Integral valorisation of faba-bean molecular compounds into nutritional texturized food products

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Faba-beans that can be cultivated in cool climates is a promising alternative to the two most commonly used vegetables for the creation of texturized plant-based products; soybeans, with limited cultivation in Scandinavian countries, and wheat gluten, which may be undesirable due to awareness of celiac disease.

Faba-bean production has dramatically increased in recent years, exceeding 100 000 tons in 2017[1]. The nutritional profile of Faba-beans[2]; protein (26-34%), starch (40-50%) and fibres (12-24%) renders it suitable for human consumption.

Figure 1. displays this project, which aim is to develop value products from the carbohydrates (starch, xylans, cellulose, nanocellulose) which currently can be obtained from the side streams of the protein biorefinery as well as from the faba bean shells.

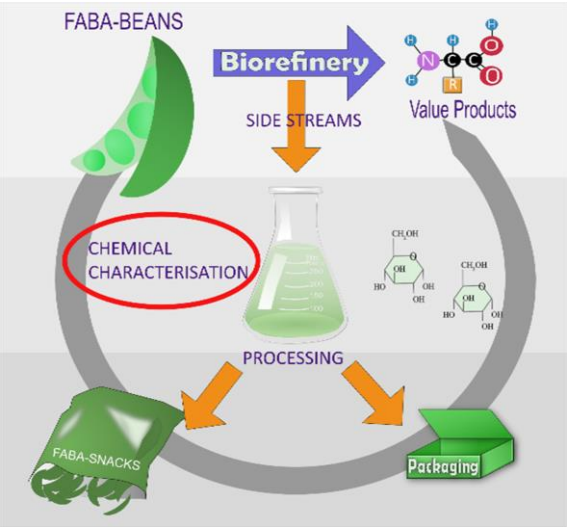

Figure 1. Schematic overview of the project where the ultimate goal is to create new bio-compostable packaging material or texturized healthy food products.

To obtain the different carbohydrate-based fractions from the Faba-beans a multicomponent isolation process using successive alkaline and bleaching treatments were applied. During the fractionation procedures, starch, cellulose as well as cellulose nanocrystals were isolated. The chemical composition of the different carbohydrate fractions were characterised in terms of monosaccharide composition, ash and Klason lignin content. The physico-chemical properties of the cellulose-based fractions as well as the physical and textural properties of the starch are evaluated.

This understanding of the chemical composition is critical for further development of faba-bean products.

1. Jordbruksverket 2017, Skörd av spannmål, trindsäd och oljeväxter JO 19 SM 1701

2. Guillon, F., & Champ, M. M. (2002). Carbohydrate fractions of legumes: uses in human nutrition and potential for health. Br J Nutr, 88 Suppl 3, S293-306. doi:10.1079/BJN2002720