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Influence of stable and abusive temperatures on lipid deterioration of Atlantic herring (*Clupea harengus*) light and dark muscle during long-term frozen storage

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Normally, the temperature requirement for frozen fish is at least -18°C and the recommendation of storage temperature for fatty species, such as herring is -24°C or colder with a strict compliance of temperature must be ensured. However, unstable storage conditions are commonly encountered during storage and transportation of frozen fish. The temperature of frozen fish products can fluctuate and sometimes go up to -12°C, due to unstable ambient conditions, the position of the fish in the store or container, or duration of transportation. Temperature abuse affects the amount of unfrozen water in the muscle thereby enzymatic reactions, and lipid oxidation can thus still take place during frozen storage. In the present study, compositional changes and lipid deterioration of light and dark muscle of Atlantic herring (caught in Icelandic waters) during frozen storage, as affected by temperature abuse (-12°C for one month, followed by storage at constant temperature of -25°C for up to 11 months) were investigated and compared to samples stored at stable temperature of -25°C for 12 months. Increased lipid oxidation (peroxide and thiobarbituric acid reactive substance values) in the dark muscle and lipid hydrolysis (free fatty acids content) in the light muscle was observed in temperature abused samples. The dark muscle. Fatty acid composition analysis indicated that the light muscle is a good source of omega-3 and has a higher nutritional value compared to the dark muscle. The study thus implied the importance of avoiding temperature fluctuations during frozen storage to improve the quality and shelf-life of frozen herring products. Furthermore, removal of the dark muscle by deep-skinning could be beneficial towards increased shelf-life of the more valuable light muscle.

Biography

Dang Thi Thu Huong is a PhD student in Food Science at Faculty of Food Science and Nutrition, University of Iceland, Iceland. She received her Bachelor's degree and MSc in Seafood Processing Technology in 2000 and 2004, respectively from Nha Trang University, Vietnam. In 2014, she attended the training course in Quality Management of Fish Handling and Processing that was hosted by United Nations University- Fisheries Training Program (UNU-FTP), Iceland. Since 2000, she has been working as a Lecturer and Researcher at Faculty of Food Technology, Nha Trang University, Vietnam and her interest research is related to Food Processing and Storage.

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