Optimizing Ham Curing Process: Impact of overripening and the use of nitrifying salts on Peptide Bioactivity.

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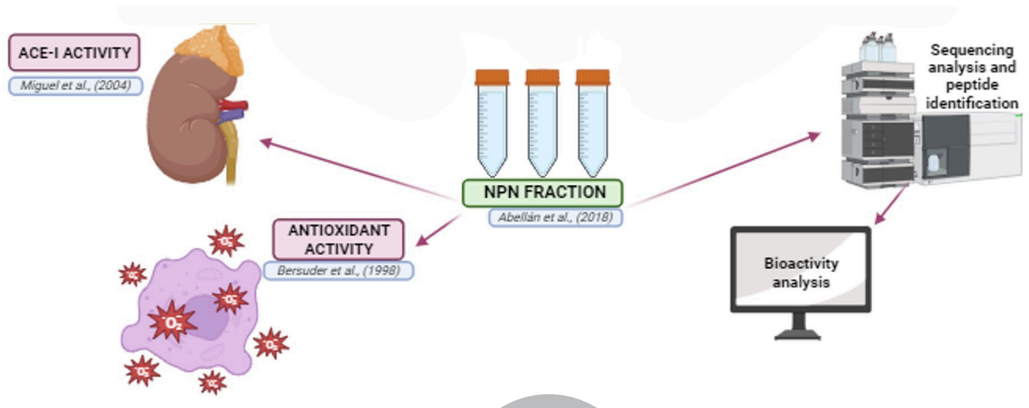
1 INTRODUCTION

Bioactive peptides are short chains of amino acids that can trigger specific effects in the human body, making them of great interest in the development of functional foods. For ham, which is often limited in consumption due to its high salt content, this study aims to improve its quality and health benefits by using alternative curing processes and salts to increase the concentration of bioactive peptides. The number and evolution of these peptides during ham maturation depend on a balance between proteolytic processes and factors such as temperature and maturation time. The study investigates how over-ripening and the use of different nitrifying salts during the salting process affect the final quality of the ham in relation to the biological activity of peptides.

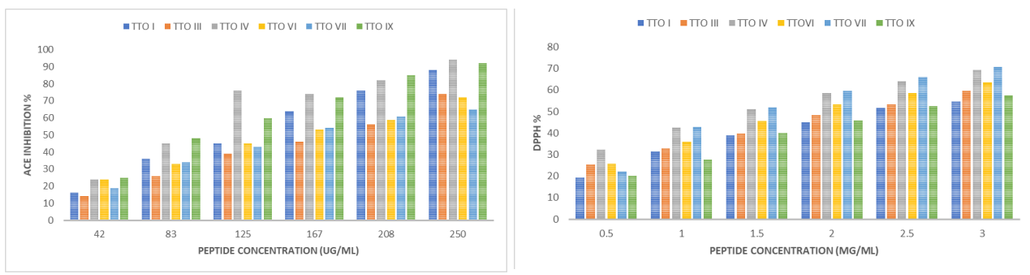
2 METHODOLOGY

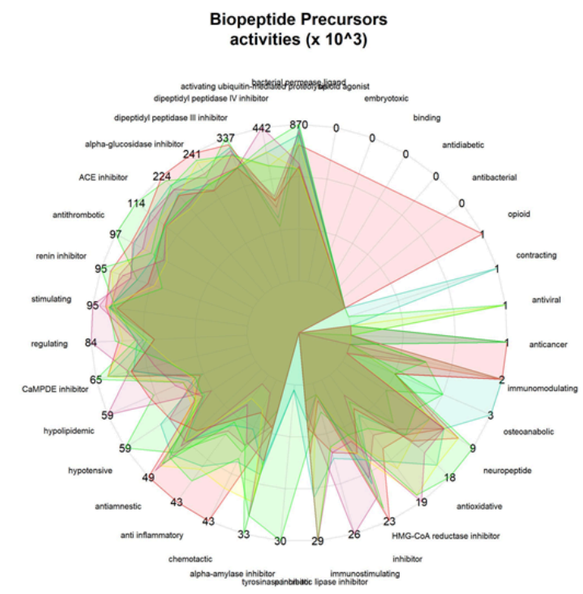
The study analyzed 9 treatments of nitrifiers and salt types in deboned cured ham, focusing on how these changes affect bioactivity. Treatments included NO3 nitrifiers with reduced salt (T1, T3), NO3 with normal salt (T4), NO2 with reduced salt (T6), and NO4 with either reduced (T7) or normal salt (T9). The goal was to identify which treatment provides the highest bioactivity in the final product.

Six batches of cured ham, each treated with a different nitrifying salt and over-ripened to a 42% weight loss, were evaluated. Bioactive peptides were identified using mass spectrometry, and their quantification was normalized using peptide spectral matches (PSM). The identified peptides were compared with the BIOPEP-UWM database to confirm their bioactive potential.



3 RESULTS





The analysis of hams matured to a 38% weight loss (SIV) versus those over-ripened to 42% (SV) reveals distinct bioactive properties. SIV hams exhibit stronger inhibition of DPP IV and ACE, indicating greater antidiabetic and antihypertensive potential, along with moderate antithrombotic effects. In contrast, SV hams show improved antibacterial and consistent antioxidant activities, despite a slight decrease in enzyme inhibition. Overall, SIV hams are more effective in enzyme inhibition, while SV hams emphasize antibacterial properties.

4 CONCLUSIONS

Some samples (such as SIV4 and SV4) exhibit high activity in inhibiting DPP IV (dipeptidyl peptidase IV), which is associated with antidiabetic effects. Inhibition of ACE enzyme, which affects blood pressure, is notable in several samples. Antiviral, antioxidant, and anti-inflammatory activities are present to a lesser extent in most samples. There is variation in activity between SIV and SV samples, suggesting differences in biopetide precursors depending on the maturation or curing conditions of the ham.

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