

Healthy fractions of oats efficiently recovered

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In his PhD thesis, Juhani Sibakov, MSc (Tech) from VTT Technical Research Centre of Finland developed methods to broaden the use of oats in, for example, snacks and beverages. Fractions with 56% beta-glucan and 73% protein were obtained. The fractionation process developed at VTT was scaled up in Germany together with NateCO2 GmbH and Hosokawa Alpine AG.

VTT's research scientist Juhani Sibakov developed [oat](#) fractions with up to 56% beta-glucan content for food and nutraceutical products. This is the highest content ever reached by a method without any water or solvents. In the beginning of the process, oats were defatted by supercritical carbon dioxide extraction. From the defatted oats, it was then possible to separate highly enriched beta-glucan [fractions](#). Several processing steps were required to obtain such a high content of beta-glucan, and thus the yield of this fraction was just a few per cent.

A beta-glucan content of approximately 35% was achieved using only dry grinding and air classification. This kind of beta-glucan fraction could be an interesting ingredient for the food processing industry because its yield was approximately 8-10% from the oat raw material.

The separation process developed at VTT was scaled up to industrial scale in Germany, and it is expected to be commercialised within the next few years.

A highly enriched protein fraction was also separated with the same separation method. The protein content of this fraction can be as high as 73%. The oat protein fraction is an interesting option for other plant-based proteins. The use of oat protein in different food applications is currently being studied at VTT.

Beta-glucan for beverages and snacks

When untreated beta-glucan is added to [beverages](#), it gives them a slimy texture, which is typical of oat porridge. In the PhD work, this sliminess was avoided by hydrolysing the beta-glucan molecules in a controlled way with acid or enzymes. The enzymatically hydrolysed oat bran turned out to be more interesting because it allowed 1.5 g of beta-glucan to be included in a beverage of 100 mL, which retained its low viscosity for much longer than the acid hydrolysed version.

The production of expanded oat [snacks](#) is challenging due to their high lipid content. This work was the first to use only oat-based ingredients for well-expanded products. The water-soluble oat fibre improved the expansion, whereas the addition of water-insoluble oat fibre led to less expanded and too hard a texture. The snack containing water-soluble fibre had up to 11% beta-glucan content. The extruded snacks based on defatted oats tasted pleasant and were stable at room temperature.

VTT also has an on-going project aiming at the commercialisation of two patents related to beta-glucan in beverage applications.

Finland as an oat producer

Finland is the world's fifth largest oat producer with approximately 1.2 billion kg of oats per year. Finnish oats are of primary quality because oats require a long cultivation season and a cool climate.

VTT has studied oats for almost 40 years, and most of the patents related to oat fractionation have been filed by employees of VTT.

Health claims

The European Union accepted two health claims for beta-glucan, the soluble fibre of oats, last year. Beta-glucan helps to control blood cholesterol and attenuates the peaks in blood glucose after a meal. In addition, the insoluble fibres improve the wellbeing of the stomach and gut.

More information: www.vtt.fi/inf/pdf/science/2014/S67.pdf

Provided by VTT Technical Research Centre of Finland

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