

**Title** High pressure processing of fresh tuna fish and effects on shelf-life extension  
**Author** Z. Zare, B.K. Simpson and H.S. Ramaswamy  
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### **Abstract**

Tuna is highly perishable and has been implicated in histamine poisoning because of high histidine levels in the muscle. There is high demand for fresh tuna fillet and steaks for Japanese type foods, and as a grilled item in restaurants. Demand for fresh, additive-free and safe seafood products has stimulated efforts to discover novel methods to prolong the shelf-life of fresh products with minimum loss of quality. High pressure processing was investigated for its effects on quality and useful shelf-life of fresh tuna. Fresh tuna was subjected to various pressure treatment (220 MPa, 200 MPa), holding times (30 min, 15 min) and temperature (below 20 °C). The pressurized and non-pressurized samples were analyzed for initial physicochemical properties and subsequent changes during chilled storage. Color parameters (L\*, a\* and b\* values), texture, pH, sensory attributes, endo-protease activity, TBA, TVB and histamine levels were all evaluated. All the pressure-treated samples lost their glossiness, and their redness decreased with pressure and holding time. Pressurization increased yellowness of the samples, and the 'b' values increased throughout storage. High pressure increased firmness of the samples, while proteolytic activity did not change significantly during storage, unlike the TVB levels that increased during storage. Pressurization at 220 MPa for 30 or 15 min, and 200 MPa for 30 min reduced TVB values the most. No consistent pattern was observed for TBA levels, although the levels were low and indicative of high quality products. Histamine formation was inhibited by pressurization at 220 MPa for 30 min while other pressure levels appeared to enhance histamine formation. A pressure level of 220 MPa for 30 min was optimal in controlling proteolysis, texture degradation, as well as histamine and TVB formation, without promoting lipid oxidation in tuna. It also achieved a 10-d shelf-life extension of the product.