**Exploring germination-induced changes in the composition, protein properties, functionality, and oleosome behaviour of soybeans.**

Arthur Baak1, Costas Nikiforidis2, Jack Yang1

*1Laboratory of Physics and Physical Chemistry of Foods, Wageningen University and Research, Bornse Weilanden 9, 6708WG, Wageningen, the Netherlands*

*2Biobased Chemistry and Technology, Wageningen University and Research, Wageningen. Bronland 9, 6708 WG, Wageningen*

**Aim:**

This project aims to understand how germination affects the physicochemical composition and structural integrity of soybean oleosomes and proteins, focusing on their rheological properties.

**Method:**

Oleosomes (lipid droplets or oil bodies) are natural oil-containing structures within plant seeds. Despite its essential role in seed physiology, the transformations undergone by oleosomes during germination remain incompletely understood. In this research, we germinated soybeans and extracted oleosomes and proteins. Afterwards, we studied their composition and functional properties using a particle size distributor (Mastersizer), SDS-page and CLSM. Further characteristics were analyzed using differential size calorimetry and other rheological instruments.

**Results:**

Oleosomes seem to remain intact up till a certain degree of germination. They remain intact largely due to their distinctive protein and phospholipid membrane. Within the protein fraction, glycinin and β-conglycinin composition modifications contribute to functional outcomes. Furthermore, germination significantly enhances the solubility of proteins, underscoring its potential to improve protein functionality.

**Conclusion:**

Germination has the potential to improve and alter protein molecular properties, which enhance properties, such as solubility and bioavailability of proteins. The excellent lubricant properties of oleosomes, combined with germination, can potentially optimize functional and nutritional applications in the food and biotechnology industries.