

RaPEQ: Rapeseed as a domestic protein source of excellent quality for human consumption

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The demand for plant protein as a source of human nutrition is constantly growing and represents a megatrend with major implications for the food industry. This is driven by health, animal welfare, environmental and climate change mitigation reasons. In addition to a supply of sufficient quantities, criteria such as sustainable and domestic production are playing an increasingly important role. This puts rapeseed in the focus of interest, as it contains not only excellent edible oil but also a considerable amount of high-quality protein. In order to develop this domestic and abundant protein source for human nutrition, the joint research project RaPEQ was launched in 2016. As an interdisciplinary project, ten partners from academia and industry are striving to contribute to this goal with biological-breeding, technological and combined approaches.

One of the main objectives of RaPEQ is to increase the protein content in the grain and the protein yield in the field while maintaining protein quality and a very high oil content. To this end, classical breeding approaches as well as novel genome-wide analyses are employed.

A main obstacle against the use of rapeseed protein as food is its bitter astringent taste. Using the sensomics approach, the RaPEQ project has identified kaempferol derivatives and in particular K3OSS (kaempferol 3-O-(2''-O-sinapoyl)- β -sophoroside) as the main cause of bitterness. Consequently, another main objective of RaPEQ is to reduce or eliminate these off-taste components. Technological approaches are pursued as well as on the biological side classical breeding methods, genome-wide approaches and, last but not least, the identification and use of putative knock-out mutants for key genes of flavanol biosynthesis leading to kaempferol. The spectrum of methods to overcome the off-taste of rapeseed protein is complemented by research on the targeted masking of negative taste components.

In order to be widely applicable as an ingredient in food, good techno-functional properties are an indispensable prerequisite. Several approaches for optimization are being pursued in RaPEQ with a focus on the dehulling of the rapeseed.

Current results and major achievements of RaPEQ will be presented, as well as an outlook on further planned work.