

# Combining Taste Panels with Focus Groups to Elicit Consumer Preferences Toward a New Shrimp Product

Ferdinand F. Wirth, Laura R. Garrido, Kathy J. Davis, and W. Steven Otwell

Demand for seafood in the U.S. far exceeds the amount produced by U.S. commercial fishermen and aquaculture producers. This shortfall in domestic supply varies widely by product but is most severe for fish blocks, tuna, and shrimp. Shrimp is very popular in the United States; by volume, shrimp is second only to canned tuna as the leading seafood consumed by the American public. Because of shrimp's high price compared to tuna, shrimp is the most valuable seafood product consumed in the U.S., accounting for about 19 percent of the total value of U.S. seafood consumption in 1998 (USDA, 1999). Over 70 percent of the U.S. shrimp supply is imported, primarily from South America and Southeast Asia.

The U.S. shrimp-farming industry has been expanding rapidly in Florida and other Southern states in response to the excess market demand for shrimp. In the past, expansion of commonly practiced brackish-water marine-shrimp aquaculture in Florida and other Southern states has been constrained by high coastal-land prices, competing uses of coastal land, and concerns over potential environmental damage to sensitive coastal ecosystems. One viable candidate shrimp species for large-scale culture in Florida appears to be the Pacific white shrimp, *Litopenaeus vannamei*, because of its market popularity, fast growth, adaptability to diverse salinities, and its large size. Recently, researchers successfully acclimated this species to hard freshwater; much of the groundwater in central and south Florida and other Southern states contains the correct mineral balance to support this species. Farmers with hard freshwater wells are now able to successfully raise shrimp from post-larvae to commercial market size in inland locations, paving the way

for the development of a marine-shrimp industry inland in freshwater.

Shrimp farmers wish to harvest and market their shrimp as quickly as possible, generally as live or fresh head-on shrimp. One proposed marketing channel—especially during the early stages of shrimp culture industry development—is for U.S. shrimp farmers to market their products directly to consumers. However, potential direct-consumer food markets for live and fresh head-on farm-raised shrimp are unknown. This study was conducted to evaluate acceptability to consumers of the appearance, aroma, flavor, texture and overall likeability of freshwater-farmed marine shrimp versus domestically wild-harvested and imported farm-raised products, and to provide shrimp farmers with the consumer-preference information needed to develop successful direct marketing strategies.

## Materials and Methods

A taste panel consisting of 100 Florida consumers used paired-preference testing to compare and evaluate samples of Florida freshwater farm-raised Pacific white shrimp versus two traditional shrimp products: brackish-water, farm-raised Ecuadorian white shrimp, *Litopenaeus vannamei*, and wild-harvested East Coast white shrimp, *Litopenaeus setiferus*, both purchased frozen from local retail stores. Consumer preference or acceptance was measured for appearance, flavor, texture, moistness, overall like, and perceived value. All ratings were based on a 9-point hedonic scale, where 1 = extremely dislike and 9 = extremely like. The sensory ratings for each attribute were subjected to analysis of variance using SAS. The model included the effects of panelist and product, and Duncan's multiple-range test was used to separate the means when a significant (0.05 level) F-value was obtained.

Following completion of the taste panels, 30 of the consumers then participated in one of three focus groups structured to explore Florida consumer

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Ferdinand Wirth and Kathy Davis are, respectively, assistant professor and coordinator of economic analysis, Food and Resource Economics Department, Institute of Food and Agricultural Sciences, University of Florida. Laura Garrido and Steven Otwell are, respectively, seafood specialist and professor, Florida Sea Grant, University of Florida.

attitudes and preferences concerning shrimp in general and freshwater farm-raised Pacific white shrimp, *Litopenaeus vannamei*, in particular. Focus groups are widely used in market research to assess consumer attitudes and preferences, and can be used to develop a thorough understanding of consumers' behavior, preferences and perceptions, and decision-making processes for food products and services. Focus groups are also a useful tool for clarifying a potential research problem area and more fully developing the full context and nature of a perceived problem or research topic (Sterns and Ricks, 1999).

There were five objectives for the consumer focus groups: identify shrimp characteristics important to consumers, investigate consumers' shrimp-purchasing behavior, explore consumers' attitudes about farm-raised versus wild-harvested shrimp, compare perceptions of Florida farm-raised Pacific white shrimp raised in freshwater to imported shrimp and wild shrimp, and determine consumers' willingness to pay for farm-raised shrimp.

The focus groups ranged in size from 8 to 12 participants, with a total of 30 participating consumers. Before each focus group the participants were asked to provide some basic demographic information. Following completion of the pre-group questionnaire, participants were led by a focus-group moderator through a series of open-ended questions designed to elicit the participants' shrimp preferences, attitudes, and purchase behavior. The responses of the three groups have been aggregated

through content analysis for this summary, although it should be noted that the questions asked in each group were not precisely the same. Each focus group lasted approximately 90 minutes, and at the conclusion of each focus group, participants were given \$25.00 each for their participation.

## Results and Discussion

### Consumer-Acceptance Evaluations

In the paired-difference taste test between the Florida freshwater-raised versus imported Ecuadorian brackish-water farm-raised Pacific white shrimp, 64 of the 100 panelists preferred local freshwater farm-raised white shrimp while 36 indicated preference for the imported shrimp. The difference between Ecuadorian whites and the Florida freshwater shrimp was found to be large by 24 panelists; 41 found the difference to be moderate, and 35 indicated a slight difference. In the evaluation against the wild-harvested East Coast shrimp, 60 panelists preferred the Florida freshwater-raised while 40 found the East Coast whites better. The difference between the freshwater farm-raised white shrimp and the wild harvested white shrimp was found to be large by 25 panelists, moderate by 41 panelists, and slight by 34 panelists.

In the consumer-acceptance tests the Florida freshwater-raised shrimp scored the highest in all areas tested (Table 1). They were found to have the best aroma, appearance, flavor, moistness and tex-

**Table 1. Consumer Perceptions toward *Litopenaeus* Shrimp Species from Three Sources: Mean Ratings (1 – 9 hedonic scale) and Duncan Grouping.**

| Attribute   | Freshwater Farm-raised |                 | Brackish-Water Farmed Ecuadorian |                 | Wild-Harvested East Coast |              |
|-------------|------------------------|-----------------|----------------------------------|-----------------|---------------------------|--------------|
|             | Mean Score             | Duncan Grouping | Mean Score                       | Duncan Grouping | Mean Score                | Duncan Score |
| Grouping    |                        |                 |                                  |                 |                           |              |
| Aroma       | 5.96                   | A               | 5.74                             | A               | 5.31                      | B            |
| Appearance  | 7.25                   | A               | 6.16                             | B               | 5.87                      | B            |
| Flavor      | 6.64                   | A               | 6.24                             | A               | 5.66                      | B            |
| Moistness   | 6.84                   | A               | 7.1                              | A               | 6.46                      | B            |
| Texture     | 6.85                   | A               | 6.38                             | B               | 6.30                      | B            |
| Likeability | 6.87                   | A               | 6.51                             | A               | 6.05                      | B            |
| Value       | 4.87                   | A               | 4.47                             | AB              | 4.12                      | B            |

ture for all samples tasted. Consumers also scored freshwater shrimp the highest for "likeability" and indicated that the shrimp had a fair market price compared to the wild-harvested shrimp.

### Consumer Focus Groups

Participants in the three focus groups first discussed their shrimp-purchase behavior during the preceding month. Of the 30 participants, 21 (70 percent) had purchased shrimp in a restaurant, 18 (60 percent) in a supermarket, 6 (20 percent) in a seafood store, and 1 participant reported purchasing shrimp from a boat. Most described their shrimp purchases as planned, often for special occasions. Shrimp purchases tend to be motivated by price, size, freshness, appearance, convenience, and nutritional value (B-vitamins, low fat, oils). Occasional impulse purchases are motivated by an attractive presentation, fresh appearance, and good price.

The focus-group participants then discussed their shrimp-purchase selection criteria. Shrimp are judged by their price, size, color, and by the cleanliness of the store. When asked how they judge shrimp quality, participants suggested that quality is judged on the basis of price, appearance, and size. It is important to note that lightness of color is considered an indicator of freshness in raw shrimp. This is significant because raw farm-raised shrimp are relatively dark compared to wild-harvested shrimp. Some participants also noted that a high-quality shrimp product should have no brown spots. A medium-sized shrimp was preferred by most of the participants.

The focus-group participants engaged in a comparison of cooked and raw Pacific white shrimp from three sources: freshwater-farm raised, Ecuadorian brackish-water farm-raised, and East Coast wild-harvested. The deep bright-orange color of the cooked Florida freshwater farm-raised Pacific white shrimp was striking to the focus-group participants. The color was attractive and had better eye-appeal than the other types. The participants indicated that the freshwater farm-raised Pacific white shrimp would look good in a display case because they looked cleaner and fresher. The shrimp from the other two sources looked pale in comparison. The bright-orange color of the cooked freshwater farm-raised Pacific white shrimp represents a distinctive product-differentiating feature that may confer a

competitive advantage to the Florida freshwater farm-raised Pacific white shrimp.

The dark color, which was a positive product attribute for the cooked Florida freshwater farm-raised Pacific white shrimp, was a negative attribute for the raw shrimp. The raw Florida freshwater farm-raised Pacific white shrimp were a dark blue-green color, much darker than the raw shrimp from the other two sources. The focus-group participants considered the raw Florida freshwater farm-raised to be too dark. The dark color would discourage purchase since participants equated darker shrimp with older shrimp. The participants indicated that they look for a lighter color. These findings suggest that in-store displays of Florida freshwater farm-raised Pacific white shrimp should highlight cooked shrimp rather than raw shrimp, at least in the early stages of industry development when consumers are unfamiliar with the product.

Finally, participants were asked several questions designed to elicit their willingness to pay for whole fresh Florida freshwater farm-raised shrimp. The questions were phrased as a series of price scenarios, with participants indicating whether or not they would pay certain amounts for shrimp with different product features. Fifty percent (50 percent) would pay \$1 more per pound for Florida farm-raised shrimp tails versus wild or imported tails. Participants clearly preferred fresh (never frozen) shrimp and were willing to pay a price premium for shrimp that have never been frozen. Participants expressed varying degrees of resistance to the purchase of head-on shrimp. Almost all of the participants indicated that they would not like to buy whole shrimp because they would be paying for waste and would have more work and preparation time. However, the majority indicated a willingness to purchase head-on shrimp if the price per pound was \$2 per pound less than for tails.

### Conclusions and Recommendations

The consumer-acceptance evaluations and focus-group results suggest that there is excellent consumer-market potential for cooked, never-frozen Florida freshwater farm-raised Pacific white shrimp tails at a premium price. Shrimp farmers will receive the most favorable market acceptance if they process their product into tail form before selling the shrimp to consumers. However, many consum-

ers familiar with the product should also be willing to purchase whole shrimp at a slightly discounted price. Each shrimp farmer will have to compare his own costs versus returns for both whole shrimp and shrimp tails before choosing the product form which yields the highest profit margin.

Marketing and promotion of the Florida freshwater farm-raised Pacific white shrimp should emphasize the bright-orange cooked color and the sweet flavor of the shrimp. Marketing in supermarkets should consist of displays of pre-cooked tails rather than raw product. Restaurant menu items should also emphasize the color and flavor and include shrimp cocktails and salads. These shrimp should probably not be highlighted in restaurant

recipes with spicy sauces, such as shrimp etouffee and shrimp Creole, that would mask the shrimp's flavor.

### References

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