

Texture Measurement of Processed Carrots

Introduction

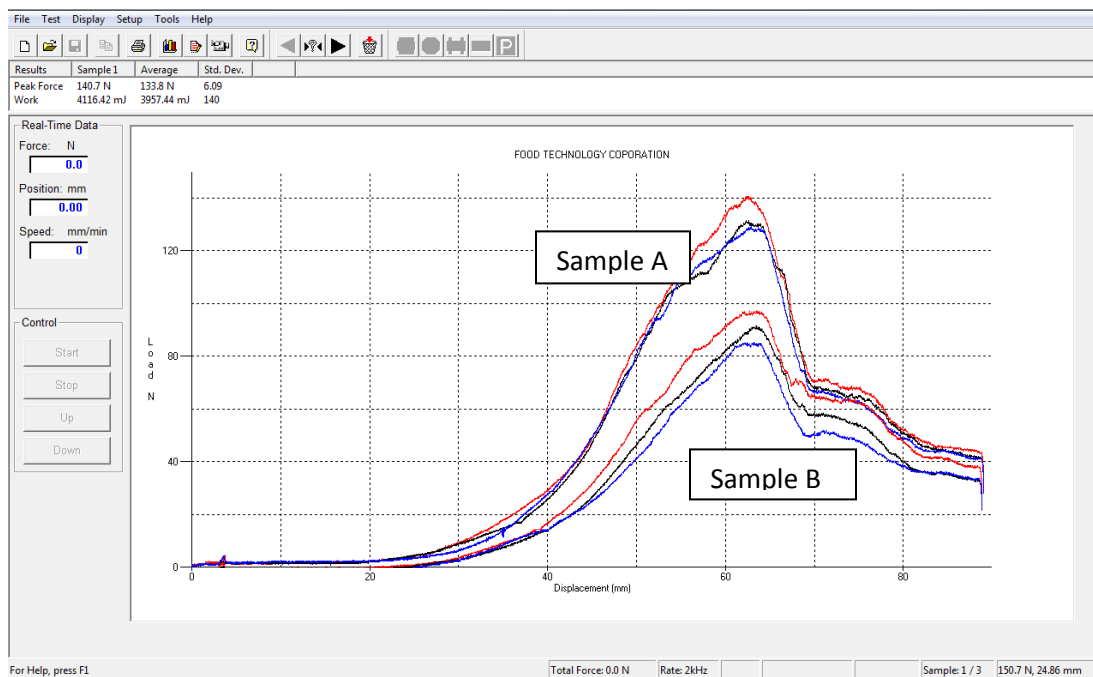
The texture of any canned or processed food is a very important quality characteristic for both processors and consumers. Carrots are no different. For the producer, texture is an indication of the correct processing parameters being applied to the raw product. Due to the change over time the incoming raw product can undergo, 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 product to be too hard. Both of these 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

Two samples of carrots were submitted for testing marked “A” and “B”. The carrot samples were actually one of the ingredients in a soup product. Both Sample A and Sample B 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, 100 grams of carrots were picked out of the soup product that had been rinsed. Broken carrot pieces were discarded. The tests were performed using the FTC Model TMS-Pro Texture System, equipped with an FX-2500 Newton load cell and the Model CS-1 Standard Shear Compression (Kramer) Cell. 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” Carrot Shear Compression Testing



Data Results from Carrot Shear Compression Testing

	Chicken and Noodle Soup		Beef Soup	
	Sample A	Sample B	Sample A	Sample B
	Peak Force	Peak Force	Peak Force	Peak Force
Units	N	N	N	N
Sample 1	144	119	141	100
Sample 2	129	110	132	95
Sample 3	141	118	129	89
Average	138	116	134	95
Std. Dev.	8 (5.7%)	5 (4.5%)	6 (4.5%)	6 (6.3%)

Conclusions

The test data show that there was a significant and repeatable difference in the texture of Samples A and B from both the Chicken and Noodle and the Beef Soup products. This is illustrated quite well by the graph on the previous page. The two different samples had a standard deviation that was within 10% of the average. The standard deviation is an indicator of the variability within the individual product. While there was a small difference between the samples from the two soups, there was a much more significant difference between the two samples.

Peak force is viewed as one of the more important characteristics of food texture measurement. In this case, it is a direct indicator of the firmness of the carrots. While being able to objectively measure these characteristics is important, the capability to repeat the results is just as valuable. This is crucial in controlling inherent variability that comes with measuring a biological product like carrots.

The level of standard deviation between test replications of the same product, 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.