

## **K -value, a freshness index of fish. Its application for modern demand**

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One of the most important factors that determines the quality of fish is its freshness. Sensory methods are eventually used to judge the freshness. They are convenient but not quantitative. Among scientific freshness indices, the most popularly used one is K-value, which was proposed in 1960s and still valuable to show the freshness of fish. The value is based on ATP metabolism in fish muscle after its death.

ATP in fish muscle is sequentially degraded into much simpler compounds after its death. The degradation of IMP into HxR is the slowest among the steps, and the relative content of HxR and Hx derived from IMP is defined as K-value. As the IMP degradation is enzyme catalyzed reaction, the process is determined by the storage temperature and period, namely storage history. The index has been accepted by people. The reasons are;

1. A complete consumption of ATP leads "Rigor-mortis", traditional freshness index.
2. IMP gives synergistic effect with Soy sauce on the taste of fish meat (Sashimi).
3. K-value increase and freshness decrease judged by traditional methods fit very well.

Analysis technology was remarkably improved from ion exchange chromatography to HPLC. Although the separation mechanism of HPLC differs from original one, the sample preparation method designed for original method was used until now. The hardest part in the original method was pH adjustment to pH 7. As HPLC analysis does not require the sample to be pH 7, pH was adjusted to 3, where ATP was kept stable. Adjusting pH to 3 is simply achieved by adding a fixed volume of KOH solution. The simplified method makes it possible to analyze a large number of samples in short time even in night time by equipping autosampler.

K-value can be applicable not only to fresh fish but also to frozen stored and cooked seafood products. In the latter cases, the value gives the freshness of the raw material (fish) before the treatments.

Established K-value measurement protocol can guarantee the freshness of any seafoods distributed in the world scientifically.

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