



Microbiological Quality and Shelf Life of Collagen-Coated *Sillago sihama* During Frozen Storage

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ABSTRACT

The study aims to evaluate the use of collagen coatings for inhibiting microbial growth, extending the shelf life of fish and protecting it from spoilage. The present study was conducted on *Sillago sihama* fish obtained from Al-Faw City, Basra Province. The fish were coated with collagen extracted from fish-processing by-products, specifically the skins of *Liza subviridis* (Mullet fish), and then frozen at -18°C for 120 days. Microbiological analyses were performed to determine the total bacterial count, psychrotrophic, proteolytic, lipolytic, and coliform bacteria. The results showed that the bacterial counts in uncoated frozen fish were higher than those in coated frozen samples. The highest total bacterial count in uncoated frozen fish reached 100.4 CFU/g, followed by psychrotrophic bacteria (36.4 CFU/g), proteolytic bacteria (28.8 CFU/g), lipolytic bacteria (21.4 CFU/g), and coliform bacteria (2.8 CFU/g). In contrast, the lowest bacterial counts were recorded in coated frozen fish, with total bacterial counts of 54.8 CFU/g, succeeded by psychrotrophic bacteria with 19 CFU/g, proteolytic bacteria with 17.6 CFU/g, lipolytic bacteria 11.8 CFU/g, and coliform bacteria with 1 CFU/g. In conclusion, the study demonstrated that biodegradable collagen coatings effectively inhibited microbial growth, extended the shelf life of fish, and protected it from spoilage.

INTRODUCTION

Fish represents one of the most important and widely consumed sources of animal protein worldwide, largely due to its relatively low cost and high nutritional value (Allam *et al.*, 2020; Maulu *et al.*, 2020; Jalal & Wael, 2024). Insufficient eating of animal protein, particularly among children, can lead to impaired development or even growth retardation due to the essential physiological functions of dietary proteins (Schonfeldt & Hall, 2012; Al-Haider *et al.*, 2019; Jabbar *et al.*, 2019). Despite the high nutritional value of fish, they can also serve as a potential source of foodborne illnesses since they may harbor pathogenic microorganisms. Several factors contribute to this issue, including improper fishing, handling, and marketing practices, as well as the inherently delicate biochemical composition of fish tissue and the activity of endogenous enzymes, all of which make fish highly perishable (Sulaiman & Hassan, 2017; Kadhim

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