

Angiotensin I-converting enzyme inhibitory and antioxidant activity of trout meat protein subjected to digestion

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Introduction: Fish proteins are considered as an interesting source of peptides with biological activity, including angiotensin converting enzyme (ACE) inhibitors and antioxidant peptides. Trout (*Oncorhynchus mykiss*) is one of the most popular fresh water fish in Poland, with high digestibility of proteins which exceeds 98%, so it may be the source of bioactive peptides in the human diet. Trout myofibrillar and sarcoplasmic proteins were examined as a bioactive peptides precursors after in vitro and ex vivo digestion.

Materials and methods: The computer tools available at UniProt database and BIOPEP-UWM database were used in the in silico part of the study (Borawska, Darewicz, Vegarud, & Minkiewicz, 2016). The 33 amino acid sequences of trout proteins available in the UniProt database were analyzed. The profiles of the potential ACE inhibitory and antioxidant activity of proteins were determined and the possibility of release of ACE inhibitors and antioxidant fragments during digestion in the digestive tract by pepsin, trypsin and chymotrypsin was checked. Then the digestion was carried out in three steps on the basis of the INFOGEST method (Darewicz, Borawska, Vegarud, Minkiewicz, & Iwaniak, 2014; Minekus et al, 2014): (1) „chewing” 3 min; (2) „gastric phase” with a gradual lowering of the pH, ie 7-5-2.5 / 2 h; (3) „intestinal phase”, pH adjusted to 7.0 / 1 hour. Human gastric juice (HGJ) and duodenal juice (HDJ) from volunteers were used for ex vivo digestion, and pepsin and Corolase PP were used for in vitro digestion. The hydrolysates were analyzed for their ACE inhibitory and antioxidant activity. An attempt was also made to identify biopeptides selected on the basis of in silico research results using the RP-HPLC-ESI-MS/MS method.

Results: Hydrolysates of trout myofibrillar and sarcoplasmic proteins obtained with different methods showed ACE inhibitory and antioxidant activities. The difference between samples were observed. Some of the ACE inhibitory and antioxidant fragments selected based on the results of in silico studies were identified in the digests via LC-MS method.

Conclusions: It was concluded that trout proteins can be the source of ACE inhibitory and antioxidant peptides.

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Literature:

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