Contribution of structural rearrangement and molecular interactions on quality improvement of frozen fish fillets

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The present study evaluated the effects and underlying mechanisms of light salting on quality properties of fish fillets during repeated freezing-thawing. Light salting was found to improve water-holding capacity and decelerated texture softening in fillets. Instead of tissue distortion and heterogeneous aggregates in control groups, light salting promoted myofibril disassembly and formation of an ordered protein network with the solubilized myofibrillar proteins. The myofibrils presented an overall amorphous appearance with the loss of M-lines, removing the restraints to myofibril swelling and solubilization from A-binds in salted groups during repeated freezing-thawing. The structural rearrangement caused by light salting facilitated the enlargement of water-holding space, transformation of tissue water, and tissue recoverability, improving water-holding capacity and texture properties of fillets during freezing-thawing. The finding provided novel insight into the improvement of quality properties of fish fillets by light salting when subjected to drastic temperature fluctuations.

Keywords: Structural rearrangement; Molecular interactions; Water transformation; Light salting; Freeze-thaw stability; Fish fillets