# 🦺 Effect of starch and fibre on faba bean protein gel characteristics ( **SLU**

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#### Background/introduction/summary

Faba bean is a promising raw material for the production of protein-rich plant-based foods. This study aimed to investigate faba bean protein gels and the effect of substituting part of the protein for starchand fibre on gel texture and microstructure. Increased knowledge could facilitate the development of novel locally produced plant-based foods based on faba bean.



## Materials and Methods

Protein, starch and fibre was extracted from Swedish Faba beans. Gelation was induced by heating to create gels with different composition.

- Oscillatory rheology was used to monitor the gel formation and gel stiffness (G')
- Textural properties was analysed by compression tests giving the gel strength and brittleness
- The microstructure was characterized using light and electron microscopy

## Results

Microstructure: Protein was the continuous phase for all gels. Starch was present as swollen and deformed granules as well as leaked amylose. The amylose was found as small aggregates throughout the protein network and on the granule surfaces. The fibre fraction was visible mainly as cell wall fragments.



**Rheology and Texture:** Substituting part of the protein for starch and/or fibre decreased the fracture stress and fracture strain, likely related to the creation of inhomogeneities acting as stress concentrators. Simultaneously, an increase in G' of the gels was observed, hypothesised to result from water adsorption by the starch/fibre resulting in a higher effective protein concentration in the surroundings.

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# Conclusions

Substituting protein for starch and/or fibre:

- Reduced the fracture stress and fracture strain
- Increased the Young's and storage modulus
- Introduced changes in the microstructure which were correlated to textural changes

In a broader perspective, our results indicate that the purity of the faba bean protein fraction can significantly affect the textural properties of gels.

#### Reference

Johansson et al. Effect of Starch and Fibre on Faba Bean Protein Gel Characteristics; SLU, Uppsala, Sweden, 2022.

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