Potato and rapeseed – sources of future cardio-vascular health?

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Potato and rapeseed industry produce vast amounts of protein-rich by-products, which could be utilized in the production of high-quality foodstuffs.

In her thesis, Sari Mäkinen, Research Scientist at the MTT Agrifood Research Finland has developed methods of producing bioactive peptides from the food industry by-products.

"The by-products of potato and rapeseed industry proved to be sources of diverse bioactive peptides. My research produced new information about the methods, which are suitable for producing peptides in the industry. Furthermore, we are especially interested in the favorable effects that peptides have on blood pressure. They have an effect on the angiotensin-converting enzyme (ACE), which plays a key role in the regulation of blood pressure," Mäkinen says.

In her research, Mäkinen also analyzed the antioxidant properties of the peptides. They can further improve cardio-vascular health by inhibiting oxidation reactions in cells.

Health effects introduced with chemical process

Health effects of the peptides will not show, if we simply add potatoes to the diet, but a suitable method is needed to produce enough peptides. In Mäkinen's study, peptides were produced with enzymatic hydrolysis and

fermentation.

"The protein content of the potato tubers is low, even though the protein of the potato is nutritionally good. However, our digestion is not able to produce active peptides from potatoes efficiently enough. To produce these peptides, proteins have to be split into their components in hydrolysis. Rapeseed proteins need to be broken down with hydrolysis as well," Mäkinen describes.

The research results show that peptides can be produced from potato and rapeseed proteins with enzymatic hydrolysis and these peptides have potential antihypertensive as well as antioxidant properties. Rapeseed peptides have also shown antihypertensive effects on animals.

Future industry?

Producing peptides from the proteins of potatoes and rapeseed in the industrial scale is not yet possible in Finland and there is still a long way to go before commercial peptide products are available. However, the methods used in Mäkinen's research meet the requirements of the food industry and can be developed to function in the industrial scale.

"Commercial products will be possible in the future when we get new research data about the effects of the peptides on humans. Moreover, new technology will be needed to produce efficient products in the industrial scale. To transfer the laboratory methods into industry is not straightforward," Mäkinen says.

Mäkinen begun her peptide studies in her master's thesis of technical biochemistry. She considers peptides very interesting compounds, which will have multiple uses in the foodstuffs of the future.

"Laboratory studies are promising. The antihypertensive effects of the

peptides are now being studied on animals. However, to market a product with health benefits, the scientific proof of the effects on humans has to be very profound. Large-scale clinical tests are needed to define the physiological effects peptides have on blood pressure, their effective mechanisms as well as their minimum effective doses. On the other hand, the proteins of potatoes as well as those of rapeseed have a high nutritional value. Therefore, we could use them more in our foodstuffs without having to market them based on health benefits alone," Mäkinen says.

More information: www.doria.fi/bitstream/handle/ … 024/102101/diss2014M%C3%A4kinen.pdf?sequence=2

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