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M3
UPGRADING PROTEIN PRODUCTS USING BIOPROCESSING ON AGRICULTURAL CROPS

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Due to increasing world population, higher average income, and changes in food preferences, there is a growing demand for proteins, especially novel plant-based protein sources, that can substitute animal proteins and supplement currently used soya proteins. Increased customer awareness to sustainability leads to a demand for plant protein products made from locally grown crops. Novel bioprocessing methods have been developed to generate protein products which are nutritious, readily available and do not generate hazardous waste. The processing focus has therefore been on developing protein-enriched products with minimized content of antinutritional compounds. For every crop it is a challenge to obtain protein fractions with sufficient added value to make processing economically feasible. In this work we present the characterization of protein products developed in pilot scale using the novel, environmentally-friendly, water-based biofractionation method. The process was optimized to yield products with protein content comparable to existing commercial products. Raw materials used for processing included soya white flakes, wind-sifted pea, lupine seeds and rapeseed pressed cake. For each of these raw materials the process needed to be optimized separately, as they present different challenges for the biofractionation. For example, soya contains proteinase inhibitors, which, if not removed, can decrease digestibility of protein. Likewise, glucosinolates present in rapeseed should be removed from the protein product to ensure good quality. During the processing these unwanted compounds can be separated from the protein to upgrade the quality of the final products. Protein products developed in the pilot scale were analyzed with respect to protein content, protein profile, protein solubility, glucosinolate content (rapeseed product), saponin content (soybean- and pea-derived products) and trypsin proteinase inhibitors (soya and pea product). Using our biofractionation methods allowed the development of protein products from different raw materials and upgrading the protein content in comparison to the raw material.

Keywords: *bioprocessing, plant proteins, food and feed quality, legumes, cruciferous crops*

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M4
AN ELISA TEST FOR THE QUANTIFICATION OF BOVINE LACTOFERRIN IN MILK AND MILK PRODUCTS

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Bovine lactoferrin (bLF) plays a key role in the defence mechanisms of the mammary gland of lactating animals. bLF can inhibit bacteria by chelating iron under certain conditions. Next to this antimicrobial activity, bLF is reported to be a natural antioxidant with numerous other functions, including anti-viral, anti-fungal, anti-inflammatory and anti-cancer activities. Since November 2012, the European Food Safety Authority (EFSA) approved bLF produced by Friesland Campina as "novel food" meaning that it is safe to be used as an ingredient in a variety of foods, including infant nutrition. A competitive enzyme immunoassay is developed for a fast quantification of bLF in milk and milk products. The test is validated for a variety of dairy matrices, such a milk, milk powder and baby milk powder. The limit of quantification (CCβ) in baby milk powder is 10 µg/ml.

Keywords: *lactoferrin, novel food, ELISA, baby milk powder*