

Application Data Sheet

No. 12

EZTest Compact Table-Top Universal Tester

Material Testing & Inspection

Evaluation of Food Texture

Introduction

Universal Design Foods is a term for foods that have been designed with consideration to texture or being easy to eat, and which can be used for everything from everyday meals to nursing-care foods. In Japan, with its rapidly aging society, a variety of nursing-care foods are currently available, and such meals must be suitable for patients.

The Japan Care Food Conference has established the Universal Design Foods concept, which is classified into 4 categories by hardness and viscosity. In this article, we introduce a system for measuring hardness. F. Yano

Measurements and Jigs

Fig. 1 shows a schematic diagram of the test jigs used to evaluate the texture of foods. A cycle of compression and unloading is used to measure the hardness. Table 1 shows the relationship between the categories and the hardness upper limit values.

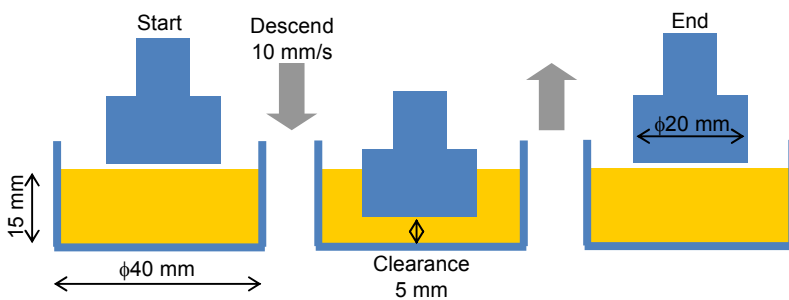


Fig. 1: Schematic Diagram of Universal Design Food Hardness Test

Table 1: Universal Design Food Categories and Upper Limit Values

Category	Hardness Upper Limit (N/m ²)
1 (Easy to chew)	5×10 ⁵
2 (Can be broken up using the gums)	5×10 ⁴
3 (Can be broken up by the tongue)	Sol: 1×10 ⁴
	Gel: 2×10 ⁴
4 (Does not need chewing)	Sol: 3×10 ³
	Gel: 3×10 ³

Measurement Results

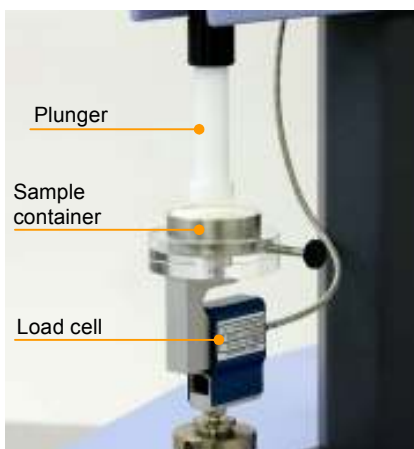


Fig. 2: Food Test Evaluation Jigs

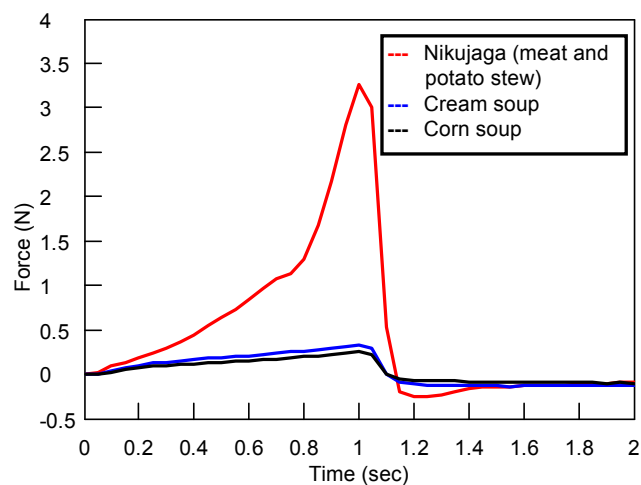


Fig. 3: Food Test Evaluation Results

Table 2: Test Conditions

Item	Set Value
Test Speed	10 mm/s
Clearance	5 mm
Test Temperature	20 °C

Table 3: Results for Food Hardness and Categories

Sample	Hardness (N/m ²)	Classification
Nikujaga (meat and potato stew)	1.04 × 10 ⁴	2
Cream soup	1.07 × 10 ³	4
Corn soup	0.81 × 10 ³	4

Food Hardness Evaluation System

Tester: EZ-SX
Load Cell: 50 N
Test jig: Universal Design Food Test Set
Software: TRAPEZIUM X Texture
Thermostat: Thermo-constant cooler/heater (separately installed)

TRAPEZIUM X



EZTest Compact Table-Top Universal Tester

Features

- Light and compact
The compact size fits easily on tables. Testing can be performed in a corner of the office.
- A high-precision load cell is adopted. (The high-precision type is class 1; the standard-precision type is class 0.5.)
Accuracy is guaranteed over a wide range, from 1/500 to 1/1 of the load cell capacity. This supports highly reliable test evaluations.
- Jog controller (optional)
This allows hand-held control of the crosshead position. Fine position adjustment is possible using the jog dial.
- TRAPEZIUM X Texture operational software
This is the optimal software for a variety of pharmaceutical and cosmetic quality evaluations and physical characteristics measurements, as well as food texture measurements. It can create flexible control patterns and data processing items specific to foods, including hardness, brittleness, and energy.
- A wealth of specialized jigs
Supporting the many needs of our customers with special jigs and applications for a number of fields, including foods, pharmaceuticals, electrical machinery & electronics, and plastics.

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