SHIMADZU

Application News

Material Testing System   No.i204

Texture Analysis of "Ikura" Salted Salmon Roe by EZTest

■ Introduction

The numeric quantification of sensations has become increasingly important in recent years to provide the basic information for the accurate determination, improvement, and differentiation of the goods that surround us in our everyday lives. Sensations were conventionally evaluated mainly by the human five senses. However, numeric quantification of sensations is an effective method for the improvement and differentiation of goods. In the food industry, in particular, the quantitative evaluation of food texture is now commonly used for various purposes including the quality control and development of new food products.

The Shimadzu EZTest texture analyzer offers dedicated texture-analysis software and a comprehensive range of specialized test jigs for the quantitative evaluation of food texture, including crunchiness, crispiness, and palatability. It is a general-purpose tester that can be used for the strength testing of packaging materials in addition to the development, improvement, and quality control of foods.

This Application News introduces the use of EZTest for the texture analysis of salted salmon roe from different regions.

■ Testing Equipment and Test Conditions

Two samples of salted salmon roe (Sample A, Sample B) produced in different areas were tested. Testing was performed using a Shimadzu EZTest texture analyzer (Fig. 1). EZTest features a compact frame

that is extremely easy to operate. In addition to texture analysis, it can be used for the strength testing of other small samples.

Table 1 shows the configuration of the tester used, including the accessories.

Table 1 Tester Configuration

Main unit	EZTest EZ-S-5N
Load cell	Capacity 5 N
Jig	15 mm dia. compression plate (upper)
Software	TRAPEZIUM Rheometer texture analysis software

The texture was evaluated under compressive loads. Table 2 lists the test conditions and Fig. 2 shows an overview of the progress of a test.

Fig. 1 Overview of EZTest Texture Analyzer

Table 2 Test Conditions

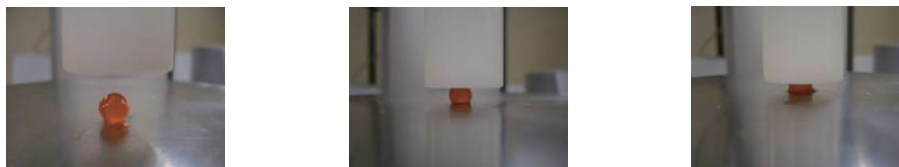| Test mode	Compression test (One egg from the salmon roe is placed on the compression plate and subjected to compressive loads.)
Test speed	10 mm/minute (constant speed)
Stroke	3 mm (Stroke to crush roe after compression.)
Ambient temperature	20 ˚C
Ambient humidity	60 %

Fig. 2 Overview of Texture Testing of Salted Salmon Roe

■ **Test Results**

Each of the two samples was subjected to multiple tests. Table 3 shows the mean values of the hardness and breaking strength results.

Fig. 3 shows the test force-stroke curves for typical samples.

Table 3 Test Results

Sample Name	Hardness (N)	Breaking Strength (MPa)
A	0.54	0.02
B	1.38	0.08

* Hardness: Maximum test force under compression
   Breaking strength: Maximum stress calculated from maximum test force and size of the egg
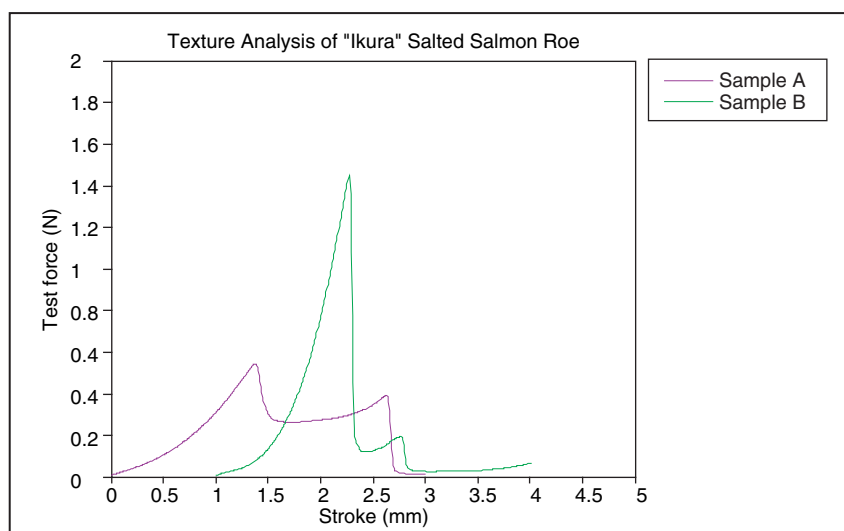

Fig. 3 Test Force-Stroke Curves for Typical Samples

These curves indicate that Sample A achieves over twice the hardness and breaking strength values of Sample B. Differences in the failure process of roe are also apparent.

These differences are sensed as differences in texture, which can be difficult to express. Therefore, numeric quantification offers the advantage of providing an indicator for the quantitative comparison of food textures.