

Texture Measurement of Cooked Rice in Soup

Introduction

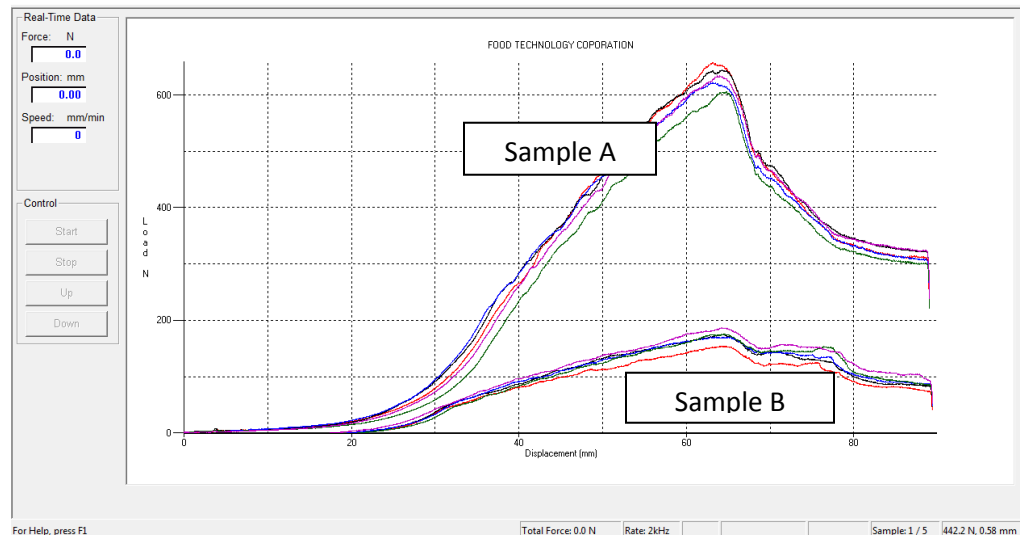
The texture of cooked rice is a very important quality characteristic for both processors and consumers. For the producer, texture is an indication of the correct processing parameters being applied to the raw product. Over time the incoming raw product can change dramatically and a process recipe that is correct one day can produce undesirable results on another day. Over processing will produce a product that is too soft, while under processing will cause the grains to be too hard. Both of these conditions can be undesirable traits for consumers. The ability to consistently and objectively measure texture and relate it to sensorial characteristics is an invaluable capability in controlling the process.



Test Parameters

Samples “A” and “B” were provided in both a large 26 ounce can and a smaller 12 ounce can. Both Sample A and Sample B, from each size can, were prepared for testing in exactly the same way. After being rinsed, the samples were allowed to stabilize at room temperature, (73 deg. F). For each sample test replication, the test cell was level filled to capacity without packing down the product. The tests were performed using the FTC Model TMS-Pro Texture System, equipped with a 2500 Newton (500 lb) load cell and the Model CS-2 Thin Blade Shear Compression Test Cell. The CS-2 was used due to the small particle size of the rice. The testing speed was set to 178 millimeters per minute (7 in/min.) and the travel distance to a displacement of 89mm (3.5 in.).

Graphic Comparison of Samples “A” and “B” Cooked Rice Shear Compression Testing



Data Results from Cooked Rice Shear Compression Testing

	Sample A		Sample B	
	26 oz	12 oz	26 oz	12 oz
	Peak Force	Peak Force	Peak Force	Peak Force
Units	N	N	N	N
Sample 1	669	657	141	163
Sample 2	581	645	139	183
Sample 3	671	622	133	179
Sample 4	635	606	141	184
Sample 5	*	634	140	195
Average	639	633	139	181
Std. Dev.	42 (6.6%)	20 (3.1%)	3 (2.1%)	12 (6.6%)

**Not enough product to perform a fifth test for 26 oz. Sample A*

Conclusions

The test data show significant and repeatable differences in the texture of the samples. The two samples had a standard deviation that was well within 10% of the average. The standard deviation is an indicator of the variability within the individual product samples.

The maximum or “Peak” force is viewed as an important measurement in food texture analysis and is typically an indicator of the firmness of the product. In this case, one can see that there is a substantial difference in the firmness of Samples A and B which the graph illustrates this quite well. The variation between the two different sizes of each sample is less significant and in the case of sample B, probably due to cook variations in the retort process. While being able to objectively measure these characteristics is important, repeatability of the results is equally important due to inherent variability that comes with measuring a biological product like food.

The large differences in the peak force readings and low level of standard deviation indicate that this test methodology is a valid and repeatable texture evaluation for this type of product.

While these tests were all performed with the TMS-Pro Texture System, similar results could be produced by using any the FTC Texture Systems set up similar equipment.