

1 **Effect of high pressure processing on flavor of fish meat and frame**  
2 **after enzymatic degradation**

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6 **Outline**

- 7 1. Introduction  
8 2. Determination of nucleotide and enzyme degradation in haddock  
9 (*Melanogrammus aeglefinus*) and herring (*Clupea harengus*) after high pressure  
10 processing.  
11 3. Optimization of the enzymatic hydrolysis assisted by ultra-high pressure  
12 processing of alaska pollock frame for improving flavour.  
13 4. Conclusion

14 **Abstract**

15 The degradation of nucleotides and the enzyme associated with degradation have  
16 been widely used to evaluate the freshness of fish. Immediately after fish death,  
17 adenosine triphosphate (ATP) will degrade to inosine-5-monophosphate (IMP) and  
18 hypoxanthine (Hx) which would affect the fish flavor. The first study used high pressure  
19 processing (HPP) to regulate 5'-nucleotidase (5'-NT) and nucleoside-phosphorylase  
20 (NP) activity and flavor indicators. According to the results, HPP under 200 MPa for 3  
21 min showed the greatest effect to inhibit the activity of 5'-NT and NP and reduce Hx  
22 production in Haddock (*Melanogrammus aeglefinus*) and herring (*Clupea harengus*)  
23 fillets thus caused the lowest K value and suppressed the generation of unpleasant flavor.  
24 Alaska Pollock Frame (APF) can produce the usable protein through enzymatic  
25 hydrolysis but it caused the formation of odorous compounds during the treatment. The  
26 second study found that HPP combined with Alcalase 3.0 T and flavourzyme enzymatic  
27 hydrolysis can increase the production of IMP and free amino acid (FAA) at 150 MPa  
28 60min pH=7.5. Gas Chromatography-Mass Spectrometry (GC-MS) analysis showed  
29 that HPP treatment could obtain 20 main volatile compounds but no odorous  
30 compounds were contained including trimethylamine, caproic acid, octanoic acid. The  
31 results of e-tongue are consistent with the results of GC-MS analysis and the analysis  
32 showed that HPP combined with enzymatic hydrolysis could optimize the flavor from  
33 APF hydrolyzate. Overall, HPP could effectively inhibit the activity of 5'-NT and NP  
34 by changing the enzyme structure, and increasing the production of free amino acids  
35 and volatile compounds, thereby extending the shelf life.

- Karim, N. U., Kennedy, J. T., Linton, M., Patterson, M., Watson, S., & Gault, N. (2019). Determination of nucleotide and enzyme degradation in haddock (*Melanogrammus aeglefinus*) and herring (*Clupea harengus*) after high pressure processing. *PeerJ*, 7, e7527.
- Zhu, W., Zhu, L., Yang, W., Bu, Y., Li, J., & Li, X. (2020). Optimization of the enzymatic hydrolysis assisted by ultra-high pressure processing of Alaska pollock frame for improving flavour. *Journal of aquatic food product technology*, 29(6), 567-576.