

Determination of the Characteristics of South Eastern US Shrimp Through Sensory Analysis

This study was conducted by Dr. Marge Condrasky and David Howell, both of the Food Science & Human Nutrition department at Clemson University. The purpose of this study was to establish the attributes of southeastern shrimp. These attributes will then be used to highlight the shrimp for marketing to chefs and consumers (tourists).

Abstract

The objective of this study was to determine differences in characteristics of southeastern shrimp (frozen and fresh) and imported shrimp (from Ecuador). This objective was accomplished through sensory work. Three different shrimp samples were used in this experiment. Two of the samples were from the southeastern (SE) United States (from South Carolina). One was frozen; the other was fresh. The third sample used was an individually quick frozen (IQF) shrimp imported from Ecuador. Four sensory taste panels were run, two using chefs (expert panel) and two using Clemson faculty (consumer panel). The first two panels were conducted using all three shrimp types served cold and without seasoning. The second two panels were conducted using all three shrimp types served in a low-country recipe created for this project. Many cooking methods were tested (sauté, boiling, grilling, and steaming) in an effort to determine the best way to prepare the shrimp; the best was found to be steaming. Compilation of the data revealed certain predominant characteristics for each shrimp.

Results

Steamed Shrimp – Expert Panel

Attribute	SE Frozen	SE Fresh	IQF Imported
<i>Aroma</i>			
Strength	5.01	5.59	5.69
Pleasant	6.10	5.18	5.66
Ocean	5.27	5.78	5.21
<i>Texture</i>			
Firmness	7.21	5.20	5.74
<i>Flavor</i>			
Flavorful	5.84	4.48	5.35
Sweet	4.35	3.35	4.83
<i>Appearance</i>			
Color	6.60	5.17	5.78
Shape	6.29	6.22	5.62
Marking	6.24	5.55	5.72
<i>Preference</i>	51.16%	16.28%	32.56%

Table 1: Results from Panel #1 (Expert Panel). All results are graded on a scale of 0-9, 0 being the least favorable and 9 being the best.

There were no significant differences (NSD) between the shrimp samples for aroma, shape, or marking. SE Frozen shrimp received the highest score for texture. The SE frozen shrimp also received the highest score for flavor. The imported shrimp received the highest score in sweetness. SE Frozen

received the highest score for color. SE Frozen were preferred over the other two samples. SE shrimp (as a total) were preferred 67.5%, while only 32.5% of the chefs tested preferred the imported.

Steamed Shrimp – Consumer Panel

Attribute	SE Frozen	SE Fresh	IQF Imported
<i>Aroma</i>			
Strength	5.73	5.03	5.44
Pleasant	5.61	5.27	6.35
<i>Texture</i>			
Firmness	6.24	5.53	7.00
<i>Flavor</i>			
Flavorful	4.92	5.47	5.59
<i>Appearance</i>			
Color	6.14	6.14	4.96
Shape	5.86	5.76	6.51
<i>Preference</i>	20.41%	31.63%	47.96%

Table 2: Results from Panel #2 (Consumer Panel). All results are graded on a scale of 0-9, 0 being the least favorable and 9 being the best.

SE Frozen shrimp had the strongest aroma, while imported possessed the most pleasant aroma. It was found that the imported shrimp received the highest score for texture. The imported also received the highest score for having the most flavor. The question regarding sweetness was not asked of the consumer panel. SE Frozen received the highest score in terms of color. In terms of appearance, the imported were found to have the most curl out of the three samples tested. Imported shrimp in this case were preferred over the other two samples. SE shrimp (as a total) were preferred 52%, while 48% of the consumers tested preferred the imported shrimp.

Recipe Shrimp – Expert Panel

Attribute	SE Frozen	SE Fresh	IQF Imported
<i>Texture</i>			
Firmness	5.16	7.21	6.63
<i>Flavor</i>			
Flavorful	5.03	5.63	5.85
Compliment	5.30	5.95	6.03
<i>Appearance</i>			
Color	4.69	6.95	5.51
Of Dish	4.69	6.65	5.59
<i>Overall</i>	5.12	6.06	6.24
<i>Preference</i>	19.51%	34.15%	46.34%

Table 3: Results from Panel #3 (Expert Panel). All results are graded on a scale of 0-9, 0 being the least favorable and 9 being the best.

Because there was no significant difference among the data collected for aroma, the attribute was excluded from the recipe taste panels. The SE Fresh shrimp received the highest score for texture. The imported received the highest score for having the most flavor. A new question was asked regarding how well the shrimp complemented the dish. The imported shrimp complemented the dish best. SE Fresh received the highest score in terms of color. In terms of appearance, the SE Fresh were found to look the best in the prepared recipe. Imported shrimp in this case were preferred over the other two samples. SE shrimp (as a total) were preferred 54%, while 46% of the consumers tested preferred the imported shrimp.

Recipe Shrimp – Consumer Panel

<u>Attribute</u>	<u>SE Frozen</u>	<u>SE Fresh</u>	<u>IOF Imported</u>
<i>Texture</i>			
Firmness	6.18	5.79	7.56
<i>Flavor</i>			
Flavorful	6.40	6.77	6.56
Compliment	6.57	6.80	6.73
<i>Appearance</i>			
Color	6.30	5.21	7.27
Of Dish	7.02	6.80	7.25
<i>Overall</i>	6.86	7.01	6.92
<i>Preference</i>	35.44%	35.44%	29.11%

Table 4: Results from Panel #4 (Consumer Panel). All results are graded on a scale of 0-9, 0 being the least favorable and 9 being the best.

Imported shrimp received the highest score for texture. The SE Fresh received the highest score for having the most flavor. SE Fresh shrimp best complemented the flavor of the dish. The imported shrimp received the highest color score and looked best in the prepared recipe. Both the SE Fresh (35%) and SE Frozen (35%) were preferred over the imported shrimp (29%) for a total of 70% preference in favor of SE shrimp.

Additional work

Headspace and texture testing will also be done on the shrimp. These tests will show if there is a correlation between the sensory characteristics that were liked and disliked for each shrimp and the characteristics found through technical testing. The data collected from both the sensory panels and the lab testing will be used by the Parks, Recreation and Tourism department to help market SE shrimp to tourists and local chefs.

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