

New technologies in fish processing and fishery products: A review

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Abstract

Health, nutrition are the main factors for human beings. Fishes are the source of protein, vitamins, minerals and fats. These are the main source as a food for human beings for their health and nutrition. A proper processing and packaging of fishes helps in maintaining the quality of fish. Today many new technologies are emerging for preservation of fish. This article gives the recent advance techniques in the processing and packaging of fish and their products.

Keywords: New technologies; Fishes and their products processing

1. Introduction

Fishes are consumed by human beings as a delicious food. They demand high quality processed foods with minimum changes in nutritional value. Recent techniques in food processing as handling, packaging, preservation and storing minimizes the same food manufactures develop many processing technologies reduces undesirable changes in food due to processing. (Belcher, 2006)

Aquatic foods are highly perishable and usually spoil faster than the other food. Fresh fish undergoes many changes as a result of autolysis and bacterial activity. Proper storage conditions are required to prevent the spoilage of fishes and their products. Many new technologies have developed for this purpose. Among these, high pressure processing irradiation, microwave processing etc. are very much important.

2. High pressure Preservation (HPP)

It is recent and innovative technology with minimum or without heat treatment (Tewari Vijay, 2007). It is effective in preserving many foods. In which the food is placed in a pressure vessel which is capable to sustain the required pressure and the food is submerged in a liquid, which acts as the pressure transmitting medium, such as water, castor oil, ethanol or glycol etc. These liquids protect the inner vessel surface from corrosion.

HPP preserving food by combining elevated pressures (upto 900 Mpa or good atmosphere) and moderate tem (upto 120° C) over a short period. Other advantages of this technique include uniform pressure, minimum heat, minimum damage to food and properties of foods.

Effects of HPP on microorganisms shown that fungi showed highest sensitivity at 300 Mpa to 400 Mpa fungi showed highest sensitivity to HPP followed by gram bacteria. HPP treatment of 250 Mpa and 200 Mpa enhanced shelf life of Indian white prawns (H. Milne Edwards, 1837) and yellowfin tuna chunks respectively (Hugas et.al. 2002, Hogan et.al. 2005).

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3. Irradiation

It is a physical treatment that consists of exposing foods to the direct action of electronic, electromagnetic rays to assume the innocuity of foods and to prolong the shelflife (Doyle, 1999). Irradiation of food can control insect infestation, reduce the number of pathogenic microorganism and delay or eliminate natural biological processes such as ripening, germination or sprouting in fresh food. (Ah et al. 2006) Three types of ionizing radiations are used to process products. Gamma rays, x-rays and accelerated electrons (Lecroix, 2005).

Various forms of irradiation treatment are radiation (life extension) radicidation (elimination of pathogens) and radappertization (sterilization). The use of irradiation is standard treatment to sterilize packages in aseptic processing of food and pharmaceuticals. It produces some chemical changes, which although lethal to food borne bacteria, do not affect the nutritional quality of the food but lead to the production of small amount of radiolytic products. Gamma irradiation has been considered as an interesting method of preservation to extend the shelf life of fish and also to reduce microbial population in fish and fish products.

4. Microwave processing

This processing include drying, pasteurization, sterilization, tempering, backing etc. Microwaves are electromagnetic waves whose frequency varies within 300 MHz to 300 GHz. Microwave heating is caused by the ability of the material to absorb microwave energy and convert into heat. Microwave heating of food material mainly occurs due to dipolar and ionic mechanism. Water content in the food material causes dielectric heating due to the dipolar of water. When an oscillating electric field is incident on the water molecules, the permanently polarized dipolar molecules try to realign in the direction of the electric field. At high frequency electric field, this realignment occurs at a million times per second and causes internal friction of molecules resulting in the volumetric heating of the material. (Datta and Anantheswaran, 2001)

Microwave drying is used to remove moisture from fish and fishery products microwave drying has advantage of fast drying rates and improving the quality of fast drying rates and improving the quality of product. In microwave drying due to volumetric heating, the vapors are generated inside an internal pressure gradient is developed which forces the water out. Thus shrinkage of food materials is prevented in microwave drying. Microwave combined with other drying methods such as air drying or vacuum drying or freeze drying gave better drying characteristics compared to their respective drying methods or microwave drying alone (Chandrashekaran et.al., 2013).

5. Conclusion

Aquatic foods play a vital role in addressing issue of food and nutritional security, product diversification, value addition, increasing exports and reducing post-harvest losses can contribute to economic growth and to reduce hunger in the world. Consumers demand high quality processed products with minimum changes in nutritional properties. Recent thermal and non-thermal processing technologies will help in extending fish's shelf life, maintain nutritive properties, ensures safety, increases convenience, reduce waste, facilitate exports, imports and most important is increases economic value.

Compliance with ethical standards

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