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Analysis of the Production and Quality of Marinated Fish with Potential Perspectives

Phidelia Kusi*

Department of Aquaculture Faculty of Fisheries, Science & Technology, Ghana

Corresponding author: Phidelia Kusi

kusiphed@gmail.com

Department of Aquaculture Faculty of Fisheries, Science & Technology, Ghana

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Abstract

Over time, in addition to whole fish, many different types of fermented fish products have been produced, including: it was done. B. Fermented fish surimi and sauce. Consuming fermented fish products has been shown to improve both physical and mental health, depending on the composition of the product. Fermented fish products can be dried prior to the fermentation process to enhance the flavor, contains various additives to aid fermentation. At the same time, the fermentation process and its conditions play a large role in determining the quality and safety of the product, as the composition changes biochemically during fermentation. In addition, the need for specific microorganisms and the challenges of avoiding harmful microorganisms will be reviewed in order to further optimize fermentation conditions in the future. While some advanced techniques have been developed to produce better quality products and simpler processes, the versatility of fermented fish processes, ingredients and products is particularly important for consumer health and safety. This review examines the nutritional, microbial, and sensory properties of fermented fish to better understand the health benefits and safety issues presented by fermented fish products. For the purposes of the review, we took an exploratory approach to the published literature using numerous books and online databases such as Google Scholar, Web of Science, Scopus, ScienceDirect and PubMed Central. This review examines key information from all available library databases from 1950 to 2022. This review will help the food industry involved in marketing fermented fish to ferment efficiently and produce a higher quality product by expediting the fermentation process without jeopardizing consumer health and safety.

Keywords: Fish; Fermentation; Health benefits; Processing; Preservation; Safety

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Introduction

Fish and fish products are foods that are regularly consumed as a reliable source of nutrition. It is an excellent source of polyunsaturated fats such as omega-3, protein, vitamin D and selenium, which contribute to a healthy diet. In addition, global fish production increased from 20 million tons in 1950 to 171 million tons in 2016 [1]. Concomitantly, fish consumption has also increased globally, from 9 kg per person in 1961. Nevertheless, increased fish production results in higher fish disposal costs. Therefore, fish preservation becomes more important than ever to take advantage of this nutrient source that can rot in landfills. To this end, fermenting fish could be a solution to extend the short shelf life of fresh fish [2-3]. It is a method of processing various plants and foods that has been practiced since ancient times. The fermented fish consumed comes in a variety of shapes and sizes and, most importantly, using a variety of preparation and fermentation methods [4-5]. Even the final product can vary in consistency: fish sauce, paste, and hard dried fish like Japanese katsuobushi. Fermentation is a better method of preserving fish than freezing, Smoking or drying due to its ability to preserve fish by enhancing its nutritional value due to the beneficial microorganisms involved in fermentation [6].

Fermentation of fish is beneficial as it can extend the shelf life of fish and reduce fish waste [7]. For example, in the fermented fish

sauce industry, Thai fish sauce and fish sauce are popular in most Western countries, especially the United States [8]. This makes Thailand one of the world leaders in the fish sauce industry and contributes to Thailand's economy. Furthermore, fish fermentation contributes to changes in the sensory properties of fish. This may be desirable or preferred depending on the type of fish being fermented. The fish flavor is enhanced by microbial fermentation by-products. Certain changes may be beneficial or undesirable [9]. For example, dimethyltrisulfide, 2,3-butanedione, and 2-methylpropanal are examples of functional volatile compounds detected in fermented fish miso and fish sauce samples. This compound is responsible for the fishy, caramelized, and nutty flavors of fish miso and fish sauce, respectively [10]. As such, fish fermentation can offer many opportunities for fisheries and local businesses. Fermenting this rich source of nutrients can extend the shelf life of fish and enhance its nutritional value and taste. Therefore, studying the diversity of fermented fish foods and their post-fermentation changes is the main purpose of this review, to elucidate the process of fermentation itself. This review also addresses the safety and challenges of fermented fish and fish products [11].

Discussion of fish and fish product fermentation

A good example of hurdle technology is fermentation. This serves as a conservation strategy by lowering the pH and redox potential (Eh) of the substrate. Fermentation is sometimes called bio preservation in modern cooking techniques. These active ingredients prevent the growth of pathogenic and spoilage microorganisms and contribute to the protection of fish. Traditional methods of producing fish products include limited drying, smoking, fermentation, and the use of substrates in ways that promote the growth of several beneficial microorganisms that stop the growth of pathogenic microorganisms.This technology offers advantages for future applications as it is safe, environmentally friendly and energy saving. In Japan, filamentous fungi like koji are widely used in the production of fermented fish products due to their beneficial effects on the quality of the final product [12]. It is widely used as an inoculum for beverages. Important enzymes such as amylase, protease and lipase are produced by koji mold. But that's not all. The use of mixed culture for filamentous fungal fermentation increases the nutritional and functional value of fermented foods and increases the efficiency of the material conversion process [13].

In recent years, the uses of modern fermentation processes for meat and fish has attracted the interest of an increasing number of researchers have altered the organoleptic properties of products. Fish products are common foods high in biogenic amines (Bas), and excessive consumption can pose health risks. Therefore, it is important to demonstrate the mechanism of Bas formation and control during fish sauce fermentation. A new method to control Bas in fermented foods was discovered through the contribution of microorganisms that control Bas accumulation during the fermentation of fish sauce. Staphylococcus nepalensis 5-5 and Staphylococcus xylosus JCM 2418 have been identified as potential starters for BA controls. A comparative UHPLC-Q/TOF-MS-based metabolomics approach combined with equivalent quantification was used to assess the flavor quality of fish products such as tilapia fillets and Chinese fish sauce during fermentation, and to determine metabolite profiles. This approach identifies chemical constituents and sheds new light on the taste, nutritional, texture and flavor qualities of fish products [14].

Nutrients, on the other hand, can be revealed at the molecular level by Food mix. Since the term 'foodmics' was introduced a decade ago, these omics techniques have been of great interest in contemporary food, nutrition and health research. Analytical approaches from many omics disciplines such as proteomics, metabolomics, lipidomics, nutrigenomics, metagenomics and transcriptomics have recently spurred food-related research. The use of various omics techniques, individually or in combination, for food component analysis, food certification, and food safety and quality assessment has been the subject of numerous studies. Analysis of food pathogens and food spoilage using next-generation sequencing techniques provides valuable insights into infectious processes, disease development, and post-treatment microbial activity. A study was conducted using DNA sequence analysis to examine the microbiota found in fermented fish products in several villages (pla-ra) in northeastern Thailand. Plala's microbial community helps us better understand how traditional products are made. Advanced optimization of fermentation processes such as B. Use of dominant bacterial taxa in starter cultures; It can facilitate food fermentation, control food quality, and provide useful guidance for industrial applications. Currently, the disposal of fish waste has become a serious environmental problem. In addition, the fermentation of fish excrement provides other notable substances [15].

Conclusion

Although fermented fish products are widely consumed in certain regions of the world, delicacies from this region are not yet widely marketed worldwide. Globalization of products is expected. In addition, the health benefits associated with fermented fish consumption may expand the market for fermented fish products. Future directions for fermented fish products include improving the fermentation process through modification and improvement of fermentation parameters. As already mentioned, the breakdown of lipids and proteins is responsible for both positive and negative properties of fermented fish, producing both desirable and harmful substrates such as histamine. To maximize the fermentation potential of fish, the temperature, pH and fermentation time should be optimized according to the fish species used. In addition, more detailed studies should be conducted on the direct composition of fermented fish to develop a more solid foundation and guidance for improving its sensory properties.

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