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Flash-Frozen IS Fresh | A Brief Summary

In 2016, three small-scale fishing businesses in Oregon, California, and Alaska: Port Orford Sustainable Seafood, Real Good Fish based in Monterey, and the Alaska Longline Fishermen's Association, partnered with Ecotrust, Oregon State University's Food Innovation Center, and Seafood Analytics to measure and document the quality of flash-frozen seafood in relation to fresh never frozen seafood. Flash-frozen fish, provided by the participating small-scale fishing businesses, and fresh never frozen products, sourced from high-end grocers in Portland, were compared and tested using two methodologies. A blind consumer sensory and taste-testing method was administered to determine differences in the samples and overall acceptability, and both fresh and flash-frozen fish samples were tested using the Seafood-CQR device, which assigned a 0-100 "freshness score" to each fish.

Consumer Testing: 108 consumers participated in acceptability testing, which addressed a range of factors including appearance, aroma, flavor, texture, quality, overall liking, and purchase intent. *Across all categories, flash-frozen fish was rated as either equally or more appealing than fresh fish.* Looking specifically at Black cod, consumers preferred flash-frozen samples in every category except appearance, in which there was no statistical difference. Contrary to popular assumption, fresh fish was not a clear favorite among consumers.

Freshness Testing: Testing was conducted by Seafood Analytics, a Michigan-based company that developed the Seafood-CQR, an innovative device used to instantly measure the freshness of fish. *Test results confirmed fish caught and immediately frozen were of higher quality and have a longer shelf life after thawing than the majority of grocery-bought fresh fish*, revealing a stark difference between fresh-frozen and fresh fish as measured by the Seafood-CQR device. Looking at the data, fresh-frozen fish registered Certified Quality Numbers (CQNs) in the high 70s-80s, while fresh fish of the same species came in significantly lower with an average score of 20 or less. In general, the higher the CQN, the fresher (and therefore higher quality) of the fish. Based on these results, fresh Black cod and Alaskan Coho purchased at retail were of much lower quality than line-caught fresh-frozen fish. Considering that fresh fish typically sits for up to a week or more behind the seafood counter, this result is contrary to popular opinion, but is not surprising.

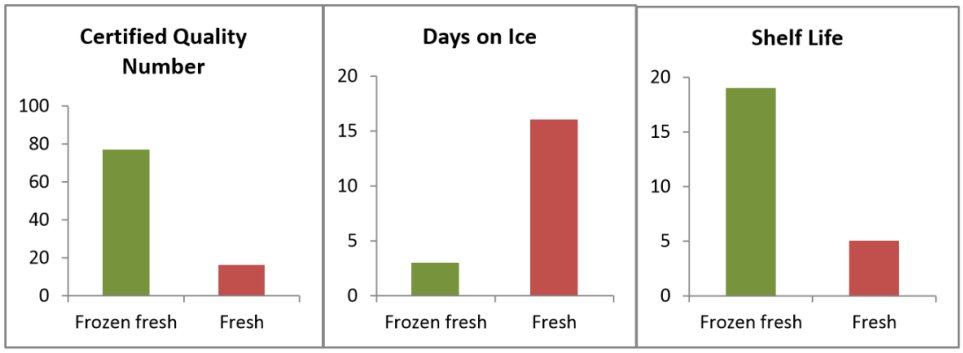

Figure 8. Comparisons using coho salmon (*Oncorhynchus kisutch).* (Fresh (red) and frozen fresh (blue) measured with a Certified Quality Reader (CQR) manufactured by CQ Foods (Detroit Michigan). Comparisons were made between measures of the certified quality number (CQN) and between predictions (made from CQN) of days on ice and shelf life remaining.

About the Seafood-CQR device

The Seafood -CQR was developed by Seafood Analytics and measures the freshness of seafood products, including both whole fish and fillets.[1] The device sends a low frequency electrical current through the fish and collects data based on its relative conductivity. Once conductivity is measured, the reader assigns a Certified Quality Number (CQN) to the seafood product, which is an indicator of freshness. The CQN scale ranges from a high score of 100 (just harvested) to less than 10 (several weeks old). In general, a higher CQN correlates to a fresher, and therefore higher-quality, fish.

Why Buying Flash-Frozen Seafood Matters

- *Locked in freshness.* The flash freezing process locks in the freshness of a fish the day it processed. Flash-freezing a product pauses its cellular degradation, creating a fresher, more delicious fish, especially if thawed appropriately (ideally overnight under refrigeration). Many "fresh" never frozen fillets may have been in the grocery seafood display case for eight days or more, and can take 10-16 days to even arrive at a retail location—thus, "fresh" fish can mean fish that has been out of the water for an overage of 10 days to two weeks, or more.
- *More species, less fishing intensity.* Freezing allows small-scale fishermen to develop markets for the entirety of their catch, including fish traditionally considered bycatch, thereby increasing resource utilization without increasing fishing intensity.

- *Less waste.* On average, 23% of fish purchased by retailers and foodservice operators is never sold and goes to waste (USDA Shrink Report[2]). Flash-frozen seafood could solve this problem by extending the shelf life of fish products, while also solving significant issues facing small-scale fishermen, such as seasonal swings in volume, distribution cost, and more accurately matched supply and demand.
- *Lower carbon footprint.* The majority of fresh fish fillets are often caught far from where they are consumed and must be shipped by air, one of the world's most carbon-intensive forms of travel. By comparison, when a fish is flash-frozen at sea, it can be moved thousands of miles by container ship, rail, or truck with a much lower carbon footprint.
- *Transparency.* flash-freezing seafood creates more a transparent supply chain, as it enables fishing communities to aggregate and distribute their high-quality products directly to consumers.

[1] "The Science", Seafood Analytics, http://seafoodanalytics.com/the-science/

[2] Jean C. Buzby, Jeanine T. Bentley, Beth Padera, Jennifer Campuzano, and Cara Ammon. Updated Supermarket Shrink Estimates for Fresh Foods and Their Implications for ERS Loss-Adjusted Food Availability Data. EIB-155, U.S. Department of Agriculture, Economic Research Service, June 2016