Development of Web and Demerit Score Based Fish Quality Index (FQI) for Fresh Fish and Shelf Life Prediction Using Statistical Models

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A demerit score based fish quality index (FQI) has been developed to assess the quality/freshness of fresh fish by considering five general characteristics in the demerit score like appearance of fish outer surface, fish eye, gills, belly and vent. These characteristics were normalized in the range 0 to 1, where 0 represents excellent/best quality of the characteristic and 1 represents bad/worst quality of the characteristic since the quality assessment is based on the demerit score. Finally, fish quality index (FQI) was computed on weighted sum of individual quality characteristics. The value of FQI was in the range of 0 to 1 by giving weightage to the quality characteristic using Delphi method based on their importance to assess the quality/freshness of fish. The value 0 of FQI represents fish with excellent/best quality and 1 represents fish with bad/worst quality. A theoretical model with auto-correlated errors was also developed to estimate the shelf life for a predicted value of FQI score. The developed FQI was validated with real time data on Milk fish (Chanos chanos) stored in chill condition. It was found that appearance of outer surface and fish gills were the important quality attributes affecting the quality/freshens of Milk fish. Modified FQI integrated into a web application using Hypertext Markup Language (HTML) and Cascading Style Sheets (CSS) to evaluate the quality of fish. A modified algorithm has been incorporated for computing the fish quality index using HTML and Javascript. The user can assess the quality of fish based on five general and their sub-quality characteristics on a demerit scale score and the system automatically calculates the fish quality index score in the range of 0 to 1 with a quality description as output. The developed IoT based system was validated with real time storage data of Tilapia and Indian oil sardine.

Keywords: Demerit score, Fish quality index, shelf life, Auto-correlation, IoT, HTML, JavaScript