

Air classification of hulled and dehulled peas and faba beans- effect on carbohydrate compositions

KNUTSEN S. (1), SALDANHA DO CARMO C. (1), SAHLSTROM S. (1)

1 Nofima AS, Aas, Norway

An increased demand of plant proteins has initiated the utilization and processing of pulses. To produce protein enriched ingredients, the main strategies are either a procedure comprising protein extraction and recovery by precipitation (protein isolates) or a water-free or mechanical fractionation (protein concentrates). The latter route includes an initial dehulling and a dry fractionation process for peas (P) and beans (B). In this the ground dehulled (D) materials (DP and DB) are pneumatically conveyed in air classifier which separates into a so-called fine fraction (FF) enriched in protein and a coarse fraction (CF) material enriched with starch granules. For peas and faba beans the removed hull had a high content of total Non-Starch Polysaccharides (tNSP); 42 and 57%, and a lower content of oligosaccharides; 8 and 3%, respectively. The dehulled materials acting as starting materials for the air classification had a similar lower tNSP, e.g., 7,6 and 7,0%, respectively, and a higher content of oligosaccharides, e.g., 14,9 and 10,7%, respectively.

Analysis of the major target fractions, e.g., the protein concentrates from peas and beans, showed that although they were enriched in protein; 46 and 61% for of peas (DP-FF) and beans (DB-FF), the protein concentrates still contained NSP and starch. A large part of the insoluble non-starch polysaccharides (NSP) was removed by dehulling and mostly assigned to cellulose. Dehulled faba beans and peas contained similar amount of total and soluble NSP, of which the latter were assigned to pectin and arabinogalactan. Dehulled materials have a relative increase of soluble NSP. As for tNSP the content of oligosaccharides (% DM) were always highest in the protein fractions, including the fine fractions produced from hulled kernels. The common non digestible raffinose series of oligosaccharides (raffinose, stachyose and verbascose) are abundant in protein concentrates from the two pulses, independent of an initial dehulling.

Although the dehulling step does not have a large impact on the nutritional most relevant constituents of the target protein concentrate, air classification without a prior dehulling will has an impact on sensory attributes as well as introduce some technical problems when operated continuously at large scale.