

## Texture Measurement of Canned Baked Beans

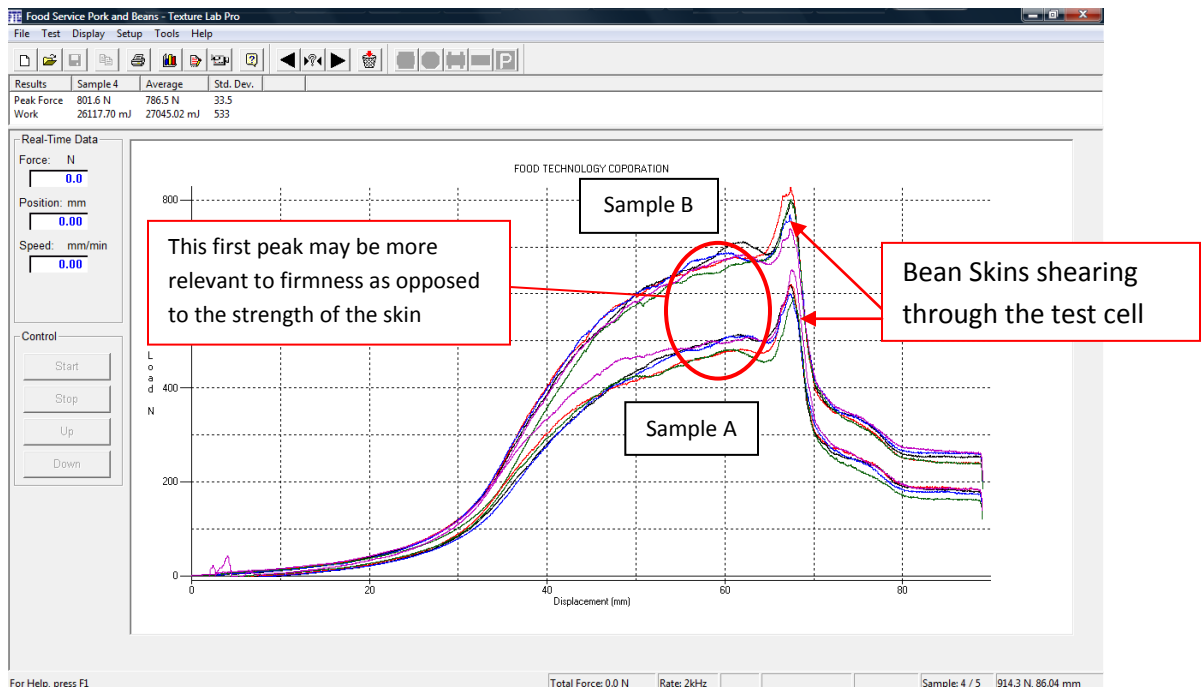
### Introduction

The texture of baked beans 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 beans 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 baked bean product were submitted for testing marked “A” and “B”. 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, the test cell was filled to level capacity without packing down the product. 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” Baked Bean Shear Compression Testing**



**Data Results from Bean Shear Compression Testing**

	<b>Sample A</b>		<b>Sample B</b>	
	Peak Force	Work	Peak Force	Work
Units	N	N.mm	N	N.mm
Sample 1	637	23496	826	27278
Sample 2	650	23830	797	27308
Sample 3	660	23972	768	27434
Sample 4	628	20603	711	24847
Sample 5	627	20655	802	26118
Sample 6	608	20386	739	27087
Sample 7	658	22254	698	24431
Sample 8	644	21282	713	24593
<b>Average</b>	<b>638</b>	<b>22059</b>	<b>756</b>	<b>26137</b>
<b>Std. Dev.</b>	<b>17 (2.7%)</b>	<b>1530 (6.9%)</b>	<b>48 (6.3%)</b>	<b>1321 (5.0%)</b>

**Conclusions**

The test data show that there was a significant and repeatable difference in the texture of the two products. 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. For example, when looking at the data for the beans; one can see that Sample B had a standard deviation significantly higher than Sample A. The reason for this may be that the individual beans in Sample A were much more uniform with fewer splits and skins, which may be reflected by the smaller standard deviation.

Peak force is viewed as one of the more important characteristics of food texture measurement. In this case, it is the indicator of the firmness of the beans. Work, or the area under the curve is also important. This is how much effort the texture analyzer applied to each sample in the deformation. As one can see on the graph above, the peak force may be more of an indication of the firmness of the skin of the bean, not the bean itself. While being able to objectively measure these characteristics is important, the capability to repeat the results is equally important. This is crucial in controlling inherent variability that comes with measuring a biological product like food. 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 as long as the same test cell and test speed are used.*