

# New method efficiently separates proteins from agrobiomass by-products

February 18 2016

---

According to research by VTT Technical Research Centre of Finland, extraction with deep eutectic solvents (DESs) offer an efficient, sustainable and easy method for dissolving proteins from agrobiomass by-products. DESs are mixtures of solids that form a liquid solution at low temperatures when mixed in suitable ratios.

The method has been tested on separating [protein](#) from BSG, rapeseed press cake and [wheat bran](#), all of which contain significant amounts of protein. These [food industry](#) by-products contain significant amounts of fibre, which decreases their suitability as feed for production animals that are not ruminants. Brewer's spent grain responded best to protein separation with DES: almost 80 per cent of the protein in BSG could be separated, while conventional extraction methods can achieve no more than 40 per cent. The separation of other substances, such as carbohydrates, can be optimised through the choice of DES.

This new protein enrichment method can particularly benefit breweries and animal feed producers, but there are hopes that after further research, this method could also find applications in the food industry.

Protein in rapeseed press cake could also be separated to a high degree, but the difference with traditional extraction methods was not significant. Further research is required with regard to wheat bran. Separating protein from wheat bran is known to be difficult.

VTT has tested the method with a 60-litre pilot system. The method can

be easily scaled up to an industrial scale. The chemicals used are cheap and suitable for use in foods, and many are FDA-approved.

DESs are e.g. used in metal extraction and polishing, but today, they are also used in the separation of biomass fractions. Previously, there has been no research on how well they are suited to separating proteins from biomass.

## **Easy and efficient dissolving process**

The method in question is rather simple: DES and solid biomass, such as BSG, are heated and mixed in the reactor for two hours. Finally, water is added into the reactor and the solids separated by filtering. DES molecules, proteins and water are separated through membrane filtering. The protein is then dried, and the end result is a high-quality protein concentrate that could be utilised in, for example, the feeding of pigs or poultry.

DES have nutritional value; they contain, for example, a precursor of vitamin B used in poultry feed.

The [method](#) may also be suitable for the production of a protein concentrate to be added to food, though this requires further study. According to VTT research scientists, animal feed is the primary application for protein enriched with DES.

The commercialisation of this patented invention is currently being examined. The research results will be published in a scientific journal in 2016. The development work was funded by Tekes - the Finnish Funding Agency for Innovation and VTT.

## **What are deep eutectic solvents?**

A deep eutectic solvent incorporates two or more substances with high melting points into a mixture with a melting point substantially lower than any of the individual pure components. A known example of this is the mixture (molar ratio 1:2) of choline chloride (mp 302 °C) and urea (mp 133 °C), which has a melting point of 12 °C. Deep eutectic solvents represent a new generation of organic solvents; research into their possible applications only began in recent years.

Provided by VTT Technical Research Centre of Finland

Citation: New method efficiently separates proteins from agrobiomass by-products (2016, February 18) retrieved 26 April 2024 from <https://phys.org/news/2016-02-method-efficiently-proteins-agrobiomass-by-products.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.