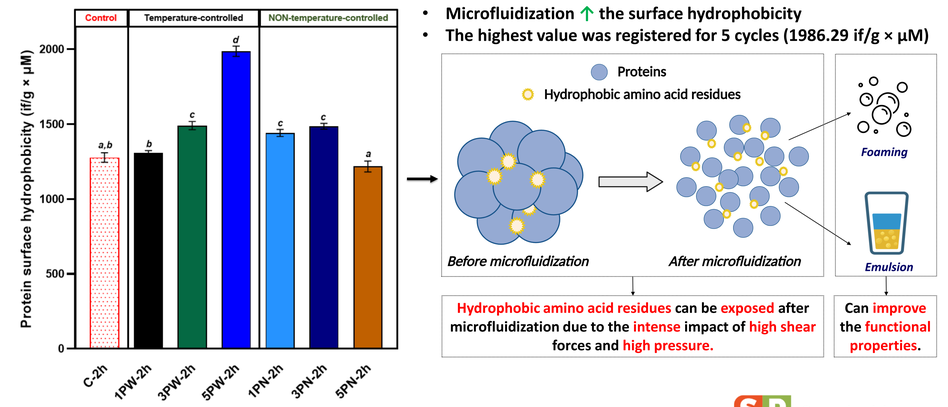
Similar protein **profile** for **non-treated** and **treated** samples with **high-shearing treatment.**

II. Impact of microfluidization treatment on secondary structure of soybean proteins



** ↓/ ↑/ ~ compared to the untreated sample and statistically different (p < 0.05)*

III. Impact of microfluidization treatment on tertiary structure of soybean proteins



- Microfluidization ↑ the surface hydrophobicity
- The highest value was registered for 5 cycles (1986.29 if/g × µM)

Hydrophobic amino acid residues can be **exposed** after microfluidization due to the **intense** impact of **high shear forces** and **high pressure.**

Can **improve** the **functional properties.**

ACKNOWLEDGEMENTS: The authors would like to thank the Walloon Region (Department of Research and Technological Development) for supporting this work as part of the ALLERSOJA project (WIN2WAL program, convention 1910044).