



## Could rapeseed be used as a protein source for human nutrition?

**R**apeseed is widely grown for its oil, which is highly rated by cooks across the world. It has the lowest saturated fat of any culinary oil and is a great source of Omega 3,6 and 9.

Rapeseed doesn't just contain oil but high-quality protein too, which contains many essential amino acids. Worldwide, around 1.12 million tons of crude protein are produced annually from rapeseed oil. Although farmers have long used this so-called rapeseed cake as a protein feed for animals, it has not played a role as a protein source in human nutrition so far.

Now, scientists at the Technical University of Munich have found the substance which makes rapeseed taste bitter. Identifying it is seen as the first step towards developing rapeseed as a human protein supply. A team led by food chemist Thomas Hofmann has now identified the substance that is pivotal for the bitter taste.

According to the Food and Agriculture Organisation of the United Nations (FAO), the demand for food will approximately double by 2050, due to the growing world population.

“Bottlenecks are to be expected in this context, particularly in protein supply,” says Thomas Hofmann, who heads the Chair of Food Chemistry and Molecular Sensory Science at the Technical University of Munich (TUM).

According to Hofmann, who is also Director of the Leibniz-Institute for Food Systems Biology, it is therefore important to develop new plant protein sources for human nutrition and rapeseed is a good local source.

One reason is that the accompanying substances contained in rapeseed strongly impair the taste of the obtained protein isolates. These substances include, for example, very bitter-tasting secondary plant constituents.

Hofmann and his team therefore looked into the issue of which bitter substances cause the rapeseed protein's unpleasant bad taste. The researchers investigated three different protein isolates, using mass spectrometric analysis methods and taste tests.

The first isolate was an extract of all the proteins contained in rapeseed meal. The second isolate predominantly contained cruciferin and the third, napin, which are the rapeseed's two main storage proteins. All three isolates had a protein content of 80-to-90 percent.

The cruciferin isolate, in particular, contained a large amount of this bitter substance with 390 milligrams per kilogramme. The rapeseed meal and napin isolate had less than a tenth of the quantity, but still tasted bitter in the sensory test.

“Since we now know the cause of the bitter off-taste, it is much easier to develop suitable technological processes or breeding strategies that can be used to produce tasty, protein-rich foods from rapeseed,” said co-author Corinna Dawid, who heads the Phytometabolomics research group at TUM.

