

The peptidomic approach to identifying peptides with dipeptidyl peptidase-iv inhibiting activity from dry-cured pork loins

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Introduction: Increasingly, food is seen as a way to maintain good health, not just basic energy needs. Consumers are becoming more and more aware of the positive effects of nutrition as an adjuvant in the treatment of diseases such as diabetes. One of the mechanisms used in the fight against diabetes mellitus type II is the inhibition of dipeptidyl peptidase IV (DPP-IV) involved in the metabolic pathways responsible for glucose. The aim of the study was to search for the potential of dry-cured pork loins as a source of peptide DPP-IV inhibitors that could determine the functional nature of the meat product.

Material and methods: The research material was dry-cured pork loins. In this study, proteins were extracted from dry-cured pork loin during ageing (after 28, 90, 180, 270, 360 days), subjected to enzymatic hydrolysis (pepsin and pancreatin as a simulation of digestion in the human gastrointestinal tract) and dialysis (<7 kDa). The obtained hydrolysates were concentrated on a rotary evaporator and the obtained material was analyzed by LC-MS / MS. Subsequently, the obtained sequences of the identified peptides were subjected to in silico analysis, assessing, inter alia, the potential inhibitory effect of DPP-IV, as well as the assessment of the ADMET conditions (absorption, distribution, metabolism, excretion and toxicology) that the peptides must overcome in order to be bioactive after ingestion.

Results: Out of over 10,000 peptide sequences obtained by spectrometric analysis, two peptides were selected, i.e. WTIAVPGPPHS from myomesine (WSF, present in studies from 6 to 12 months) and FKRPPL from troponin (SSF, present in studies maturing up to 6 months) as the most promising inhibitors against DPP-IV. An ADMET analysis was performed for them. Fragments of these peptides showed promising similarity to drugs, suggesting that they may be potential food ingredients effective in fighting diabetes.

Conclusion: The obtained results suggest that the aging dry-cured pork loin is a potential biologically active source of peptides with DPP-IV inhibitor activity, meeting pharmacokinetic and pharmacological recommendations.

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