Fractionation of wheat bran to create functional ingredients

Solja Pietiäinen[a]

[a] Dept. of Molecular Sciences, Swed. Univ. of Agricultural Sciences (SLU), 75007 Uppsala, Sweden

Arabinoxylan (AX) is one of the main dietary fiber components in wheat bran that could be used as a food ingredient to improve bread quality. Wheat bran AX is however embedded in a complex cell wall matrix and hard to extract efficiently without compromising its properties in terms of molecular weight and feruloylation.

Aim of this project is to fractionate wheat bran on industrial scale and to optimize this process to generate feruloylated high viscosity AX. AX will be also characterized in terms of properties and functionality first in model systems and then in bread. Raw material and process conditions are expected to affect both functional properties of fractions and their functionality in food products. Extracted AX is expected to be able to work as functional ingredient in bakery products.

Pre-treatments are tested to increase AX extractability. Pre-treatment effectiveness is assessed using thermogravimetric analysis and both confocal laser scanning microscopy and scanning electron microscopy to imagine changes in arabinoxylan distribution. Functionality and properties of fractions are assessed with regard to emulsification, gel formation and foaming.

This project will lead to utilization of a milling by-product as a functional bakery ingredient and increases sustainability of cereal production. Also nutritionally beneficial components of wheat bran currently lost in milling will be brought back to human consumption. Using bran for food productions will also increase the value of this previously low cost side stream.