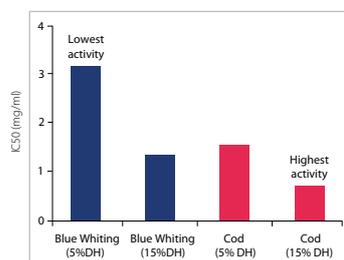


Can fish peptides control blood pressure?



The ultimate goal is the production of new valuable products from Icelandic raw material and increased knowledge in Food Science and Nutrition.



ACE (Angiotensin converting enzyme) inhibition activity of peptides processed from blue whiting and cod presented as IC50 value [mg/ml]. Proteins hydrolyzed to a different Degree of Hydrolysis (%DH) with Alcalase (Blue whiting) and Protamex (Cod) from Novozymes.

Bioactive fishpeptides

Consumption of functional foods that contain peptides derived from food proteins have been shown to have bioactive functions in humans including blood pressure lowering effects. Currently most of those products originate from milk. Research indicates that processed fish proteins, i.e. peptides, can be more effective than those of milk origin. At Matis several projects aim at processing bioactive food ingredients and functional foods with blood pressure lowering effect. This research and development effort is aimed at having a positive impact on the Icelandic food industry leading to novel and highly valuable products which can have a positive effect on the state of health of the general public.

The research and development projects

Coronary heart disease is one of the primary causes of premature death in Western countries where increased blood pressure is one of the main risk factors. Positive effects of fish omega-3 fatty acids on health have been known for some time but in the past years increased interest has been on peptides derived from various aquatic sources.

Various enzymatically hydrolyzed food proteins have been reported to include peptides that may exert an antihypertensive effect. Proteins from unique Icelandic raw materials are a potential source for such blood pressure lowering peptides that might be used to develop valuable products and nutraceuticals. This relates to both proteins from fish and other aquatic foods as well as other protein rich products like Icelandic bovine milk.

At Matis several projects are ongoing in this field including "Production of bioactive peptides from fish proteins and its *in vivo* effect", "Bioactive

flavors produced from Icelandic seafood's" funded by the AVS Research Fund for the Fish Industry and "Novel bioactive surimi products developed from byproducts" funded by The Technical Development Fund of the Icelandic Research Council.

Activities measured in vitro

Proteins are made from a chain of amino acids. When broken down in smaller units of several amino acids they are named peptides. At Matis different enzymes have been used to break down proteins isolated from fish down to smaller units. This releases peptides that have potential blood pressure lowering effect that the parent protein did not have. Blood pressure lowering effects have been measured by following the activity of peptides to inhibit the enzyme Angiotensin I Converting Enzyme (ACE) that participates in blood pressure control. Those trials are made *in vitro*, i.e. in test tubes. Research at Matis has for example shown that peptides from cod (see figure) have higher inhibition activity compared to Blue whiting, i.e. lowest amount of cod peptides are needed to inhibit ACE. The specific fish species are though not the only factor as the enzyme used and degree of breakdown (%Degree of hydrolysis; %DH) has also a significant effect on the peptide function. It should also be kept in mind that activity *in vitro* is not the same as *in vivo*, i.e. in a living organism. For a peptide to be able to have an ACE inhibition effect it needs to reach unaffected through the digestion and into the body. In collaboration with partners in the USA, Sweden and Iceland the aim is to investigate peptides processed at Matis in stomach simulators as well as animals and humans.

The ultimate goal is the production of new valuable products from Icelandic raw material and increased knowledge in Food Science and Nutrition.