Effects of Different Extraction Methods on the Contents of Type II Collagen and Chondroitin Sulfate in Chicken Sternal Cartilage and Sturgeon Notochord

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Outline

1. Introduction
2. Analysis of Type II Collagen and Chondroitin Sulfate Contents and Their Structural Characteristics in Cartilage
   2-1 Extract from Chicken Sternal Cartilage
   2-2 Extract from Sturgeon Notochord
3. Conclusion

Abstract

Chondroitin sulfate (CS) and undenatured type II collagen (Col II) are the two major biological macromolecules found in cartilage-related tissues. This study investigated the extraction techniques and structural characteristics of Col II and CS obtained from chicken sternal cartilage (CSC) and sturgeon (Acipenser gueldenstaedti) notochord by-products. The results showed that both enzymatic hydrolysis and alkaline treatment effectively yielded CS and Col II. The enzymatically extracted Col II consisted mainly of α_1 (130 kDa) and β (270 kDa) chains, while Fourier-transform infrared spectroscopy (FTIR) confirmed that its triple-helical structure remained intact after processing. The average molecular weight of CS ranged between 38 and 80 kDa, and the predominant form was chondroitin-4-sulfate (CS-A). Differential scanning calorimetry (DSC) and scanning electron microscopy (SEM) analyses revealed that Col II exhibited a fibrillar structure, whereas CS appeared as rough, granular aggregates; together, they formed stable hybrid fibrils. These findings demonstrate that CSC and sturgeon notochord are promising sources of Col II and CS, providing a scientific basis for the valorization of animal by-products.

Keywords: Type II collagen, Chondroitin sulfate, Chicken sternal cartilage, Sturgeon, Notochord

Reference

Ata, O., Bozdogan, N., Mataraci, C. E., Kumcuoglu, S., Bayram, S. K., & Tavman, S. (2025). Extraction and characterization of valuable compounds from chicken sternal cartilage: Type II collagen and chondroitin sulfate. *Food Chemistry*, *462*, 141023.

Meng, D., Li, W., Leng, X., Takagi, Y., Dai, Z., Du, H., & Wei, Q. (2023). Extraction of chondroitin sulfate and type II collagen from sturgeon *(Acipenser gueldenstaedti)* notochord and characterization of their hybrid fibrils. *Process Biochemistry*, *124*, 180-188.