DISCOVERY AND FUNCTIONALITY OF BIOACTIVE PEPTIDES CONTAINED IN THE PORCINE INTESTINAL MUCOSA HYDROLYSATE PRODUCT PALBIO HP

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INTRODUCTION:

Porcine intestinal mucosa hydrolysates (PIMH) are a by-product of heparin production, obtained through a specific enzymatic hydrolysis (Figure 1) which might generate **bioactive peptides** (BAPs).

Our study aimed to characterize BAPs contained in Palbio HP (PHP, Bioiberica SAU, Spain), a PIMH protein source marketed for animal feed.

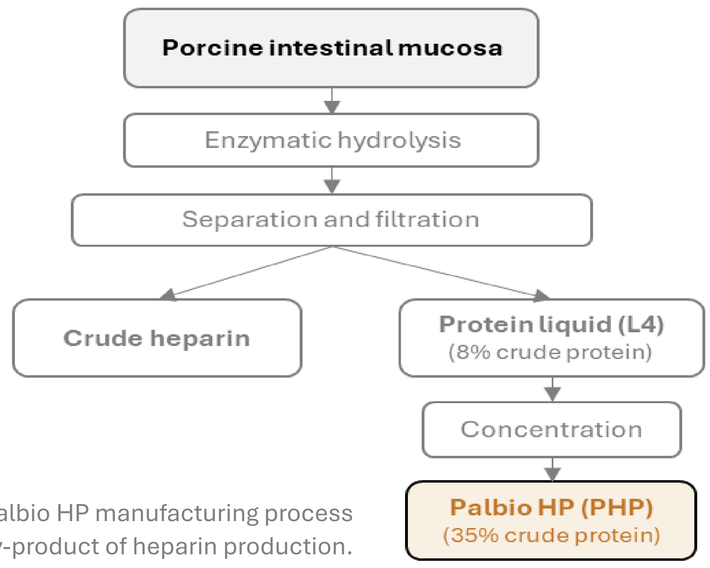

Figure 1. Palbio HP manufacturing process as by-product of heparin production.

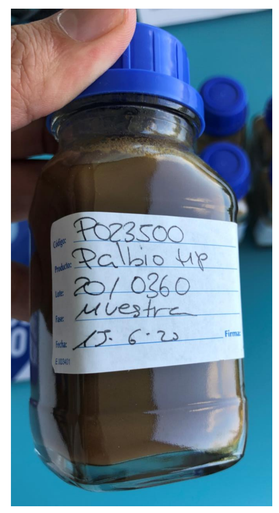

Figure 2. Palbio HP sample used in the study

METHODS:

- Three PHP samples from batches 20/352, 20/0360 and 20/0361 were used (Figure 2).
- Each sample was fractioned based on molecular weight (<3 kDa, 3 to 10 kDa and >10kDa).
- The first fraction was directly analyzed by mass spectrometry (MS)-based peptidomics while the other two were first digested using LysC and trypsin and then analyzed by MS.
- The resulting peptide fragments were analyzed with MaxQuant and PEAKS software to identify and characterize peptide sequences (Figure 3).
- The identified peptide sequences were matched against public BAPs databases (APD2, Neuropedia, StraPep, AHTPDB, and BIOPEP-UWM).

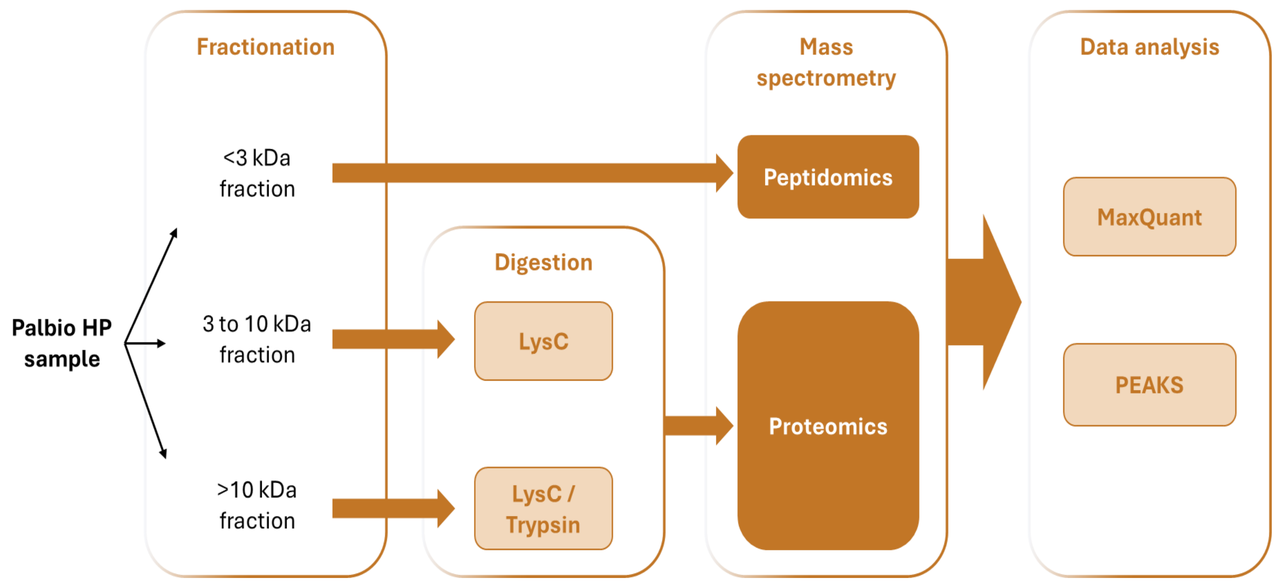

Figure 3. Peptidomics/proteomics workflow description.

RESULTS:

- This workflow identified **961 peptides**.
- Subsequent bioinformatic analysis using public databases revealed the discovery of **6 significant BAPs related to antimicrobial and cytokine/growth factor-like, antioxidant or immunomodulatory activities** (Table 1).
- These activities are in accordance with prior *in vivo* benefits reported after using PHP in swine or poultry.

Bioactive peptide discovered in Palbio HP	Associated biological activity	Average amount (pg Peptide / μg of total amount of peptides)
TNVPRASVPDGFLS	Cytokine/growth factor/antioxidant/immunomodulatory	1.4596
TNVPRASVPDGFLSEL	Cytokine/growth factor/antioxidant/immunomodulatory	8.0500
VHVVPDQLMAF	Cytokine/growth factor/antioxidant/immunomodulatory	0.0310
DAVEDLESVGK	Antimicrobial	0.1626
EGIPPDQQRLIFAGK	Antimicrobial	0.2637
TITLEVEPSDTIENVK	Antimicrobial	0.3594

Table 1. Bioactive peptides found in the samples with associated biological activities and average amount.

CONCLUSION:

Palbio HP is a source of bioactive peptides with biological functions which are consistent with its origin and preceding enzymatic hydrolysis process and could therefore potentially be used for enhancing animal health and welfare through dietary supplementation.

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