Topic 2: Bioaccessibility/absorption of beneficial and harmful compounds | Poster

(22785) - BIOACCESSIBILITY OF NOVEL BIOACTIVE PEPTIDES FROM THE BODY MUCUS OF THE LUSITANIAN TOADFISH HALOBATRACHUS DIDACTYLUS USING AN IN VITRO DIGESTION MODEL

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Abstract

The bioprospection of marine resources for drug discovery is receiving increasing attention (1). Adverse marine environmental conditions lead organisms to develop a collection of bioactive molecules for survival (1). Mucus, acting as a first line of defense against pathogens (2), is known to protect fish from the surrounding environment. Our previous studies have already demonstrated the bioactive potential of body mucus from the Lusitanian toadfish Halobatrachus didactylus. We performed LC-MS/MS to identify potential peptides within the mucus peptide fraction, selecting them based on in silico predictions of their bioactivities. It was important to assess the capacity of our bioactive peptides to resist the gastrointestinal tract and cross the intestinal epithelial barrier, thereby confirming their possible applicability as health potentiators (3). In this study, two peptides coded HdLPN (sequence PFPGPLPN) and HdVLPN (sequence VYPFPGPLPN) were submitted to an in vitro digestion model using the protocol INFOGEST 2.0. The digested content from the dialysis process after gastrointestinal simulation, both permeate and retentate using 3.5 kDa membranes, were evaluated in vitro for their antioxidant activity through ORAC assay, and the permeate for antihypertensive potential through inhibition of angiotensin-converting enzyme (iACE). The antioxidant activity of the two digested peptides, in both permeate and retentate forms, was comparable to the control (which utilized water in place of peptides); similar results were obtained for their antihypertensive activity in the permeate form. The results for both bioactivities showed no significant differences when comparing the digested peptides' retentate and permeate forms with control. This suggests that the enzymatic hydrolysis occurring during digestion degrades the bioactivity of these peptides, as they exhibited antioxidant activity prior to digestion (HdLPN 0.20±0.02 µmol Eq. Trolox/ mg peptide and HdVLPN 1.51±0.07 µmol Eq. Trolox/ mg peptide), and there was no subsequent activation or potentiation related to antihypertensive activity, which was also absent before digestion. This research primarily focused on evaluating how digestion affects bioactive peptides derived from the mucus of H. didactylus. However, comprehensive analysis, including mass spectrometry, is essential to fully understand the impact of digestion on the hydrolysis of these peptides. A forthcoming study could explore biocompatible materials for safe delivery methods of peptides, e.g. encapsulation, enabling them to withstand gastrointestinal digestion and effectively reach target organs to exert their intended bioactivity (3).

References

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