

Seafood marination-A review

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ABSTRACT

Marinated fish is one such fish products which consist of fresh, frozen or salted fish or portions of fish processed by treatment with a solution including sugar,spices,oil, plant extracts and acids like vinegar,fruit juice, wine that are used to improve the tenderness,juiciness,flavour and aroma to extend the shelf life. Sometimes the shelf life is limited due to mishandling and microbial attack. This review helps to discuss about the different ingredients which is suitable for marinationand also different types of marination which will be further help to manufacturer as well as valorised food industry.

Key word: Marination, Valorisation, Fish product, Shelf life

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INTRODUCTION

Fish is highly perishable in nature and therefore various methods like drying, curing, canning, freezing etc. have evolved over the period of time to preserve them. The seafood processing and marketing has become competitive all over the world and exporters are switching to preservation along with value addition to increase profit. Value addition is the most talked word in the seafood processing industry because of the possibility of better utilization of resources as well as foreign exchange earnings and high unit value. The growth of seafood production has increased quickly in the last few years, and at the same time, there is an increase in consumers' need or demand for convenience seafood products. "Ready-to-eat", "ready-to-cook" or "ready-to-serve" seafood in attractively packed convenience foods to match the dynamic desires of today's consumers running short of time are amongst such product. Marination is a processed treatment with edible acids and salt and put up in brine, sauce or oil. It involves an increase in ionic strength and a decrease in pH bringing desirable change in taste, texture, flavour of marinades. Because most marinades contain acid ingredients, the marination should be done in a glass, ceramic or stainless steel container, never in an aluminum one. The food should be covered and refrigerated throughout the process [20, 21].

TRADITIONAL MARINATION METHOD

From the ancient period, the marination process is done by using acetic acid and salt with a limited shelf life and quality. Both acetic acid and gluconic acid is used in the process of the marination process to find out the quality and stability of the end Product [23]. Various salt like NaCl, CaCl₂ and acid like lemon juice, citric acid, tripolyphosphate are used to increase the muscle toughness with the better texture of fish product during marination

[29]. The seafood like squid, surimi, mussel, shrimp, sea snail, and cuttlefish and octopus are also used for marination [12, 22].

MARINATION BY USING FLAVOUR ENHANCER

Marinades are semi preserve, acid usually acetic acid and salt are added to the fish to retard the action of bacteria and enzyme, resulting in a production with a characteristic flavour but limited shelf life [18]. Additives such as spice, sauce, cream, oil, mayonnaise, parsley and dill have essential effects on quality of marinades[10]. Different vegetable additives and sauces including garlic, pasteurized hot pepper sauce, marinated green olive with a toothpick are used in marinated anchovy where vegetable additives and sauces had no pathogenic effect on microorganisms that might endanger towards public health [24]. Sauce plays as an important flavour enhancer in the marinated product. Different types of sauce like tomato sauce, pomegranate sauce and olive lemon juice sauce are used in the marinated product [16, 27, 8, 9]. The sauce contains many preservatives like spices, salt, condiments, sugar with the addition of garlic powder and some stabilizer where the sugar act as a cryo-protectant. So it has the effect to make the product safe with extended shelf life in refrigerated storage. Kaya and Bastruk [15] compared marinated fish with brine preservation and sauce preservation. The parameter like TVB-N, TBA, TMA-N and peroxide number values with sensory analysis were at acceptable limits during the storage period without any quality problems. Brown mussel (*Pernaperna*) is also used for marination incorporated with sauce given a better result as compared to others (Aveiro *et al.*, 2008). Commercial lemon pepper and eugenol extract are also used as a flavour enhancer in marinated seafood products [33, 5].

Different types of oil like sunflower oil, corn oil, essential oil and vegetable oil are also used in marination [31, 32, 2, 6].

Marination by using plant extract:

Different types of plant extracts like myrtle, rosemary and nettle extracts with brine are used on the preservation of marinated product [28]. Brining with plant extracts has the highest antioxidant effect and slowed down the lipid oxidation process. Tomato and garlic extracts also exhibited inhibition effects on lipid oxidation and lowered down the peroxide, para-anisidine, conjugated diene, UV absorbance and a free fatty acid value in the marinated product. [9]. Green-curry paste with garlic used for marination gave better consumer acceptability on quality changes in the marinated white shrimp [25]. Herb like dill leaves sometimes used for marination which prevents the growth of bacteria [22].

Marination by using novel techniques:

The novel technology like high hydrostatic pressure (HHP) and gamma irradiation are used in the preservation of fish product and value addition sector. Now it's also implemented in the marinated food industry for irradiation of microbial attack and extending the shelf life. The effect of gamma irradiation (0, 2, 3 and 4 kGy) on vacuum-packed marinated anchovy fillets was analysed by Tomac *et al.* [26] and assessed their texture, colour, lipid oxidation and sensory acceptability under refrigeration. The irradiation caused a slight increase in hardness values with prolonging shelf life. The effect of modified atmosphere packaging also plays an important role in extending the shelf-life of marinated seafood products [10, 11]. Marinated products in MAP and the effect of gas mixtures (70% CO₂/30%N₂=M1, 50% CO₂/50% N₂=M2) helps to increase the quality like physical, chemical, microbiological and sensory during the refrigerated storage as compared to air-packaged marinated seafood. Pasteurization is another technique to kill micro-organism in different temperature ranges [19]. The high hydrostatic pressure (HHP) treatment is of great value to the seafood industry processing and has been applied to a range of different seafood including shrimp [14], prawn (Ginson *et al.*, 2013), herring, haddock (Karim *et al.*, 2011), mahimahi and trout [30]. The ranges of 100 and 300 MPa is considered the best for sensory analysis like taste, texture and appearance [19]. High hydrostatic pressure and thermal treatments for ready to eat marinated products also help in reducing the microbiological load [31].

Nutritional quality of marinated product:

Marinated product serves as a good additive in the diet due to presence of some amino acid like aspartic acid, glutamic acid and lysine, which constituted approximately 31% of total amino acids. Many amino acids, such as glutamic acid, aspartic acid, alanine and glycine, are responsible for flavour and taste. These amino acids are important because they give

marinated fish their characteristic taste and flavour. Marinated fish contained high amounts of n.3 long chain polyunsaturated fatty acids such as eicosapentaenoic acid (20:5n.3) and docosahexaenoic acid (22:6n.3) and hence may contribute to the prevention of diseases related to geriatric and cardiovascular disorders [13].

Problems in marinated product:

There are some limitations like gaseous spoilage manifested by bulging of the lids of the jar, slime formation and off odour like changes during the storage period [3,4, 17] is found due to non-putrefactive organism such as acetic tolerance lactic acid bacteria i.e. *Leuconostoc gelidum* and *Leuconostoc gasicomitatum*. So before adding vegetable and spices it should be sterilized or stored in cold storage to eliminate the micro-organism.

CONCLUSION

Marinades which is a traditional preservation method has a great reputation and public interest for typical taste, texture and flavour properties. Limited information exists about marinated seafood products. Fish preservation by marination technology is an untouched area in India. So standardize procedure should be applied in the valorisation food industry by extending the shelf life.

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