

Rapeseed Protein Extraction and Application

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Rapeseed oil production has been established as a very efficient process. Residual products such as protein meal have found commercial applications. Yet, there are potential value-added applications for protein meal if appropriate technologies can be made available to obtain higher quality protein fractions and to isolate purified individual proteins. Rapeseed proteins - which are present at about 20 to 25 % of dry seed weight - besides their high nutritional value possess promising functional properties. They enable stabilization of emulsions and foams as well as formation of gel-like and other structured systems with high water binding capacity. Therefore, a lot of new higher value applications in human nutrition, animal and particularly fish feeding and for different technical purposes are envisaged. Numerous descriptions of technologies for processing and application of rapeseed proteins are found in the literature. However, there are only few commercial applications.

The primary regulatory problem in Europe is the classification of rapeseed proteins as “Novel Food” which does not allow its use as food or food additive before completion of a time-consuming and expensive regulatory approval process.

In contrast to other oilseeds, rapeseed contains two protein fractions in similar amounts ranging between 30 and 60 % each: napin (albumin) and cruciferin (globulin). These proteins have different solubility properties. Therefore, protein extraction has to be more sophisticated to extract both almost quantitatively. A (single step) process in which one protein is not efficiently extracted leads to high yield losses and, consequently, is not economically efficient. Additionally, rapeseed contains some characteristic secondary plant substances, like glucosinolates, sinapic and phytic acid, which interact with the proteins and negatively influence both their nutritional value and their functional properties. Finally, protein yield and functionality are strongly dependent on the process steps applied before protein extraction.

The presentation will describe solutions for rapeseed protein extraction and purification technologies, among them a new EBA IEX process which leads to extremely pure individual napin and cruciferin proteins. Furthermore, results of application tests in aquaculture and in the paper industry will be presented.