

**ASSESSMENT STUDIES FOR POST-HARVEST (PHP) OYSTERS:**

**Part 2. Buyer and Seller Assessments**

- **Buyer Focus Groups**
- **Buyer Willingness to Carry Survey**
- **Experimental Economic Market**

Joint Project conducted for the  
Interstate Shellfish Sanitation Conference (ISSC)

by

\*\* William L. Huth<sup>1</sup>, O. Ashton Morgan<sup>2</sup>, David M. Bruner<sup>2</sup>, David M. McEvoy<sup>2</sup>,  
Felicia N. Morgan<sup>1</sup>, Richard J. Sjolander<sup>1</sup>, Christopher S. Burkart<sup>1</sup>, and Richard Hawkins<sup>1</sup>

<sup>1</sup>University of West Florida and <sup>2</sup>Appalachian State University

Final Report

**ASSESSMENT STUDIES FOR POST-HARVEST (PHP) OYSTERS:**

**Part 2. Buyer and Seller Assessments**

**TABLE OF CONTENTS**

TABLE OF CONTENTS..... 1

ACKNOWLEDGEMENTS ..... 2

EXECUTIVE SUMMARY ..... 3

SELLER FOCUS GROUPS ..... 8

    Methods ..... 8

    Results – Seller Focus Groups ..... 10

    Taste Comparisons ..... 11

SELLER WILLINGNESS TO CARRY SURVEY ..... 14

    Methods ..... 14

    Results - Seller Willingness to Carry Survey ..... 16

EXPERIMENTAL ECONOMIC MARKETS..... 24

    Methods ..... 24

    Results – Experimental Economic Markets ..... 28

REFERENCES ..... 37

ATTACHMENTS..... 40

APPENDIX 1 ..... 63

# **ASSESSMENT STUDIES FOR POST-HARVEST (PHP) OYSTERS:**

## **Part 2. Buyer and Seller Assessments**

### **ACKNOWLEDGEMENTS**

A number of people helped in the production of this research report and without their collected efforts and assistance this research report would not have been possible. Thanks go to Juanita Johns and Barbara Partrick at the University of West Florida (UWF) who provided administrative and purchasing support for the project; Cheryl Allen and Carol Rafalski at UWF who provided IRB assistance and sponsored research contract support; Scott Bartel, with Fire Fish Video who provided video and audio production support for the focus groups in Orlando; Stacy Noeth, with Sensible Transcription who provided audio transcription services; Mike Derozier, with Peg Leg Pete's Restaurant who provided expert oyster shucking services; Grady Leavins, Leavins Seafood who provided oysters and advice for early economic experiment tasting; Tommy Ward, Buddy Ward and Sons Seafood, Inc. who provided oyster product for the focus groups and the economic experiment; David Heil, Florida Department of Agriculture and Consumer Services for guidance in several aspects of the research; and Kristen Dominguez, a graduate research assistant at UWF for Excel help and logistic assistance with the economic experiment. Finally a special thanks to Dr. Steve Otwell and Victor Garrido at the University of Florida for handling the raw oyster harvesting and post-harvest processing logistics and to Dr. Greg Martin at Northern Kentucky University for his advice regarding the supplier survey process.

# **ASSESSMENT STUDIES FOR POST-HARVEST (PHP) OYSTERS:**

## **Part 2. Buyer and Seller Assessments**

### **EXECUTIVE SUMMARY**

The Interstate Shellfish Sanitation Conference (ISSC) and the U.S. Food and Drug Administration (FDA) combined to commission a comprehensive look at the potential for using seafood processing technology to manage public health issues that arise from the consumption of Gulf of Mexico oysters during the warmer months of the year. The FDA proposal would require that oysters harvested during the April through October period from the Gulf of Mexico and destined for the raw (half-shell) market be post-harvest processed (PHP) using one of four FDA approved processing technologies. The ISSC was informed of the FDA intent to require PHP by a letter to its membership at the ISSC October 2009 biennial meeting.

In response to the proposal, FDA and ISSC contracted with Research Triangle Institute International (RTI) to examine the supply side implementation of PHP production technologies in the industry and with the University of Florida to examine demand side consumer acceptance in the marketplace. The University of Florida (UFL) focused on the sensory aspects associated with consumer acceptance of a PHP product and the University of West Florida (UFW) was tasked with examining the economics of consumer willingness to purchase and seller willingness to carry PHP product. The UFW segment of the research effort comprised an economic examination of the supply side of the market to measure seller willingness to carry PHP oysters as a part of their product line and an examination of the demand side of the market to measure consumer willingness to pay for PHP oysters as substitutes for traditional raw product.

To measure supplier willingness to carry, focus groups were held at a major food service trade show in the southeast. Trade show exhibitors and attendees were recruited and participated in 90 minute audio and video recorded focus groups where raw oysters approximately seven days from harvest in Apalachicola Bay, FL were sampled. Portions of the harvest had been subjected to the various PHP processes. Participants tasted all PHP types along with traditional processed oysters while completing a taste survey. After the tasting, they participated in a facilitator led discussion of the experience. The discussion focused on the tasting experience, perceived consumption risk, consumer PHP acceptance, PHP characteristics, and industry impacts from the FDA proposed restrictions. To support the qualitative focus group findings a quantitative survey was developed and administered online to the population of exhibitors and attendees at the same trade show that indicated an interest in seafood as a part of their registration. These efforts addressed the required research objectives and the UFW research group will be continuing research along this line by sampling food service trade show attendees in California. California

implemented the restrictions proposed by the FDA in 2003 and, as a result, might be able to provide additional information associated with regulatory change on consumer preferences. Muth et al. 2011 mention anecdotal evidence from California that PHP sales increased but were unable to find any additional information regarding impacts in the marketplace. It is anticipated that the California portion of the UWF market supply study will be completed by the end of summer 2011.

Results from the supply side analysis of supplier willingness to carry PHP product suggest the following:

- Focus group participants felt that regulatory change was inevitable given the nature of government but that a preferred solution would be to allow consumers the freedom to choose between both traditional and PHP product in the marketplace. Without the FDA restriction the seller survey indicated a willingness of sellers to offer both PHP and traditional product at the lower price points (\$.25 and \$.60) and when a seller PHP “demand” curve was developed it appeared that sellers might be induced to carry PHP via a subsidy.
- Focus group participants were concerned about the risk to consumers from raw oyster consumption and indicated that as a favorable attribute of PHP product. This was also supported by the seller survey where a majority of participants (56%) indicated that risk reduction was an important characteristic of PHP product.
- Focus group participants, after having sampled both traditional and PHP oysters, generally agreed that they would be acceptable to consumers but were concerned with market related aspects regarding price and marketing. This finding was supported by the seller survey data where respondents overwhelmingly (70%) suggested their consumers were sensitive to prices and that regarding PHP characteristics the PHP price relative to traditional was important (70%). The seller survey results from willingness to adopt as cost changed also indicated that suppliers were sensitive to their raw material costs and would negatively respond to price increases.
- Focus group participants were mixed about the impact of the proposed restrictions on the industry. Several suggested they would switch to PHP and others said they would switch sources. Seller survey results were more direct and when asked about the impact of the FDA proposal on their business only 17% suggested it would be positive.
- Seller survey purchase intentions with and without the FDA regulatory change over the warm (April through October) and cold (November through March) months indicated no statistically significant differences for PHP oysters. That is sellers did not indicate that they were likely to increase their purchases of PHP in response to the FDA restriction. Both traditional raw and shucked product purchase intentions changed significantly before and after the restrictions with reductions in likeliness to purchase from April through October and increases in the November to March period.

- The seller survey indicated that 40% would change their source for oysters, 21% would stop serving traditional raw product, and 39% would serve PHP as raw.

The demand side of the economic question about PHP was examined using an experimental economic market. Willingness to pay for PHP oysters was measured by creating an experimental market for oysters at UWF. Four different markets were created at UWF on September 16, 2010, one market for each of the four different PHP technologies. Upper division and graduate students along with faculty and staff were recruited for the experiments using the UWF email messaging and electronic announcement systems. From the interested participants 30 research participants were signed up for the 4 sessions. Oysters for the experiment were from the same Apalachicola summer season harvest that was used for the focus group tasting and the UFL sensory assessment. The focus group tasting was with oysters that were 7 days post-harvest and the oysters used for the economic experiment were 10 days post-harvest. The UFL sensory testing used oysters at both a 7 and 14 days post-harvest.

Research participants arrived, completed a survey, and then engaged in an exercise to elicit their preferences for risk. The participants then received instruction in the auction mechanism and completed a practice round. After that they participated in four successive bidding rounds each for a half dozen oysters (3 traditional, and 3 a particular type PHP). The first round was based on individual participant subjective beliefs and established a baseline price for the two oyster types. Between the two rounds the research participants tasted both oyster types; they were provided a single oyster to taste and rate and then another single oyster to taste and rate. After the consumption experience they were informed as to the oyster types and asked to bid so that the only additional information that they had was the oyster taste. Once second round bids were in the participants were provided a third round bid card with specific information regarding the risk of raw oyster consumption (an IRB informed consent was completed prior to the experiment that contained a standard menu warning about raw protein consumption). The actual risk measure used was based on prior research and the research participant was informed that the average oyster consumer faces a risk of 1 in 50,000 of becoming ill every time he or she consumes an untreated raw oyster. After bidding took place in the third round participants received a final fourth round bid card with information about the particular type of PHP processing technology that was used for their oysters. After the fourth round a particular round was randomly selected and the n-1 highest bidders paid the nth highest price (see steps 6 and 7 in Attachment 8). Each participant then purchased oysters of either type and was served what they paid for with standard restaurant condiments. After consumption participant payments were tabulated and paid accordingly from their initial dollar endowment; average earnings across all participants net of their oyster payments was approximately \$20.

The main findings from the portion of the study were:

- Initially, there was not a statistically significant difference between mean bids for PHP and traditional raw oysters. That is consumer willingness to pay was the same for both oyster types.

- After tasting each oyster type, the mean bid for the PHP oyster declined significantly and substantially across all PHP types. On average, research participant valuations indicated that PHP oysters were less preferred relative to traditional product from a willingness to pay perspective.
- After receiving information about the risk of illness the mean bids for PHP increased and the mean bid for traditional raw oysters declined and the declines were statistically significant. Consumers were willing to pay more for PHP and less for traditional oysters after receiving foodborne illness risk information but the increase was not enough to remove the premium of traditional raw over PHP that resulted from the tasting.
- The mean bids did not change significantly after receiving more information about the particular post-harvest processing technology that was used for the PHP oyster.
- Information about specific post-harvest processing technology increased the discount but not significantly.

Overall the results from this portion of the research indicate that while consumers find PHP product acceptable they appear to be unwilling to pay a premium for it. Sellers also seem to find the product acceptable but generally express an unwillingness to carry the product.

These conclusions were based on a warm month harvest from the Gulf of Mexico. Harvest during other months with differing water temperatures that are known to influence the composition and sensory character of oysters could alter the results.

# ASSESSMENT STUDIES FOR POST-HARVEST (PHP) OYSTERS:

## Part 2. Buyer and Seller Assessments

### Introduction

The Interstate Shellfish Sanitation Conference (ISSC) and the U.S. Food and Drug Administration (FDA) combined to commission a comprehensive look at the potential for using seafood processing technology to manage public health issues that arise from the consumption of raw oysters, *Crassostera virginica* harvested from the Gulf of Mexico during the warmer months of the year. One proposed option would require that oysters harvested during the April through October destined for the raw (half-shell) market would be post-harvest processed (PHP) using one of several FDA approved technologies. These technologies have been previously validated in accordance with established ISSC and FDA protocol for appropriate reductions of the potential pathogenic *Vibrio* bacteria. The oyster processing sectors were informed of the FDA intent to require PHP by a letter to the ISSC membership during the October 2009 biennial meeting.

In response to the proposal, FDA and ISSC contracted with Research Triangle Institute International (RTI) to examine the supply side consequences from the implementation of PHP production technologies in the industry and with the University of Florida (UFL) to examine demand side consumer acceptance in the marketplace. UFL focused on the sensory aspects associated with consumer acceptance of a PHP product and the University of West Florida (UFW) was charged with examining the economics of consumer willingness to purchase and seller willingness to carry PHP product. The UFL and UFW work was linked through the common use of a single area and single oyster harvest time from Apalachicola Bay (Table 1). The harvest site and time was arranged to assure a homogenous group of raw oysters that could be used in comparison trials, displays, and group discussions. A strict chain of product custody was maintained from the moment of harvest through all experiments to assure original product identity and typical product quality through refrigerated storage.

The UFW segment of the research effort was comprised of an economic examination of the supply chain to measure seller willingness to carry PHP oysters as a part of their product line and an examination of the demand side of the market to measure consumer willingness to pay for PHP oysters as substitutes for traditional raw product.

The UFW work assessed buyer responses to PHP oysters using two complementary methods:

**Seller Focus Groups** - that involved product displays, tasting, information, and subsequent group discussions to compile impressions, opinions, and advice, and a

**Seller Willingness to Carry Survey** – an email survey for buyer opinions regarding the purchase and sale of PHP oysters.



**Table 1.** Illustration of the work schedule from harvest through respective processing methods and eventual consumer and expert assessments. Oysters, *Crassostera virginica* for traditional (T) processing were collected simultaneously during each harvest September 6 and 7 (Harvest site – Apalachicola Bay, Florida site designation FL-1632 L-525)

Days in storage	Post-Harvest Processing (PHP) Methods			
	HP	LTF	GI	MH
0	Harvest and refrigeration		Harvest & transported to Panama City, FL - Iced and processed (stored at 0°F)	Harvest & transported to Panama City, FL - Iced
1	Transport to Houma, LA - Iced	Transported to Mulberry, FL - Iced	Transported to Gainesville, FL – Dry ice	Processed and transported to Gainesville, FL - Iced
2	Processed and transported to Gainesville, FL - Iced	Processed and transported to Gainesville, FL - Iced	Frozen storage (0°F)	Refrigerated storage (35°F)
	Refrigerated Storage (35°F)			
7	Day 7 Consumer & Expert Sensory Assessments (UFL)		Day 7 Consumer & Expert Sensory Assessments (UFL)	
7-8	Seller Focus Groups (Orlando)			
10	Experimental Economic Markets (UWF)			
14	Day 14 Sensory Evaluations & Expert Evaluations		Day 14 Sensory Evaluations & Expert Evaluations	

Key: HP – high pressure; LTF – low temperature freezing; GI – gamma irradiation ; MH – mild heat

The UWF work also assessed consumer demand for PHP oysters using experimental economic markets. These markets were staged auctions with actual bidding that was influenced by consumer product perceptions as they received progressive information that addressed various oyster product attributes including risk.

## SELLER FOCUS GROUPS

### Methods

Formal focus groups were used to determine seller subjective preferences for PHP oysters versus traditional raw oyster products using product displays for informal seller assessments and discussion. The focus groups were arranged to document retail/restaurant acceptance,

preferences, and willingness to carry PHP product. The selected setting was the Florida Restaurant and Lodging Show (FRLS) held September 12-14, 2010 in the Orange County Convention Center in Orlando. Given the project requirements to align the focus groups with the availability of the particular PHP oysters (7-8 days post-harvest; Table 1) there was only a one week period available for recruiting participants. This forced on-site recruiting at the trade show, but still, the potential participants represented a wide selection of food service experience concentrated in one location. The focus group participants represented chefs, buyers, and owners from wholesale, retail, and restaurant operations predominantly from the eastern United States (mainly the southeast).

Focus group participants were recruited during the opening day of the trade show through visits with on-site exhibitors who were offering seafood products at the show and attendees that stopped by a UWF recruitment booth on the show floor. The recruitment process involved asking individuals if they ate raw oysters and, if so, proceeding with other qualification items and finally confirming their participation in one of two sessions (see recruitment scripts, Attachment 1). The qualifying questions were intended to assure participants who were 1) currently or recently involved in the purchase of seafood or oysters for a business (i.e., a chef, a buyer, a restaurant owner); 2) willing to eat five types of “raw” and PHP oysters and talk about the experience; 3) available at the Restaurant Show for a pre-determined 90-minute period; 4) not “at risk” due to health reasons; and 5) able to accept a \$100 honorarium incentive for participation. A total of 21 individuals were recruited, qualified, and assigned to a focus group. Each participant was given a reservation card with the date, time, and location for the focus group session and asked to contact the investigators if they could not participate. The target number for each focus group was five to ten participants.

Two focus group sessions were conducted during the late morning and early afternoon on the second day of the trade show to maintain consistency with the refrigerated shelf-life of the oysters. The 90 minute sessions (30 minutes for tasting and 60 minutes for a group discussion) were held consecutively for each separate group starting at 10:00AM and 1:00PM, respectively. The protocol for the 90-minute group sessions included the sequence of: 1) introductions; 2) participants receive information on PHP oysters; 3) participants tasting five versions of “raw” and PHP oysters and completing a taste survey; and 4) participants engaged in a facilitated, video and audio recorded, focus group discussion about their tasting experience and the PHP oysters in general.

The sessions were conducted in a rented space arranged for product display and group discussions. A 1,000 sq. ft. conference room (310B) was partitioned into three areas: a shucking and food preparation area, an oyster tasting area with tables arranged in restaurant fashion, and additional tables for the focus group discussion. Immediately prior to the start of each focus group, oysters were shucked (shucking was just being completed as the early participants began arriving) and plates with crushed ice were set up with two traditional oysters and one each of the four different PHP oyster types. The oysters were clearly labeled on the plates as TRAW (T,

traditional raw), COLD (LTF, low temperature freezing), HOT (MH, mild heat treatment), PRESS (HP, high pressure, HP), and RAD (GI, gamma irradiated).

When the group was in place, the focus group facilitator welcomed them and provided each participant with a clipboard containing documents and forms for the session. The forms included, a taste survey, Institutional Review Board (IRB) informed consent, a video release, and a receipt for the \$100 honorarium provided to each participant (Attachments 2-4). Next the participants were given a brief introduction to the research project and post-harvest processing methods and then asked to taste the oysters (see Attachment 5 for the PHP information). The participants were instructed to fill out a survey form during the tasting in which they were asked questions about the tasting experience, a sample Oyster Focus Group Product Comparison Sheet (Attachment 6). For each oyster type (T, LTF, MH, HP, and GI) the research participant was asked about appearance (e.g. color), aroma, plumpness, flavor, texture and mouth feel, saltiness (salinity), and aftertaste. In each instance they responded using a 7-point likeability scale labeled from Very Good (1) to Very Bad (7) so that smaller values indicate a more favorable ranking. The research participants were allowed to reference their product comparison sheet during the subsequent focus group discussion. The entire tasting experience was video and audio recorded with permission and a release.

As participants finished their tasting surveys, they were invited to move to the tables set for the facilitated discussion. All participants were seated at this table by the end of the designated 30 minute tasting and information period. The discussion began with a question regarding the participants' expectations about the taste of the various types of oysters as compared to their tasting experience. That discussion was followed by the questions and issues included in the protocol. To meet the requirements of the research Statement of Work, the protocol for the facilitated discussion part of the session included questions that addressed 1) prior expectations about the taste of the different oysters compared with the actual taste; 2) the risks associated with the consumption of traditional (untreated) raw oysters and the importance to the participants of mitigating that risk; 3) the acceptance level(s) of PHP oysters in the marketplace in general and for their customers in particular; 4) the likely impact on retailers and restaurants of the various factors associated with carrying PHP oysters such as the monetary and non-monetary costs, shucking, shelf life, and seasonality; 5) the likely impact of the proposed FDA ban of traditional "raw" Gulf oysters from April 1 through October 31 on the willingness of retailers and restaurants to carry PHP oysters; and 6) a summary of the participants' opinions of the various types of PHP oysters (most acceptable; least acceptable; their own opinions and consumers' likely opinions).

### **Results – Seller Focus Groups**

There were 21 participants recruited and 11 attended the focus group sessions (5 at the 10:00AM and 6 at the 1:00PM session). The focus groups comprised a diverse set of individuals from various segments of the seafood industry. All of the participants ate raw oysters and either

made or influenced seafood purchase decisions for their respective firms, with the exception of one advanced culinary student. The sample of seafood professionals included both wholesale and retail employees. The groups consisted of sales managers for seafood wholesalers in Florida and the northeast, each with more than 20 years of experience; four Florida chefs with an average of 20 years work experience; two mid-western restaurant owners with at least 20 years' experience each; two food service managers with between 10 and 30 years' experience; and one culinary student from Florida.

### Taste Comparisons

Table 2 data is aggregated for the taste comparisons over all 11 participants from both focus groups. Once finished with the tasting questions regarding product appearance (e.g. color), aroma, plumpness, flavor, texture and mouth feel, saltiness (salinity), and aftertaste, they were asked for 'Overall Acceptance' for each post-harvest processed oyster. Finally they were asked which post-harvest processed product was their favorite and which was their least favorite. As can be observed from the mean responses listed in the table, the focus group participant tasting summary results across the various attributes resulted in the high pressure treated oyster (HP) being ranked highest followed by traditional raw (T), irradiated (GI), cool pasteurized (MH), and finally frozen (LTF). Virtually all of the participants found the traditional raw product acceptable, all but one found the high pressure treated product acceptable, and all but two found the irradiated product to be acceptable. It should also be noted that a majority of the participants found all the post-harvest products to be acceptable. Finally the high pressure treated oyster was ranked as the most favored followed closely by the traditional raw oyster. Only one participant each indicated that the irradiated and frozen oysters were their favorite and no one listed the pasteurized oyster as their favorite. From a statistical perspective it should be emphasized that this was a qualitative study that gathered ordinal data with a small sample size and results are reported simply to summarize the attitudes and opinions for the group of 11 focus group participants and are not intended to be used as a generalization to a larger population.

**Table 2.** Combined Focus Group Oyster Tasting Descriptive Statistics Results (N=11) based on ratings for likeability from very good (1) to very bad (7). Key: T- traditional; LFT-low temperature freezing; MH-mild heat; HP-high pressure; and GI-gamma irradiation

	T	LTF	MH	HP	GI	Mean	Std. Dev.
Appear	2.545	3.182	2.636	2.091	2.273	2.5454	0.416578
Aroma	2.727	2.818	2.818	2.909	3.000	2.8544	0.103756
Plump	3.455	3.182	2.727	2.000	2.273	2.7274	0.606559
Flavor	2.636	3.000	3.273	2.727	2.909	2.9090	0.249214
Texture	2.273	2.636	3.091	2.273	2.818	2.6182	0.354296
Salt	2.182	3.091	3.182	2.727	2.727	2.7818	0.394186
Aftertst	2.545	3.091	3.182	2.545	2.909	2.8544	0.299057

Mean	2.623286	3.000	2.987	2.467429	2.701286
	0.414801	0.203482	0.254304	0.349702	0.304593

**Product Acceptance**

	Yes	No
T	11	0
HP	10	1
GI	9	2
LTF	8	3
MH	6	5

	Product Ranking	
	Favorite	Least Favorite
HP	5	T 3
T	4	MH 3
GI	1	LTF 2
LTF	1	HP 2
MH	0	GI 1

Focus Group Discussions

Once the product tasting portion was complete the research participants were reassembled around a table for a discussion of the taste experience along with a general discussion of PHP oyster acceptability in the marketplace. Each focus group discussion was both audio and video recorded. After the FRLS, the recordings were converted to a DVD and given to a transcriber who converted the audio portion of each focus group into text. The transcriptions were then examined and summarized to produce a set of excerpts that might provide a deeper insight into the robustness associated with each focus group discussion. The combined responses from each group are condensed for each of the six primary focus group knowledge area questions. A selected and annotated version of the group responses is arranged per question in Appendix 1.

*Question 1: What were your expectations about the taste of the different oysters and how did the actual taste compare with what you expected? Probed for overall impression of the types.*

Of the PHPs, pressure treated (HP) received the most favorable mentions across the groups and irradiated (GI) was viewed as the least favored across the groups. When saltiness as a favorable attribute is taken into consideration, cold (LTF) was also perceived unfavorably, with four mentions across the groups.

*Question 2: When you consider the risks associated with eating traditional raw oysters, how well do PHP oysters reduce this risk? How important is it for you in your business to mitigate or reduce this risk?*

Risks are known and are an important issue in selling raw oysters to most end customers. Reducing or mitigating the risks via the use of PHP oysters was generally viewed as favorable.

*Question 3: How well-accepted would PHP oysters be in the marketplace, in general, and by your customers, in particular?*

There was a moderate level of agreement among participants across Groups 1 and 2 that PHP oysters, in general, would be accepted in the broader marketplace. However, the culture, profile, and preferences of the final user were identified as important determinants of the degree of PHP oyster acceptance. Marketing issues such as the amount and content of information provided to end users should be carefully addressed. There was a general level of agreement that PHP oysters were acceptable for consumption.

*Question 4: What is the likely impact on retailers and restaurants of the various factors associated with carrying PHP oysters such as monetary and non-monetary costs, shucking, shelf life, and seasonality?*

There was general agreement that the additional costs that might be associated with carrying and offering PHP oysters would be a factor for consideration. Certain intermediaries might be able to pass on potential premiums to end customers, but that would depend on geographic location and end user consumption profiles and preferences. Not everyone was in agreement that the market would accept a higher price for PHP oysters as compared with traditional raw oysters. Several participants suggested that just the opposite might be the case; a premium for traditional raw. The research participants suggested that garnering end user acceptance would require a combination of education, marketing (including point-of-purchase presentation and the shucking “show”), and cost considerations. They also indicated that, ultimately, the acceptance of PHP oysters in the broader marketplace might just be a matter of time.

*Question 5: What will be the likely impact of the proposed FDA ban on traditional raw (T) Gulf oysters from April 1 through October 31 on the willingness of retailers and restaurants to carry PHP oysters?*

There was no consensus across the groups as to the likely effects of the proposed FDA ban. Several participants indicated that they would attempt to procure traditional raw oysters from other regions, even at a premium price. Other respondents indicated that over time the ban and PHP oysters would come to be accepted in the marketplace. Several respondents across groups indicated that they would purchase some type of PHP oyster during the months in which the ban is in effect. The specific types mentioned included cold (LTF), and pressure treated (HP). Some respondents indicated that they thought costs would go up. Another suggested response to the

ban was a stimulus to aquaculture; to farm-raise bacteria-resistant oysters that could be served as traditional raw (T).

*Question 6: A summary of participants' opinions of PHP oysters.*

There was not a firm consensus across the groups as to preferences for the various types of PHP oysters even though pressure treated (HP) was mentioned most frequently either in a positive light or as a favorite. Participants across both groups provided a strong indication that they are highly driven by end user perceptions and behavior.

## **SELLER WILLINGNESS TO CARRY SURVEY**

### **Methods**

A quantitative seller survey (see Attachment 11) was developed and implemented to further assess the willingness of supply chain firms to carry post-harvest processed oysters. The qualitative results from the focus group were used to frame questions for the survey. Combining qualitative and quantitative methods has been termed pluralistic research in the marketing research literature, Burns and Bush (2010), and helps to produce more robust results. This combined approach served to provide further support for the results from the focus group qualitative assessment of buyer willingness to carry PHP product.

The survey was developed in the Qualtrics survey research and development environment. The online survey was implemented using an email list from Reed Exhibitions, the vendor that managed the 2010 Florida Restaurant and Lodging trade show in Orlando where the focus group participants were recruited. The email list was a subset of 2,340 exhibitors and attendees, generated from their 10,000 plus participant database that indicated a seafood interest in their registration information. That list was leased from Reed for two electronic mailings, an initial one on April 11, 2011 and a follow-up one on April 22, 2011. Both emails received by potential respondents were from the "Reed Family of Foodservice Events" and the subject line for the first emailing was "FDA Oyster Ban Survey" and "FDA Oyster Ban Survey: Last Chance" for the follow-up. The email message itself qualified the candidates for participation:

*Hello,*

*The University of Florida and the University of West Florida have been tasked by the Interstate Shellfish Sanitation Conference (ISSC) to measure seafood industry opinions and attitudes concerning raw oysters and a proposed restriction on the sale of Gulf of Mexico oysters that is being considered by the U.S. Food and Drug Administration (FDA).*

*If your organization currently (or might in the future) purchases, sells, or serves raw (half-shell) oysters from the Gulf of Mexico and you are in a position to make seafood*

*purchasing decisions for your organization then we would appreciate it if you would help by giving us your input about this important national policy decision.*

*If your firm purchases oysters, but you do not make purchasing decisions for your organization, please forward this email to someone who does. The survey will take less than 5 minutes to complete and will provide needed information from professionals in the seafood industry.*

*Please click on the following link to begin the survey..... **link**....*

Clicking the link took the research participant to a welcoming screen:

*Thank you for taking a look at our request for your input. We are asking for your help with a research project that was funded by the Interstate Shellfish Sanitation Conference (ISSC) to measure seafood supplier willingness to offer post-harvest processed Gulf of Mexico oysters to consumers. The U.S. Food and Drug Administration (FDA) is currently considering a requirement that all Gulf of Mexico oysters destined for the raw (half-shell) market harvested from April through the end of October be post-harvest processed using one of several approved methods.*

*We are university researchers interested in gathering market information from professionals like yourself to help with a national policy decision that is currently facing the FDA and that will influence the national market for oysters.*

*Your participation in this survey is voluntary and your responses will be kept anonymous. You are free to quit your participation at any time. It should take less than 5 minutes to complete the survey. Thanks again for your help with this important project. The first few questions gathered information about the research participants and the organizations they were working in.*

Initially information was collected about the research participant's organization type, location, and size; their job title; and years both in the industry and in their current position. Participants were also asked to indicate the portion of their business that was seafood and the portion of their seafood business that involved both traditional and post-harvest processed (PHP) oysters. Research participants were also asked to indicate their level of knowledge about PHP and their anticipated oyster purchases in the absence of any seasonal restrictions from the FDA.

Specific information was then provided to each participant about the proposed ban and consumer acceptance of PHP product. The exact script presented was:

*There is a risk to people with health issues (liver problems, diabetes, immune deficiencies) from consuming raw oysters from the Gulf of Mexico. The risk is due to a naturally occurring bacterium (*Vibrio vulnificus*) that is present in warm saline waters, especially during summer months. While healthy individuals are not affected,*



*approximately 20 at-risk people die annually from Gulf of Mexico raw oyster consumption.*

*The FDA has approved several "post-harvest processing" (PHP) methods that have been proven to eliminate *V. vulnificus* risk in raw oysters. The FDA is currently considering a requirement that all Gulf of Mexico oysters destined for the raw, half-shell, market from April through October be post-harvest processed. This processing comes at a cost but reduces risk to at risk consumers (it eliminates the risk of death). It also makes for easier and safer shucking, and in some cases results in longer shelf life.*

*A taste test study at the University of Florida has suggested that consumers find PHP oysters acceptable although there was still a preference for the traditional raw product. Focus group results from individuals like you indicated a supply chain willingness to include PHP product given an FDA requirement. We would like to ask you a few questions about the willingness of oyster retailers and wholesalers to include PHP oysters in their product lines.*

After the information treatment the research participants were asked to indicate the importance to sellers associated with various characteristics of PHP product including shucking, consumer risk, and price. They were then asked about their oyster customer price sensitivity and the typical prices that their business paid and received for oysters. Once this information was in place, PHP cost data from the Muth et al. (2011) study was used to develop a randomized cost increase per dozen oysters purchased by the seller. Increases of \$.25, \$.60, and \$1.00 per dozen oysters were randomized over the participants and then they were asked about a PHP adoption decision in the absence of an FDA requirement for PHP. The choices were yes they would adopt and sell only PHP oysters, yes they would adopt a combination of PHP and traditional raw, and no they would not adopt PHP and continue to sell traditional raw. The participant was subsequently asked what they would do if the FDA seasonal restriction was put in place with the same cost and price assumptions as in the previous question. The options this time were to change their source of oysters, serve PHP as half-shell, or stop serving half shell completely. Then each participant was asked for their maximum willingness to pay and expected selling price with and without the proposed FDA restriction. Each research participant was re-asked their intentions to purchase raw, shucked, and PHP product over the 7 month and 5 month seasonal periods that would be in place with the FDA ban on Gulf of Mexico oysters in place. The final question asked the research participant to assess the impact of the proposed FDA requirement on their business.

### **Results - Seller Willingness to Carry Survey**

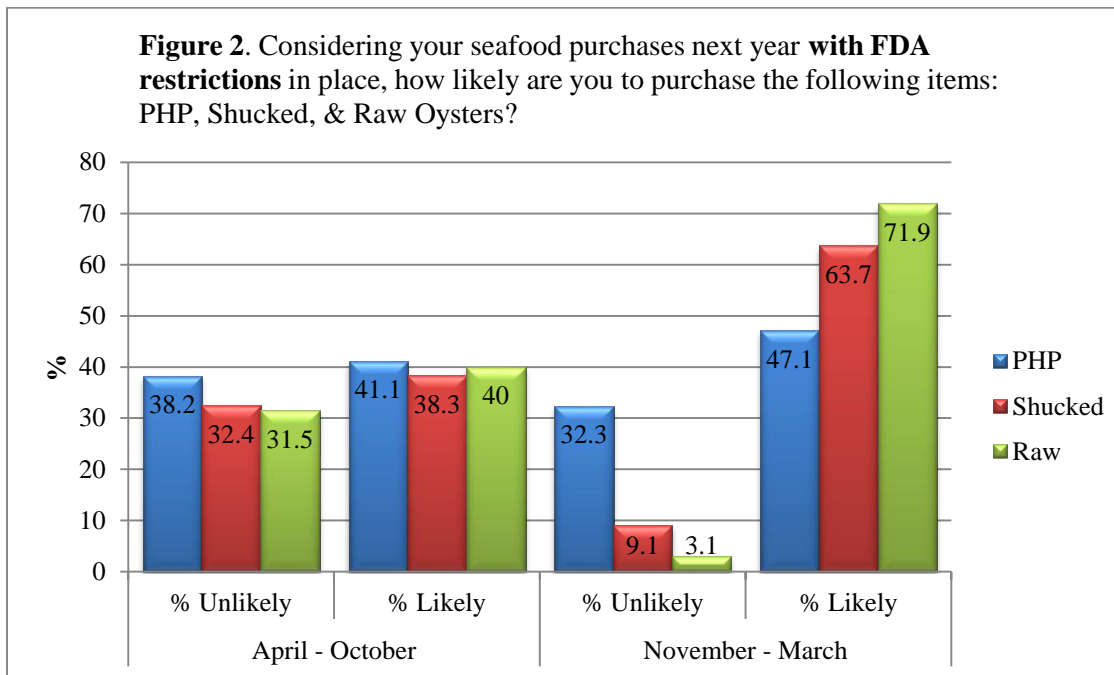
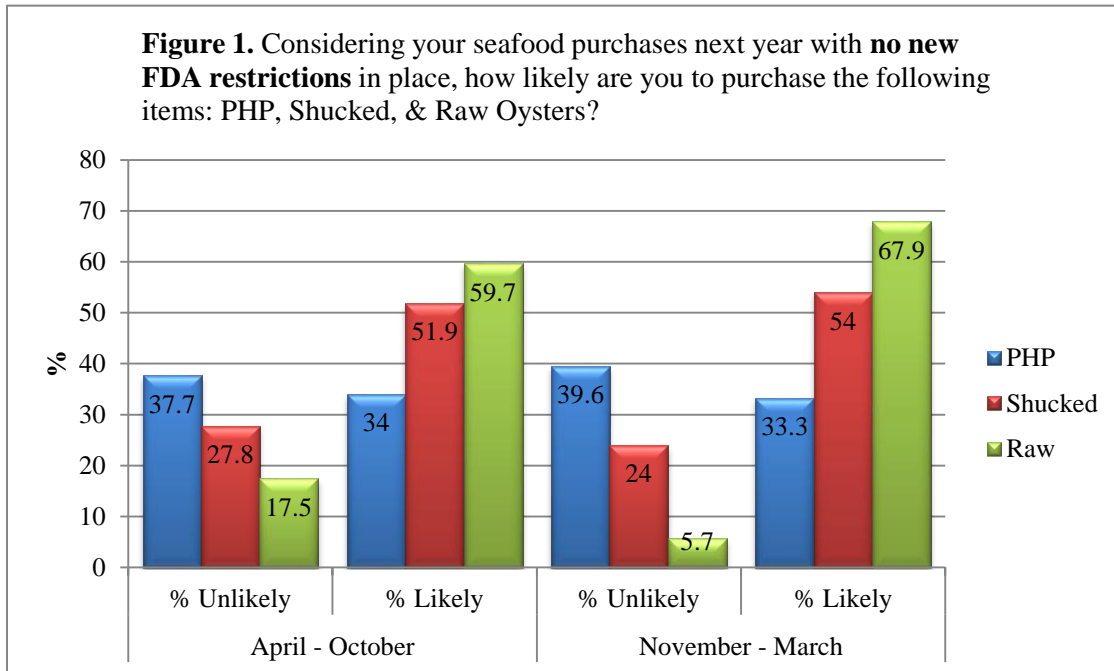
A total of 61 responses were completed and usable. There were a large number of rejects where potential participants did not respond to large segments of the survey. It appeared that many who were not qualified clicked the survey link anyway and then answered a few of the

beginning questions and then quit responding when the questions asked began to require specific domain knowledge. The analysis below is based on 61 participants mainly from restaurants (67%) with the remainder divided up among retail, wholesale, and institutional food service. With regard to job title the responses were evenly divided among four general categories: Chef, Owner, Director, and Management. Examples included culinary director, director of purchasing, general manager, Chef de Cuisine, owner/operator, oyster bar owner, and so forth. The research participants in the sample had a mean of 27.2 years in the seafood industry and 13.2 years in their present position. Approximately 38% of the research participants worked in organizations with more than 80 employees and the remaining participants worked in organizations with an average of 34 employees. The median monthly volume of raw half shell product handle by the research participant's organization was 275 pounds and there were 10 responses indicating over 3,000 pounds per month. The average portion of monthly business activity involving seafood was 58% and of that business activity approximately 14% was raw (half-shell) oysters. When the research participants were asked about their knowledge of PHP oysters only 16% disagreed with the statement "I am knowledgeable about PHP oysters" while 49% agreed. When the participants were asked what percent of their average monthly oyster sales were PHP, 35% indicated zero and 8% indicated 100%. The average PHP percent of the 57% participants in between the two all or none extremes was 30%.

The respondents were asked twice about their expected seafood purchase behavior in two different periods of the coming year. The first period was the seven months from April through October that include the warmer months of the year and correspond to the time period for the proposed FDA restrictions and the second period spanned the remaining five months from November through March during which the restrictions would be lifted. The first question asked for the composition among traditional raw, shucked, and PHP oyster purchases under a status quo scenario with no FDA restrictions in place. After the research participants were provided with the risk information noted above, the same question was asked under a scenario with the proposed FDA restriction in place.

Without an FDA imposed restriction (Figure 1) over the seven months from April through October, 37.7% and 34% of the respondents indicated they were unlikely and likely, respectively, to purchase PHP oysters. With the imposed restriction (Figure 2) there was not much change in the PHP purchase stated preference, 38.2% unlikely and 41.1% likely. A McNemar test was run to test the differences in the paired proportions and there was not a significant difference in PHP purchase intentions with the FDA requirement in either time period. The results suggest that sellers may not be willing to increase the portion of PHP in their product lines. Regarding intentions to purchase traditional raw in the absence of the FDA requirement over the April through October period, 17.5% and 59.7% of the research participants indicated that they were unlikely and likely to purchase, respectively (see Figure 1). With the restrictions over the seven month period in place, purchase intentions for traditional raw product were 31.5% unlikely and 40% likely (see Figure 2). The decline in traditional raw willingness to purchase was statistically different before and after the regulatory change over the warm weather

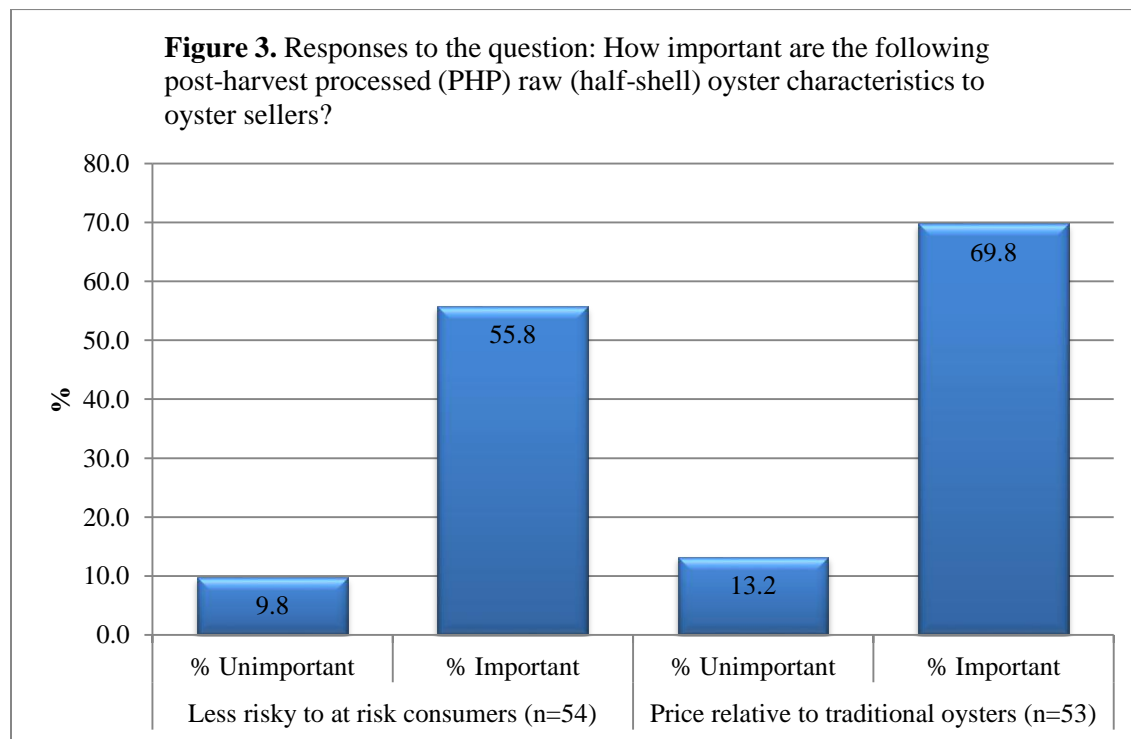
time frames at better than a .01 significance level. There was also a statistically significant increase in willingness to purchase traditional raw during the cool month period that might well



indicate a shifting of purchase intentions from the warm months to the colder ones. The same finding was evident for shucked product as well with a statistically significant (.01 level of significance) reduction across regulatory regimes along with a shift in purchasing to the colder, November to March period. While the proposed restrictions will not apply to shucked product that intention might not have been clear to the survey participants and may indicate a need for clarification to sellers. The lack of a change in the likely purchase percentages of PHP before and

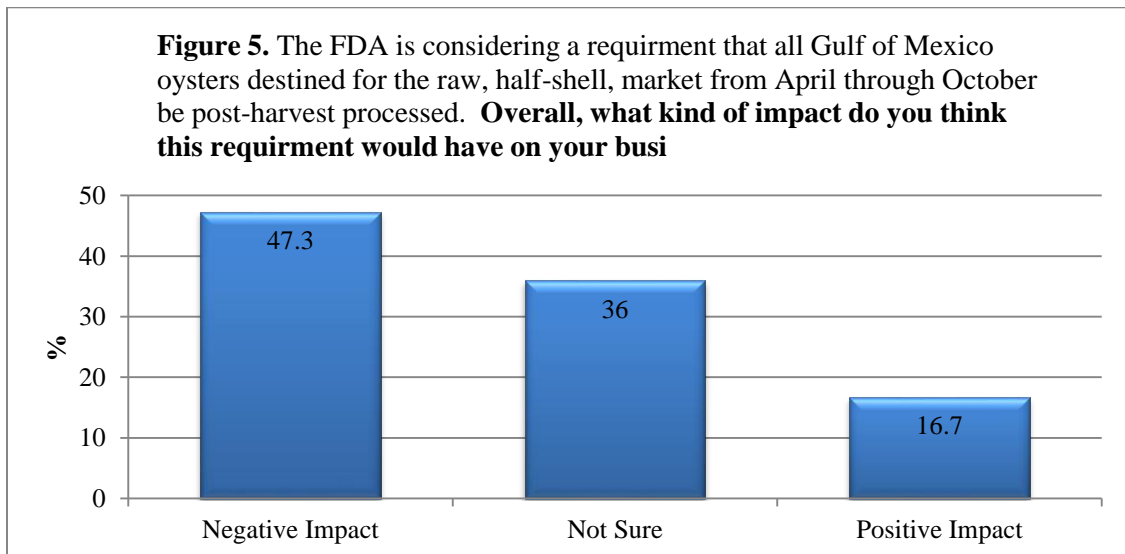
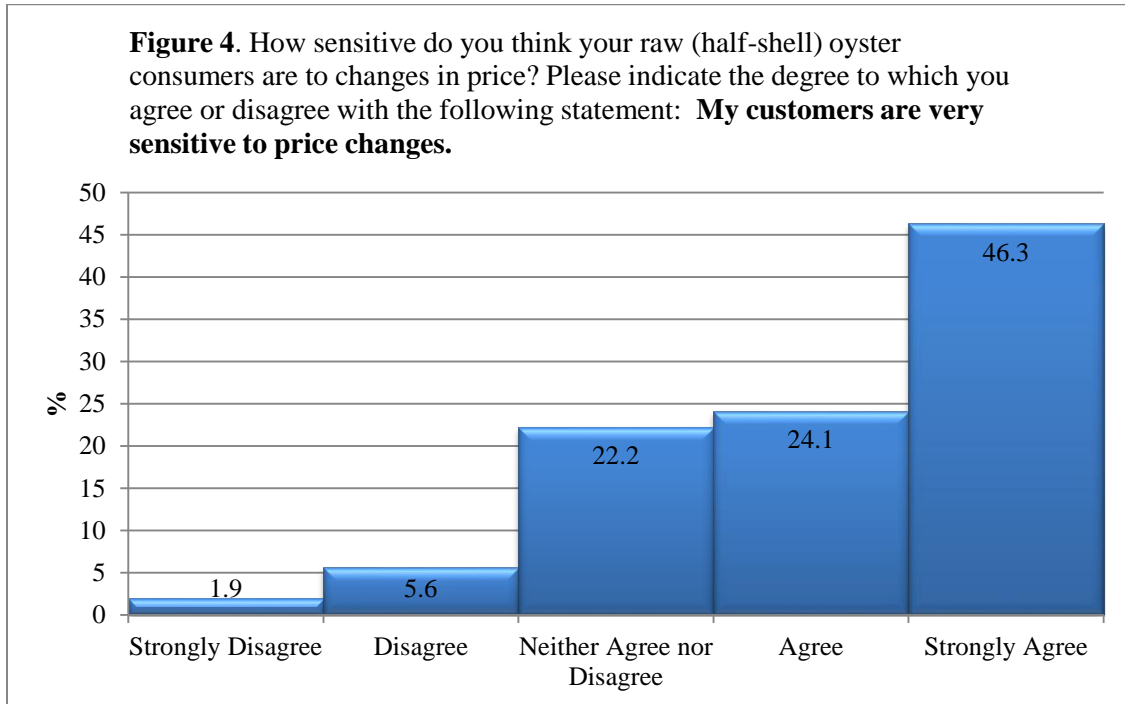
after the imposition might indicate that the participants not already dealing in PHP would either shift to other non-Gulf sources, simply drop half shell product over the restricted period, or shift factor demand to the cooler months.

Research participants were asked to indicate “How important to raw (half-shell) oyster sellers do you think the following post-harvest processed (PHP) characteristics are?” The listed characteristics were easier to shuck, less chance of injury while shucking, less risky to at risk consumers, and price relative to traditional oysters and responses ranged from unimportant to very important on a balanced 5-point Likert scale. With regard to PHP being easier to shuck, 47.2% of the participants indicated it was unimportant while 28.3% indicated it was important. Research participants were less divided with regard to the importance of “less chance of injury while shucking” with 34.7% saying it was unimportant and 40.4% indicating it was important and the remaining 25% indicating that they were neutral. The results from the questions regarding risk reduction to at risk consumers and price relative to traditional oyster are shown in Figure 3. Both were deemed important characteristics by the research participants with 55.8% and 69.8%, respectively, indicating that risk reduction and price were important characteristics.



Sensitivity to price is an important element associated with establishing a market price for a product and also can indicate how easy it might be for a seller to pass on portions of a cost increase to consumers. Research participants were asked how sensitive their raw (half-shell) oyster consumers were to changes in price by indicating their degree of agreement with the following statement: My customers are very sensitive to price changes. A balanced 5-point

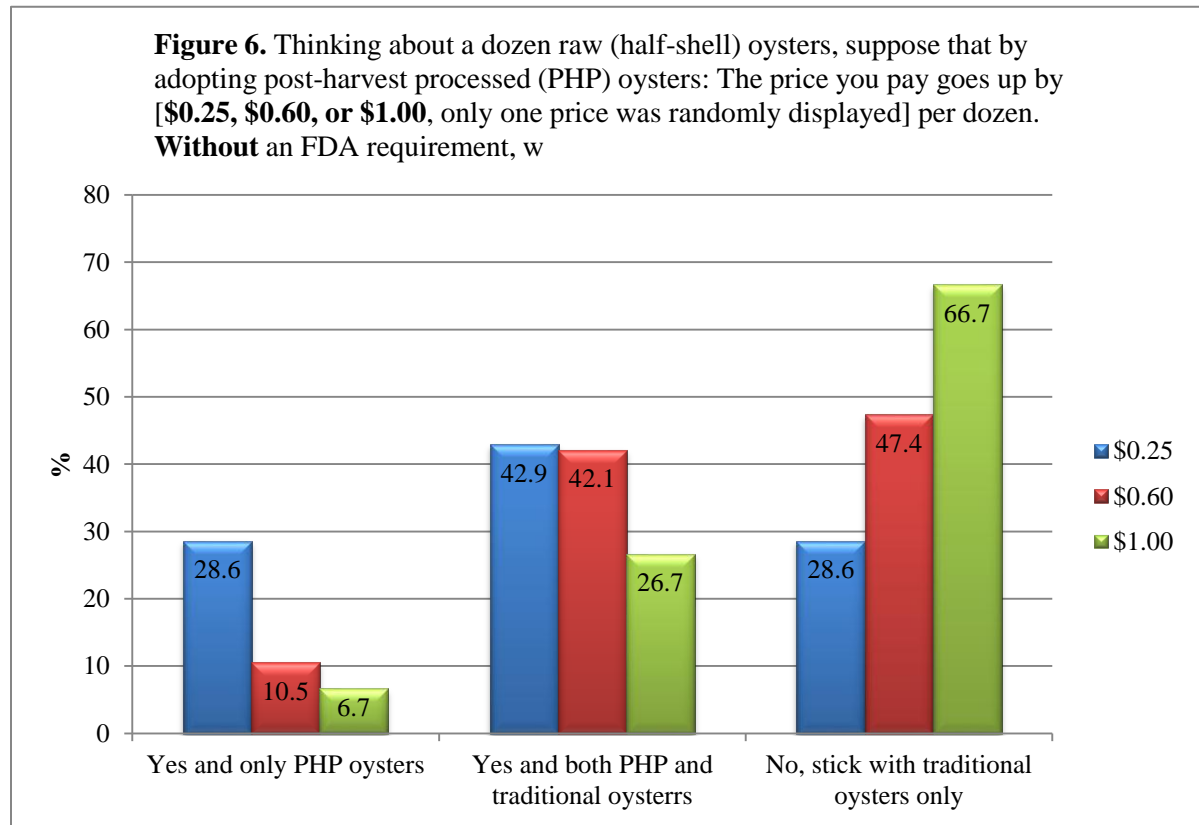
Likert scale was used from strongly disagree to strongly agree. The results are shown in Figure 4 and research participants indicated that their consumers were very sensitive to oyster price changes. Only four participants disagreed with the statement and 70% of the participants agreed that their customers were very sensitive to price changes. This indicates relatively elastic demand and an inability for sellers to pass on price increases to oyster consumers.



The research participants were then asked open ended questions about the price that they paid for oysters and the price they received. The price paid was based on a 60 pound quantity (a common case or bag size) and the price received was asked for on a price per oyster basis. Earlier in the survey, participants were informed that 60 pounds was approximately 15 dozen

oysters (180 individual oysters). Mean price paid by the research participants for a 60 pound quantity was \$45.88 so that participants per oyster purchase cost was \$.25 each and the mean price that they received per oyster sold was \$1.15 for a \$.90 margin.

Finally research participants were asked about the impact that the proposed FDA restrictions would have on their business if they were to be implemented. The results from this question are shown in Figure 5. Research participants’ overwhelmingly indicated that the proposed FDA harvest restrictions would have a negative impact on their businesses. Only 16.7% felt that the proposed restrictions would have a positive impact on their business. The data from the survey was also used to estimate a discrete choice model concerning supply chain willingness to carry post-harvest processed product. Research participants were randomly assigned one of three different PHP cost increase scenarios on a per dozen oyster basis. The cost increase scenarios were taken from the Muth et al. (2011) study commissioned by the FDA and delivered in March, 2011. Responses to the randomized price information in the absence of an FDA restriction are



shown in Figure 6. The results were consistent with economic theory in that as the price of PHP increased willingness to carry PHP declined and willingness to carry traditional raw increased. The results were interesting for adopting both products for the two lower price points. Figure 7 shows research participant responses to the question about their supply choice should the FDA ban the sale of raw (half-shell) product from the Gulf of Mexico over the April to October time period. In this instance they were asked to consider the same set of prices received

and paid that were used in the previous question. Results for the average price paid for PHP oysters indicated that 40.4% would respond by changing the source for their raw (half-shell) product, 38.5% would adopt PHP, and 21.2% would stop serving half-shell product.

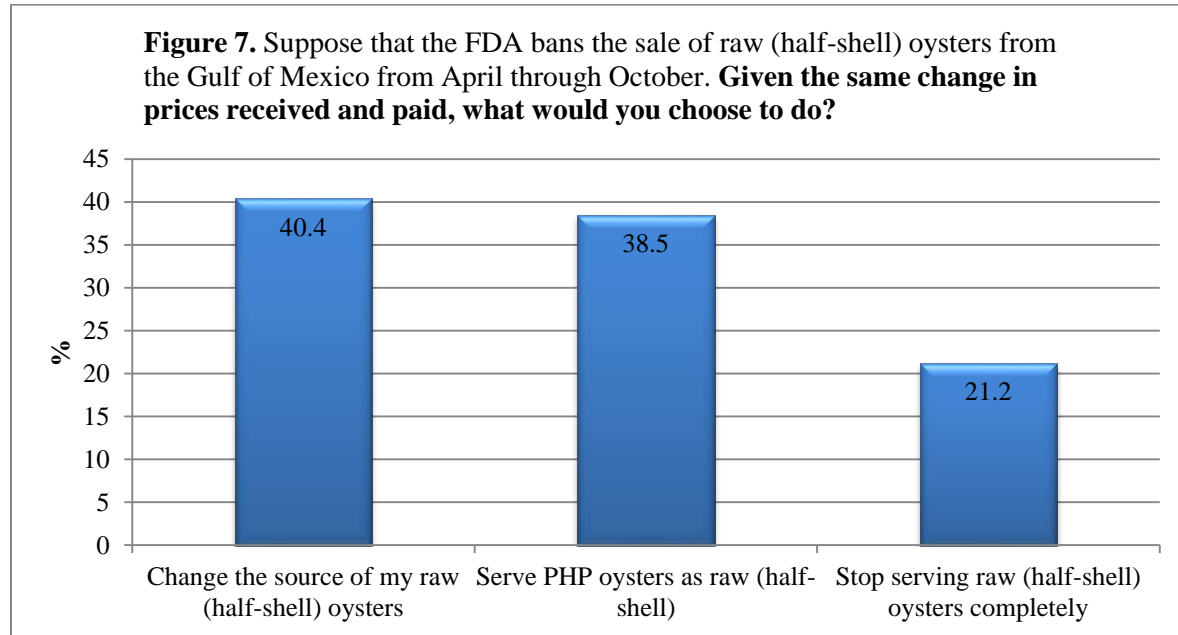


Table 3 below includes estimates from a best fit dichotomous-choice logit model where the likelihood that a respondent will adopt PHP oysters based on price and experience has been modeled without an FDA PHP requirement over the April through October seasonal period. The dependent variable was the adoption decision (to adopt PHP or not adopt PHP). Respondents were given information about PHP oysters and then presented with a randomized price premium for the PHP oysters. They then indicated their decision to either adopt or not adopt the PHP oysters.

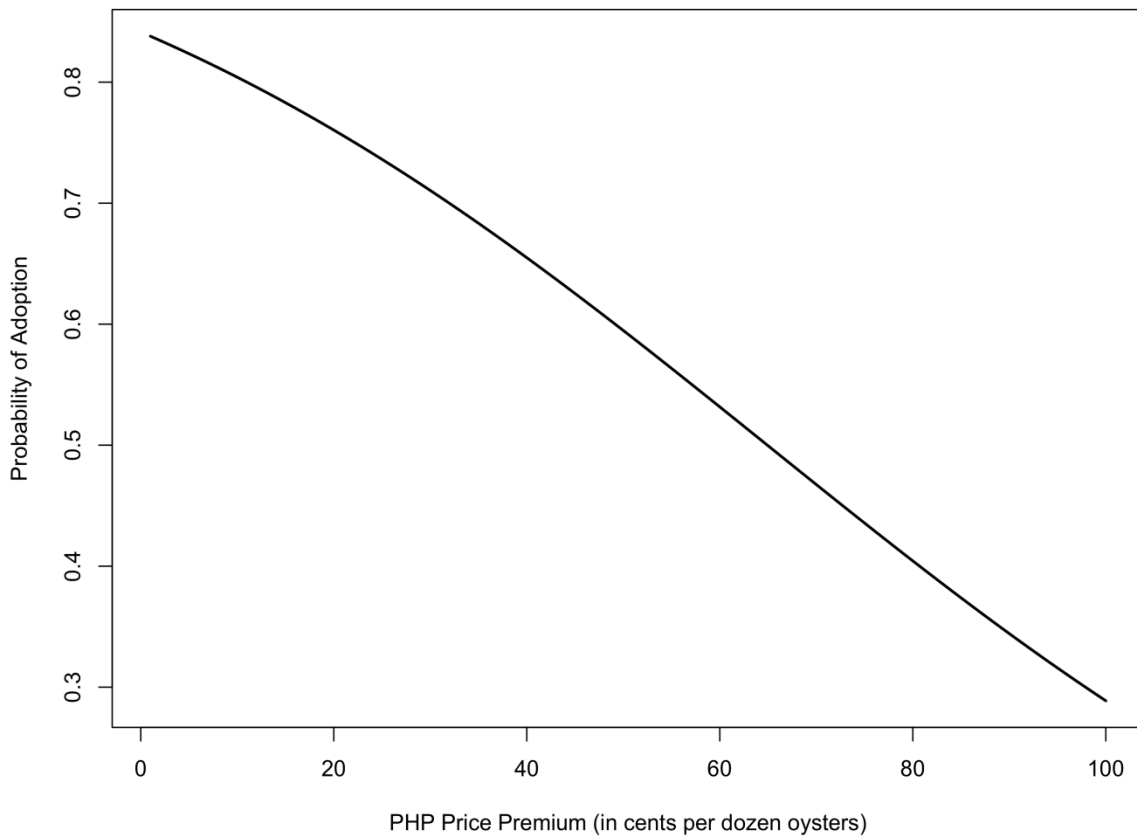
**Table 3.** Best-Fit Dichotomous Choice Logit Model

	Estimate	Standard Error	z value	Pr(>  z )
Intercept	2.4272	0.8324	2.92	0.0035
Randomized Price	-0.0257	0.0105	-2.45	0.0142
Experience in Position	-0.0600	0.0294	-2.04	0.0415

Both the randomized price (the same three prices indicated in Figure 6) and the respondent’s experience in their position were significant at the 5% level or better, with the price nearly at the 1% level. The sign for price response is as expected, with a higher price leading to a lower probability of adoption. The sign on experience was interesting, and suggested that more experienced decision-makers were less likely to adopt, regardless of the adoption cost.

A graphical representation of the results is shown in Figure 8. Using the estimated parameters, the graph below simulates the probability of adoption across a range of prices, holding the experience level constant at the sample mean. In effect, it is a “demand” curve for PHP. With information about the increase in production cost associated with PHP oysters, this could be interpreted as response to a variety of subsidy levels. For example, if production costs were expected to lead to a \$1.00 increase in wholesale cost per dozen, a \$1.00 cost premium per dozen would hold with no subsidy in place, while a \$0.25 cost premium would represent a \$.75 per dozen subsidy.

**Figure 8.** Probability of PHP adoption versus price premium, without FDA ban.



It appears that the price premium for PHP oysters is having some effect on the lack of retail availability for these products. This supports the idea of a subsidy as a policy tool for encouraging PHP in the marketplace. While participants were not asked specifically how they would behave if PHP oysters were cheaper; as the PHP price premium increased, the willingness to carry the product declined (Figure 8). If 60% were willing to carry the product at a \$0.50 (per dozen oyster) cost increase, one can only expect a larger majority if the cost increase is even smaller.



Models were also estimated for PHP adoption probability in the presence of an FDA PHP requirement but the results were inconclusive. The price variable had the correct sign but was not statistically significant.

Results from the supply side analysis of supplier willingness to carry PHP product suggested the following:

- Focus group participants felt that regulatory change was inevitable given the nature of government but that a preferred solution would be to allow consumers the freedom to choose between both traditional and PHP product in the marketplace.
- Focus group participants were concerned about the risk to consumers from raw oyster consumption and indicated that as a favorable attribute of PHP product. This was also supported by the seller survey where a majority of participants indicated that risk reduction was an important characteristic of PHP product.
- Focus group participants, after having sampled both traditional and PHP oysters generally agreed that they would be acceptable to consumers but were concerned with market related aspects regarding price and marketing. This finding was supported by the seller survey data where respondents overwhelmingly suggested their consumers were sensitive to prices and that regarding PHP characteristics the PHP price relative to traditional was very important. The seller survey results from willingness to adopt as cost changed also indicated that suppliers were sensitive to their raw material costs and would negatively respond to price increases.
- Focus group participants were mixed about the impact of the proposed restrictions on the industry. Several suggested they would switch to PHP and others said they would switch sources. Seller survey results were more direct and when asked about the impact of the FDA proposal on their business they overwhelmingly suggested it would be negative.

## **EXPERIMENTAL ECONOMIC MARKETS**

### **Methods**

Prior research concerning consumer education and *Vibrio vulnificus* consumption risk has suggested that consumer demand would decrease in response to a PHP requirement (Morgan et al. 2010). To further examine consumer demand, the willingness to pay for PHP oysters was estimated by creating an experimental market for raw oysters at UWF. The demand side of the economic question about PHP for research objective two was accomplished using an experimental economic market (an nth-price auction market; Shogren et al. 2001). Four different experimental markets were created at UWF, one market for each of the four different PHP technologies paired along with traditional raw oysters in which 30 different sets of consumers participated in each. The auction market approach involved bidding for oyster products after the market participants received information about product attributes. After bids for three of each

type of oyster (PHP type and traditional raw) a price was randomly selected and those bidding higher than that price (the  $n$ th price) purchased and consumed the oysters. For example, each of  $k$  bidders submits a bid; for instance, if the monitor randomly selects  $n = 5 \leq k$ , the four highest bidders each purchase the good priced at the fifth-highest bid. There were 30 research participants recruited for the four sessions (sessions were over booked to assure a sample of size 30 for each market). Oysters for the experiment were from the same Apalachicola summer season harvest that was used for concurrent sensory assessments (see Table 1 above).

The UWF University Conference Center was reserved for the experiment and research participants were recruited via an email to junior and senior undergraduate students and to graduate students (Attachment 7). Faculty and staff were also recruited via an announcement in the UWF “Argus Today” newsletter. Those interested in participating were directed to a web site where they registered for one of four hour-long sessions (12pm, 2pm, 4pm, and 6pm on Thursday, September 16, 2010). The conference center lounge was used as a staging area for oyster preparation and a large conference room was set up for the experiment and tasting. The services of a professional oyster shucker from a local oyster restaurant (Peg Leg Pete’s on Pensacola Beach) were obtained so that, depending on the probability determined price and participant bids, the oysters could be delivered to the consumers in a timely manner with a restaurant quality presentation. Initially, upon arrival at the specified times, the research participants were presented with an Informed Consent Form that had been developed and approved as a part of the UWF Institutional Review Board human research participant protection process. They were informed that their participation would include the consumption of raw (unprocessed) oysters and a particular type of post-harvest processed oyster that had been approved by the U.S. FDA. They were also given a standard menu warning about consumption risk (see Attachment 2 ,IRB, Part III, Potential Risks of the Study).

Each experimental session consisted of a series of pair-wise random  $n$ th-price auctions (Shogren et al., 2001). The items auctioned were three traditional (unprocessed) raw oysters and three PHP raw oysters, all on the half-shell, for consumption. All oysters were harvested from Apalachicola Bay, FL as described in detail above. A portion of the harvest was subjected to validated PHP procedures in commercial settings (Table 1). Four different types of PHP technologies were used: flash freezing (LTF), low-heat pasteurization (MH), high-hydrostatic pressurization (HP), and irradiation (GI). All oysters that research participants purchased were consumed at the end of the experimental session. The participants were informed in advance that they would be provided saltine crackers, hot sauce, cocktail sauce, and fresh sliced lemons to eat with any raw oysters they purchased. In addition, each participant was provided with a bottle of water. Each of the four sessions involved oysters from a particular PHP technology paired with traditional raw oysters. The sessions were all scheduled on the same day to ensure identical freshness across the oyster types.

The following protocols were used for each of the experimental sessions. The 30 research participants ( a different set of 30 for each of the 4 sessions) entered the room and were seated at

tables. At each seat was a brief questionnaire, see Attachment 8, to collect demographic information, oyster consumption behavior, risk perceptions, knowledge about the PHP technology, and prior beliefs regarding taste differences. After completing the questionnaire, they participated in a risk preference elicitation exercise, see Holt and Laury, 2002 and Lusk and Coble, 2005. Participants completed a menu of 10 choices over lottery pairs. Each decision involved a choice between two binary lotteries, which paid \$5 or \$3 with probability  $p$  and \$0 or \$2 with probability  $1 - p$ . The probability of winning was increased from 10% to 100% in 10% increments in each successive decision so as to induce the participant to switch from choosing the safe lottery to choosing the risky lottery. The point at which they switched from safe to risky was an estimate of that participant's underlying risk preference. Choosing the safer lottery less than five times indicated the subject had a preference for risk and more than five safe choices indicated the participant was risk averse. The participants were informed only one lottery choice would be binding at the end of the elicitation experiment and that a bingo cage would be used to randomly select the decision that would be binding and they would be paid according to the outcome of their lottery choice.

Next, instructions regarding the auction were handed out and projected by computer on a large screen at the front of the room. The moderator read the instructions (Attachment 9) that explained the procedures of the  $n$ th price auction mechanism aloud to the group and included an example. After completing the instructions, they participated in a practice round of bidding, after which any remaining questions were answered. They then participated in four rounds of simultaneous  $n$ th price auctions. The research participants were not informed in advance of the number of bidding rounds. However, they were informed that only one round would be randomly selected and implemented as the binding round after all bidding was concluded.

In each round, the research participants' submitted separate bids for three traditional and three PHP raw oysters, on the half-shell (see Attachment 10 for a bid sheet example). In the first round, they submitted bids based solely on their individual subjective beliefs, providing a basis for measuring change in bid prices as they were provided additional information in the successive bidding rounds. The questionnaire had informed the participants that there were traditional and PHP oysters available. The questionnaire also provided them with information that the PHP technology was intended to reduce the risk of illness from raw oyster consumption (as did the informed consent form), but nothing else. After the first round was concluded, each participant was given a single raw oyster to consume, and then asked to indicate the type of oyster (traditional or PHP) they believed it was and their preference on a Likert scale. They were then given a second (traditional or PHP) oyster and asked again to indicate their preference. The order of the oyster types was alternated between sessions to minimize any possible effect of communication between research participants outside of the experiment. The actual oyster types were then revealed to the participants when they received their second round bid cards. So for the second bidding round for three traditional and three PHP oysters the research participants had a taste experience for both products.

Prior to submitting bids in the third round, research participants were provided with information regarding the objective risk associated with raw oyster consumption. Hlady and Klontz (1996) reported on the incidence of *Vibrio* infection among oyster consumers in the state of Florida. They estimated that an average of 10.3 adults contracted a *Vibrio* infection for every 1,000,000 raw oyster-consuming adults. Their estimate used reported cases of *Vibrio* to the Department of Health and Rehabilitative Services between 1981 and 1993. Of course many cases of foodborne illness, including *Vibrio*, do not get reported because infected persons do not always seek medical help. To account for this an adjustment factor from Mead et al. (1999) was used to adjust the estimated frequency of *Vibrio* infection to roughly twice the reported rate. Therefore, we estimated that average annual incidence of *Vibrio* at 20 cases for every 1,000,000 (1 in 50,000) oyster-consuming adults in Florida.

In the experiment, estimates regarding the risk of becoming ill from consuming raw-oysters were presented in the context of oyster meals. That is, each third round bid card stated that the average oyster consumer faces a risk of 1 in 50,000 of becoming ill every time he or she consumes an untreated raw oyster. We framed the risk information in this way to make the link between the illness risk and the consumption decisions made in the experiment as salient as possible. The precise language used on the bid card was the following:

*According to national and regional statistics, the estimated risk of food-borne illness associated with consuming an oyster meal (defined to be meals at any time in which your main course was oysters, meals in which oysters were an important ingredient in a dish, like gumbo, or meals in which you just ate an oyster appetizer) is 1 in 50,000 meals.*

*[PHP technology] of raw oyster after harvest reduces naturally occurring harmful bacteria to non-detectable levels, thereby reducing the risk of food-borne illness.” [Each sessions bid cards replaced [PHP technology] with the one of the four processes.]*

Finally, the research participants submitted bids in the fourth round after receiving more detailed information about the particular PHP technology used for their oysters. The information provided to them was a brief, one or two sentence description of the relevant PHP process. The descriptions for each PHP type were:

***Individual quick freezing*** involves rapid freezing of half shell oysters on trays, then adding a thin glaze of ice to seal in the natural juices before storing them frozen.

***Low-heat pasteurization*** is a patented process whereby live oysters are placed in warm water for a certain time period and then immediately dipped in cold water to stop the cooking process.

*High hydrostatic pressure is a patented process that subjects oysters to high pressures (35,000 to 40,000 pounds per square inch) for 3 to 5 minutes.*

*Irradiation involves exposing oysters, either packaged or in bulk, to high energy gamma rays. This is done in a special processing room or chamber for a specified duration.*

After the fourth round of bidding was concluded, one round was randomly selected using a bingo ball cage. The price for each oyster type (traditional and PHP) was then randomly determined using the bingo ball cage again, with the  $n - 1$  highest bidders paying the  $n$ th highest price. The bids for the selected round were displayed by computer projection on a large screen at the front of the room in ascending order with an identifier for each person. Each participant that purchased oysters, of either type, was served a set of three freshly shucked oysters along with condiments. After all oysters were consumed, participant payments were tabulated and paid accordingly.

The experiments were conducted at the Conference Center at UWF on September 16, 2010. Research participants registered for sessions through an online database and in total, 120 research participants took part in the experiment (30 per session). Experimental sessions lasted about 90 minutes. On average, each participant earned approximately \$20.00 for their participation.

### **Results – Experimental Economic Markets**

Table 4 summarizes participant responses to the questionnaire regarding socio-economic characteristics. The sample was diverse with regard to gender, age, income, and ethnicity. The group was 55% male and approximately 60% were between the ages of 18 and 24 with the remaining 40% uniformly distributed between the ages of 25 to 66. Approximately 66% of the participants were Caucasian, 12.5% were Latin, 8% were Asian, and 7% were African American. Household annual income ranged from 9% of subjects with less than \$10k, 32% with less than \$25k, 60% with less than \$50k, 88% with less than \$100k, and 12% earning more than \$100k. Except for the final category, cumulative frequencies are reported. The sample was primarily made up of oyster consumers who ate oysters an average of 4.7 months of the year with an average of 4 meals per month. Hence, the average subject consumes oysters about 18.8 times per year. This is consistent with other surveys of oyster consumer behavior. A majority (58%) of the research participants ate both raw and cooked oysters, while 35% ate only raw oysters.

**Table 4.** Descriptive Statistics of Participant Demographics

Variable	Description	Mean	S.D	Min	Max
Gender	1 if male	0.55	-	-	-

Age	Age of participant	27.67	10.34	18	66
Caucasian	1 if Caucasian	0.66	-	-	-
Oyster Months	Number of months per year eats oysters	4.70	3.26	0	12
Oyster Meals	Number of oyster meals per month	4.22	4.80	0	25
Raw	Method of Consumption (1 = if raw; 2 if cooked; 3 if both)	2.23	0.94	1	3

Table 5 characterizes the distribution of research participant risk preferences. As can be seen, the majority of the participants were risk averse. On average, they made about six safe choices (i.e. the lottery with lower variance). This pattern of risk preferences is consistent with previous research (Holt and Laury, 2002; Lusk et al. 2004), suggesting that oyster consumers are similar to the general population with regard to their general risk preferences. The fourth column reports the value of a risk preference index created by subtracting five from the number of safe choices a subject made. Hence, the index assumes a value of zero in the region of risk neutrality and incrementally increases (decreases) the more risk averse (seeking) a research participant's preferences. The index is used as a control variable in the subsequent analysis. Previous studies (Lusk et al., 2003) have used the midpoint of the range of risk parameter values.

**Table 5.** Distribution of Elicited Risk Preferences

Number of Safe Choices	CRRA Parameter	Classification	Index	Number of Participants
2 or less	$-0.222 > r > -0.398$	very risk loving	-3 or less	5
3	$-0.097 > r > -0.222$	risk loving	-2	7
4	$0.000 > r > -0.097$	slightly risk loving	-1	14
5	$0.079 > r > 0.000$	slightly risk averse	0	25
6	$0.146 > r > 0.079$	risk averse	1	30
7	$0.204 > r > 0.146$	very risk averse	2	17
8 or more	$r > 0.204$	extremely risk averse	3 or more	22

*Table Notes: Category frequencies are reported assuming participant responses were consistent. 25 percent of participants had inconsistent responses.*

Table 6 summarizes research participant responses regarding risk of illness, knowledge of the PHP technology, and perceived taste differences across the various oyster types. While most

participants knew little, if anything, about the various PHP technologies, nearly two-thirds believed traditional raw oysters would taste better. A third of the research participants believed there was no difference in taste across oyster types and about 7% thought a PHP raw oyster would taste better than a traditional raw oyster. The average perceived risk of illness from a single traditional raw oyster meal was about 1 in 50,000 and closer to 1 in 5,000 from 10 traditional meals. On the other hand, the average perceived risk of illness from a single PHP oyster meal was 1 in 5,000,000 and a slightly higher 1 in 500,000 from 10 PHP meals. Figure 1 displays the complete distribution of differences in risk perceptions. The top row compares perceived risk across oyster types while the bottom row compares the risk across number of meals within an oyster type. The upper left graph displays individual differences in risk between 1 and 10 traditional oyster meals, while the upper right graph does the same comparison for PHP oysters. Clearly, both distributions suggest the majority of subjects perceived traditional raw oysters to be more risky than PHP oysters. The bottom left graph plots perceived risk differences from eating 1 and 10 traditional raw oyster meals, while the bottom right does the same comparison for PHP oysters. When it comes to traditional raw oysters, the modal research participant believes 10 meals to be roughly 10 ten times riskier. This result is important in order for the blind taste test not to confound the results of subsequent bids. If participants thought

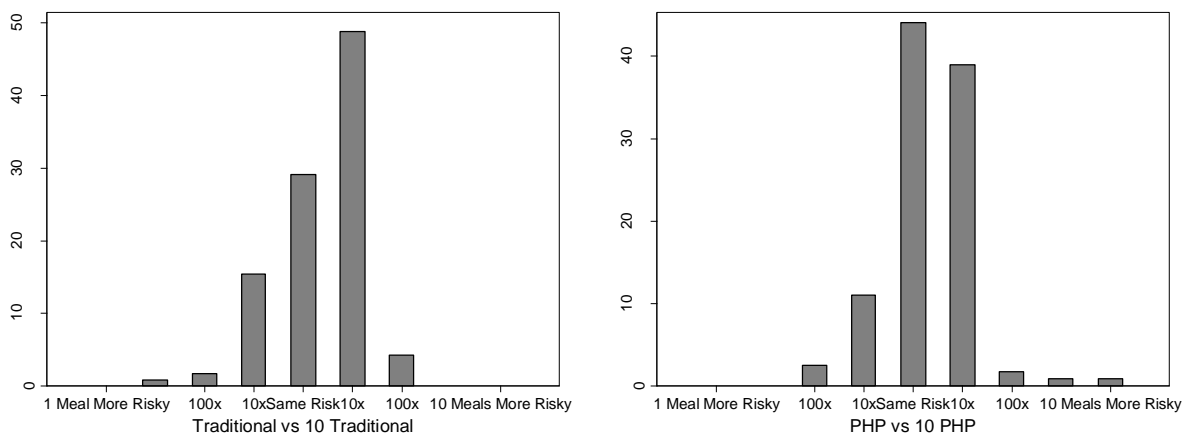
**Table 6. Descriptive Statistics of Elicited Beliefs**

Variable	Description	Mean	S.D	Min	Max
Raw Risk 1	Subjective Traditional Risk (1 meal) (1 = No Risk to 4 =Very Risky)	2.19	0.65	1	4
Raw Risk 2	Objective Traditional Risk (1 meal) (1 = 1/5,000,000 to 6 = 1/50)	3.22	1.41	1	6
Raw Risk 3	Objective Traditional Risk (10 meals) (1 = 1/5,00,000 to 6 = 1/50)	3.56	1.49	1	6
Treat Risk 1	Subjective Treated Risk (1 meal) (1 = No Risk to 4 =Very Risky)	1.80	0.62	1	3
Treat Risk 2	Objective Treated Risk (1 meal) (1 = 1/5,000,000 to 6 = 1/50)	2.59	1.39	1	6
Treat Risk 3	Objective Treated Risk (10 meals) (1 = 1/5,00,000 to 6 = 1/50)	2.92	1.49	1	6

PHP Knowledge	Knowledge of treatment process (1 = Nothing to 4 = Well informed)	1.49	0.651	1	4
Taste Different	1 if believes traditional and treated taste different	0.66	0.47	0	1
Taste Better	1 if believes traditional tastes better	0.89	0.32	0	1

eating a single oyster was just as risky as eating 10 oysters, then after being exposed to the risk in the taste test, there is no reason to purchase the safer product. Hence, subsequent bids would not reflect a food safety premium. By contrast, the modal participant believed 10 meals of PHP oysters to be roughly as risky as a single meal (which makes sense if the perceived risk is virtually zero). These results are confirmed by Friedman tests of the equivalence of the ranking

Figure 1 – Distribution of Differences in Beliefs about Risk of Illness from Oyster Consumption



distributions. The Friedman test statistics conducting pair-wise comparisons of the ranking distributions were all significant at the one percent level of significance.

Table 7 reports descriptive statistics on participant bids for traditional and treated raw oysters, as well as the difference in bids, for each of the bidding rounds. Table 5 also reports the same descriptive statistics for each PHP technology. While bids for the traditional raw oysters were fairly stable across the four bidding rounds, bids for PHP oysters varied across the bidding rounds. Initially, there was not a statistical difference in mean bids for PHP and traditional oysters. However, after the taste test, the mean bid for PHP oysters declined substantially. After, receiving objective information regarding risk, the mean bid for PHP oysters increased and the mean bid for traditional oysters declined. However, the mean bid for the PHP oysters declined after receiving additional descriptive information regarding the particular PHP technology, while the mean bid for traditional oysters did not change much. Figure 2 below contains plots for the entire distribution of bids for both traditional and PHP oysters for each of the four bidding



rounds. The modal bid in the first round is \$1 for 3 traditional oysters and \$2 for 3 PHP oysters. However, after the taste test, the modal bid for PHP oysters is \$0, in all three remaining rounds. After information regarding the risk involved with raw oyster consumption is disseminated, the modal bid for traditional oysters is also \$0, in both the remaining rounds. As these patterns may represent some sort of reaction to the auction institution (e.g. learning), we will focus primarily on the *differences* in bids across oyster types for the remainder of the analysis to remove any such effects.

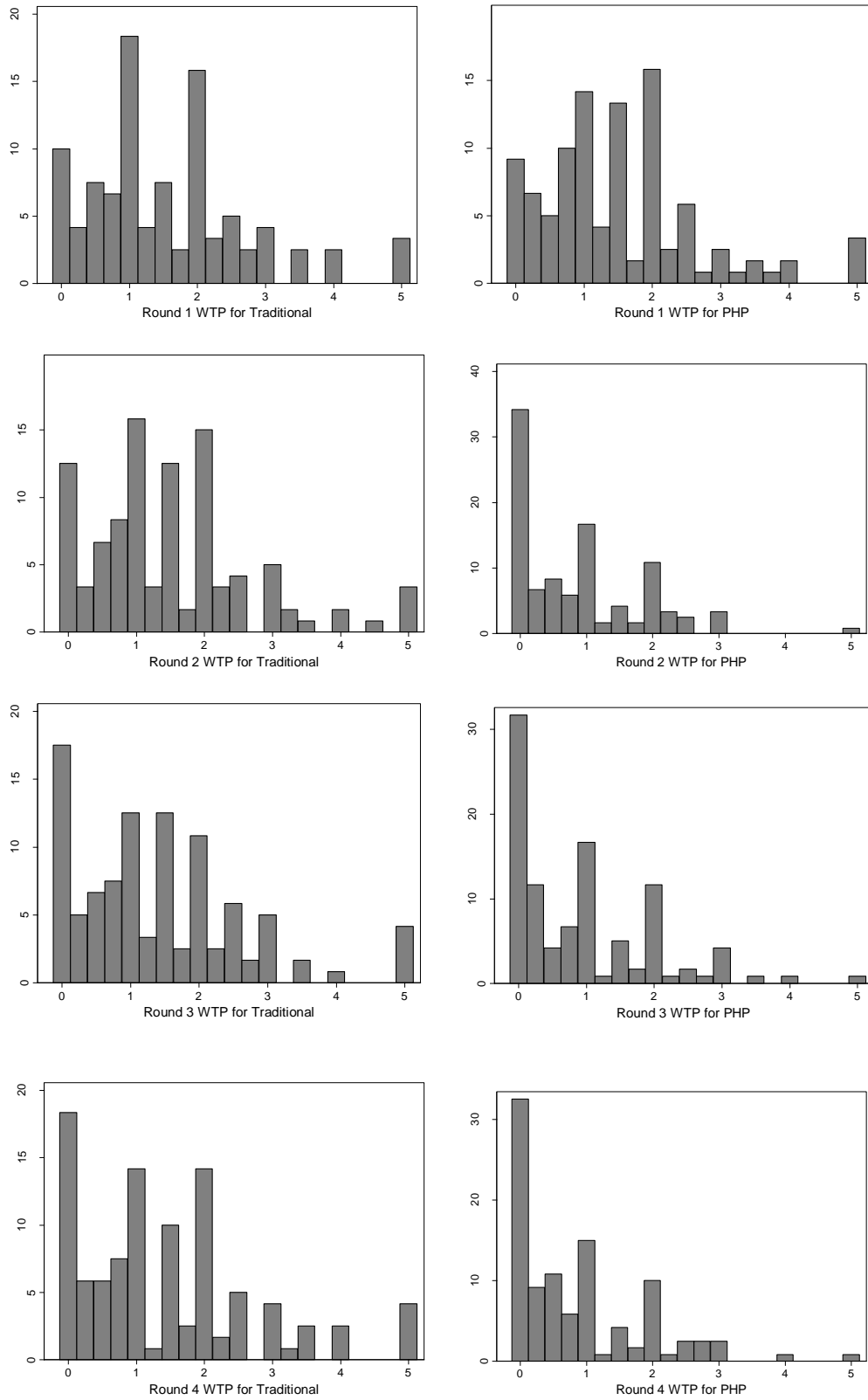
**Table 7.** Descriptive Statistics for Bids

Bidding Round	Traditional	PHP	Difference
1	1.55 (1.17)	1.51 (1.14)	0.05 (0.58)
2	1.50 (1.17)	0.88 (0.95)	0.62 (1.20)
3	1.41 (1.22)	0.93 (1.02)	0.49 (1.23)
4	1.44 (1.28)	0.87 (0.99)	0.57 (1.21)

*Table Notes: Average bids are reported with standard errors in parentheses.*

Difference-in-difference tests were conducted to analyze the impacts from the information treatments about taste, risk, and PHP technology. These tests remove any institutional features the lab might impose on the data (e.g. if research participant’s bids are (de)inflated due to the use of the *n*th price auction or the time of day). The results are reported in Table 8 below. In order to estimate the effect of information about taste, the differences in bids for traditional and PHP are differenced across bidding rounds 1 and 2. The results of the test indicated that information from tasting significantly reduced the mean valuation of the PHP oysters. That is, on average participant’s valuations suggested the PHP oysters taste sufficiently different from traditional oysters to warrant a *discount*. The differences in bids for traditional and PHP oysters are differenced across bidding rounds 2 and 3 in order to estimate the effect of risk information. The test results indicated that risk information significantly increased the premium for PHP oysters relative to traditional. Finally, the differences in bids for traditional and PHP are differenced across bidding rounds 3 and 4 in order to estimate the effect of objective information about the PHP technology. The test results suggested that information regarding the PHP technology increased the *discount* for PHP oysters, but not significantly.

Figure 2 –WTP Distribution for Traditional and PHP Oysters Across Bidding Rounds



**Table 8.** Difference-In-Difference Test Results

Difference-in-Difference	Test Statistic	P-Value
Taste Effect (D1 – D2)	-4.946	0.000
Risk Effect (D2 – D3)	2.446	0.016
Technology Effect (D3 – D4)	-1.606	0.111

*Table Notes:* The test statistics are for paired t-tests.

Table 9 summarizes the results of the difference-in-difference tests for treatment effects conducted for each PHP technology. The results are fairly consistent across technologies and consistent with the more detailed results. In all cases, the effect of taste information results in a discount on the PHP oysters, however, the effect is insignificant for the quick-freezing process. Objective information about the risk associated with raw oyster consumption and information about the PHP technology only have significant effects on irradiated oysters; the former results in significant premium being placed on the irradiated oysters, but the latter results in a significant discount. As indicated by Table 9 by the fourth round differences, the net effect of all three types of information is a discount for PHP oysters for all PHP technologies.

**Table 9.** Descriptive Statistics for Bids by PHP Technology

Bidding Round	Traditional	PHP (Quick-Freezing)	Difference
1	1.54 (1.04)	1.45 (0.94)	0.09 (0.47)
2	1.19 (1.03)	0.91 (0.85)	0.27 (0.84)
3	1.12 (1.04)	0.97 (1.05)	0.15 (0.81)
4	1.07	0.89	0.18

	(1.05)	(1.00)	(0.93)
Bidding Round	Traditional	PHP (Pressurized)	Difference
1	1.97 (1.38)	1.91 (1.30)	0.06 (0.62)
2	1.86 (1.29)	0.72 (0.87)	1.14 (1.65)
3	1.79 (1.37)	0.69 (0.85)	1.10 (1.62)
4	1.73 (1.42)	0.63 (0.87)	1.10 (1.72)

Bidding Round	Traditional	PHP (Pasteurized)	Difference
1	1.69 (1.13)	1.77 (1.20)	-0.08 (0.56)
2	1.81 (1.32)	1.29 (1.04)	0.52 (1.15)
3	1.73 (1.40)	1.41 (1.10)	0.32 (1.23)
4	1.81 (1.51)	1.32 (1.05)	0.49 (1.01)

Bidding Round	Traditional	PHP (Irradiation)	Difference
1	1.02 (0.92)	0.90 (0.81)	0.13 (0.67)
2	1.16 (0.86)	0.59 (0.91)	0.57 (0.84)
3	1.02	0.64	0.38

	(0.83)	(0.93)	(0.92)
4	1.16	0.66	0.50
	(0.92)	(0.91)	(0.86)

---

*Table Notes:* Average bids are reported with standard errors in parentheses.

The oyster experimental market produced the following results on the demand side of the market:

- Initially there was no statistical difference in mean bids for processed and traditional oysters.
- After tasting both product types (traditional and PHP) the mean bid for processed oysters declined significantly and substantially.
- After receiving information regarding risk, the mean bid for PHP oysters increased slightly and the mean bid for traditional oysters declined.
- The mean bids for both oyster types did not change significantly after receiving more detailed information about the PHP type.
- Information from tasting significantly reduced the mean valuation of the processed oysters. That is, on average, research participant' valuations after a consumption experience suggested that post-harvest processed oysters were less preferred relative to the traditional raw product.
- The test results indicated that risk information significantly increased the premium for post-harvest processed oysters relative to traditional and that post-harvest process information increased the discount for processed oysters, but not significantly.
- Oyster consumers were unwilling to pay a premium for a post-harvest processed product.

# ASSESSMENT STUDIES FOR POST-HARVEST (PHP) OYSTERS:

## Part 2. Buyer and Seller Assessments

### REFERENCES

- Alfnes, F. and K. Rickertsen. 2003. European Consumers' Willingness to Pay for U.S. Beef in Experimental Auction Markets. *American Journal of Agricultural Economics* 85(2): 396-405.
- Bergstrom, J.C., J.R. Stoll, and A. Randall. 1990. The Impact of Information on Environmental Commodity Valuation Decisions. *American Journal of Agricultural Economics* 72: 614-621.
- Bernard, J.C. and D.J. Bernard. 2009. What is it About Organic Milk? An Experimental Analysis. *American Journal of Agricultural Economics* 91: 826-836.
- Bosch, D., N.K. Kuminoff, A. Harris, J.C. Pope, K. Stephenson, and P. Mason. 2010. Economic Implications of Alternative Management Strategies for Virginia Oysters and Clams. Department of Environmental Quality, Virginia Coastal Zone Management Program, NOAA Grant #NA07NOS4190178.
- Bruhn, C.M. 1995. Consumer Attitudes and Market Response to Irradiated Food. *Journal of Food Protection* 58: 175-181.
- Burns, A.C. and R.F. Bush. 2010. Marketing Research. Boston: Prentice Hall/Pearson.
- Desencios, J.A., K.C. Klontz, L.E. Wolfe, S. Hoechert, 1991. The Risk of *Vibrio* Illness in the Florida Raw Oyster Eating Population, 1981 – 188. *American Journal of Epidemiology* 134(3): 290 – 297.
- Dickinson, D.L. and D. Bailey, 2002. Meat traceability: Are U.S. Consumers Willing to Pay for It? 27: 348 – 364.
- Fox, J.A., D.J. Hayes, and J.F. Shogren. 2002. Consumer Preferences for Food Irradiation: How Favorable and Unfavorable Descriptions Affect Preferences for Irradiated Pork in experimental Auctions. *The Journal of Risk and Uncertainty* 24(1): 75-95.
- Hanson, T.L., L. House, S. Sureshwaran, B. Posadas, and A. Liu. 2003. Opinions of U.S. Consumers Toward Oysters: Results of a 200-2001 Survey. Mississippi State University.
- Hayes, D.J., J.F. Shogren, S.Y. Shin, and J.B. Kliebenstein. 1995. Valuing Food Safety in Experimental Auction Markets. *American Journal of Agricultural Economics* 77: 40-53.
- Hayes, D.J., J.A. Fox, and J.F. Shogren. 2002. Experts and Activists: How Information Affects the Demand for Food Irradiation. *Food Policy* 27(2): 185-193.
- Holt, C.A. and S.K. Laury. 2002. Risk Aversion and Incentive Effects.” *American Economic Review* 92(5): 1644-55.

- Huffman W.E., Rousu, M., J.F. Shogren, and A. Tegene. 2007. The Effects of Prior Beliefs and Learning on Consumers' Acceptance of Genetically Modified Foods. *Journal of Economic Behavior and Organization* 63: 193-206.
- Lusk, J.L. L.O. House, C. Valli, S.R. Jaeger, M. Moore, J.L. Morrow, and W.B. Traill, 2004. The Effect of Information About Benefits of Biotechnology on Consumer Acceptance of Genetically Modified Food: Evidence from Experimental Auctions in the United States, England, and France. *European Review of Agricultural Economics* 31(2): 179-204.
- Lusk, J.L. and K.H. Coble. 2005. Risk Perceptions, Risk Preference, and Acceptance of Risky Food. *American Journal of Agricultural Economics* 87(2):393-405.
- Marette, S., J. Roosen, A. Bieberstein, S. Blanchemanche, and F. Vandermoere. 2009. Impact of Environmental, Societal, and Health Information on Consumers' Choices for Nanofood. *Journal of Agricultural and Food Industrial Organization* 7: 1-25.
- Mead, P.S., L. Slutsker, V. Dietz, L.F. McCaig, J.S. Bresee, C. Shapiro, P.M. Griffin, and R.V. Tauxe, 1999. Food-Related Illness and Death in the United States. *Emerging Infectious Diseases* 5(5): 607 – 625.
- Melton, B.E., W.E. Huffman, J.F. Shogren, and J.A. Fox, 1996. Consumer Preferences for Fresh Food Items with Multiple Quality Attributes: Evidence from an Experimental Auction of Pork Chops, *American Journal of Agricultural Economics* 7: 916 – 923.
- Miles S. and L.J. Frewer. 2002. Trust, Perceived Risk, and Attitudes Toward Food Technologies. *Journal of Applied Social Psychology* 32: 2423-2433.
- Morgan, K.L., T.J. Stevens, R.L. Degner, Larkin, S.L., and C.M. Adams. 2010. Economic Impacts of Alternative Regulatory Scenarios on the Florida Fresh Half Shell Oyster Industry. Industry Report 10-1, Institute of Food and Agricultural Sciences, University of Florida, Gainesville, FL.
- Morgan, O.A, G.S. Martin, and W.L. Huth. 2009. Oyster Demand Adjustments to Counter-Information and Source Treatments in Response to *Vibrio vulnificus*. *Journal of Agricultural and Applied Economics* 41, 683-696.
- Morgan, O.A., J.C. Whitehead, W.L. Huth, G.S. Martin, and R. Sjolander. 2010. A Revealed and Stated Preference Latent Class Model to Examine Homogeneous Subgroup Consumer Behavior Responses to Information and Food Safety Technology Treatments. Presented at the 2010 Southern Economic Association meeting.
- Muth, M.K., S.A. Karns, D.W. Anderson, and B.C. Murray. 2002. Effects of Post-Harvest Treatment Requirements on the Markets for Oysters. *Agricultural and Resource Economics Review* 3, 171-186.
- Muth, M.K., D.W. Anderson, S.A. Karns, B.C. Murray, and J.L. Domanico. 2000. "Economic Impacts of Requiring Post-Harvest Treatments of Oysters," Special report prepared for the Interstate Shellfish Sanitation Conference, Columbia, SC, by Research Triangle Institute, Research Triangle Park, NC.

- Muth, M.K., J.E. Arsenault, J.C. Cajka, S.C. Cates, M.C. Coglati, S.A. Karns, M. O’Niel, C. Viator. 2011. Analysis of How Post-harvest Processing Technologies for Controlling *Vibrio vulnificus* Can Be Implemented. Special report prepared for Paul DiStefano, Food and Drug Administration by Research Triangle Institute, Research Triangle Park, NC.
- Nayga Jr, R.M., R. Woodward, W. Aiew. 2006. Willingness to Pay for Reduced Risk of Foodborne Illness: A Non hypothetical Field Experiment. *Canadian Journal of Agricultural Economics* 54(4): 461-475.
- Poortinga, W. and N.F. Pidgeon. Trust in Risk Regulation: Cause or Consequence of the Acceptability of GM Food. *Risk Analysis* 25(1): 199-209.
- Roosen, J., D.A. Hennessy, J.A. Fox, and A. Schreiber. 1998. Consumers’ Valuation of Insecticide Use Restrictions: An Application to Apples. *Journal of Agricultural and Resource Economics* 23: 367-384.
- Rousu, M., D.C. Monchuk, J.F. Shogren, and K.M. Kosa. 2005. Consumer Willingness to Pay for “Second-Generation” Genetically Engineered Products and the Role of Marketing Information. *Journal of Agricultural and Applied Economics* 37(3): 647-657.
- Rousu, M. and J.F. Shogren. 2006. Valuing Conflicting Public Information About a New Technology: A Case of Irradiated Foods. *Journal of Agricultural and Applied Economics* 31(3): 642-652.
- Rousu, M., W.E.. Huffman, J.F. Shogren, and A. Tegene. 2007. Effects and Value of Verifiable Information in a Controversial Market: Evidence from Lab Auctions of Genetically Modified Foods. *Economic Inquiry* 45(3): 409-432.
- Rozan A., A. Stenger, and M. Willinger. 2004. Willingness-to-Pay for Food Safety: An Experimental Investigation of Quality Certification on Bidding Behavior. *European Review of Agricultural Economics* 31(4) 409-425.
- Schultz, H.G., C.M. Bruhn, and K.V. Diaz-Knauf. 1989. Consumer Attitude Toward Irradiated Foods: Effects of Labeling and Benefits Information. *Food Technology* 43: 80-86.
- Shapiro, R.L., S. Altekruze, L. Hutwanger, R. Bishop, R. Hammond, S. Wilson, B. Ray, S. Thompson, R.V. Tauxe, P.M. Griffin and the *Vibrio* Working Group, 1998. The Role of Gulf Coast Oysters Harvested in Warmer Months in *Vibrio vulnificus* Infection in the United States, 1988 – 1996. *The Journal of Infectious Diseases*. 178; 752 – 759.
- Shogren, J.F., J.A. Fox, D.J. Hayes, And J. Roosen. 1999. Observed Choices for Food Safety in retail, Survey, and Auction Markets. *American Journal of Agricultural Economics* 81(5): 1192-1199.
- Shogren, J. F., M. Margolis, C. Koo, and J.A. List. 2001. A Random *n*th-price Auction. *Journal of Economic Behavior and Organization* 46: 409 – 421.
- Viscusi, W.K. 1997. Alarmist Decisions with Divergent Risk Information. *Economic Journal* 107: 1657-1670.



**ASSESSMENT STUDIES FOR POST-HARVEST (PHP) OYSTERS:  
Part 2. Buyer and Seller AssessmentsTTACHMENTS**

**Attachment 1: Recruitment Document**

**Oyster Focus Group: Recruiting**

*Engage passerby or exhibitor: Are you interested in getting paid to participate in a focus group about oysters?*

*If MAYBE or YES get a Business Card and proceed with more information.*

We are offering an Honorarium of \$100 for your participation in a 90 minute video and audio recorded Focus Group tomorrow (Monday) in this building that involves tasting and discussing raw Gulf of Mexico Oysters (Florida harvest). The focus group is a part of a University of Florida and University of West Florida research project about attitudes and opinions concerning sea food products.

- |  |     |    |
|--|-----|----|
| 1. Are you <u>interested</u> in participating in the focus group about oysters?                              | YES | NO |
| 2. Do you <u>eat</u> raw oysters?  | YES | NO |
| 3. Are you someone who makes or influences <u>seafood purchase</u> decisions for a business or organization? | YES | NO |

*If YES on all 3 above, continue. Otherwise, stop, thank, and get contact info. Ask if we can contact them later to get feedback on the show.*

- |   |     |    |
|---|-----|----|
| 4. Do you now or have you ever purchased or influenced the <u>purchase of oysters</u> for any business or organization. | YES | NO |
| 5. Are you <u>familiar with Post Harvest Processed</u> oysters?   | YES | NO |

*If yes, probe for extent of familiarity. What do you know? if OK, continue. Otherwise, stop, thank, and get contact info.*

6. What type of organization you are affiliated with:
- |  |   |
|--|---|
| <input type="checkbox"/> Retail Food Products    | <input type="checkbox"/> Institutional Food Service |
| <input type="checkbox"/> Wholesale Food Products | <input type="checkbox"/> Food Product Production    |
| <input type="checkbox"/> Restaurant              | <input type="checkbox"/> Other _____                |

7. What is your JOB TITLE? \_\_\_\_\_ What is your contact information here at the show?
- NAME \_\_\_\_\_ MOBILE \_\_\_\_\_ EMAIL \_\_\_\_\_

8. There are three Oyster Focus Group time slots for tomorrow (Monday, September 13). Indicate times. Which time would you prefer? Second choice?

#1) 10:00 to 11:30am \_\_\_\_\_ #2) 1:00 to 2:30pm \_\_\_\_\_ #3) 4:00 to 5:30pm \_\_\_\_\_

*Check sign-up lists for available time slots. Sign up if slot is available.*

Here is some information about the session you've signed up for. OR We will contact you later today, thanks for your interest.

Signed Informed Consent \_\_\_\_\_ Signed Model Release \_\_\_\_\_

## **ASSESSMENT STUDIES FOR POST-HARVEST (PHP) OYSTERS:**

### **Part 2. Buyer and Seller Assessments**

#### **Attachment 2: Informed Consent Form**

##### **Oyster Tasting Focus Group**

**I.** U.S. Federal government and University of West Florida (UWF) regulations require us to obtain signed consent for participation in research involving human participants. After reading the statements in section II through IV below, please indicate your consent by signing and dating this form.

**II. Statement of Process:** Thank you for your interest in this research project being conducted by UWF faculty. You are considering participation in an oyster tasting experience. We will be asking you questions about your consumption experience associated with six (6) oysters. Two of the oysters will be traditional raw and the remaining four will be post harvest processed (PHP). We will be asking you to discuss your experiences and ability to detect differences between the oysters and your preferences for them from a taste perspective. You will find a summary of the major aspects of the study described below; including the risks and benefits of participating. Carefully read the information provided below. If you wish to participate in this study, sign your name and write the date. Any information you provide to us will be kept in strict confidence and used only for research purposes.

If you have any questions or concerns regarding this project, please contact Dr. Bill Huth in the Marketing and Economics Department at UWF via telephone at (850) 474-2826 or by email at whuth@uwf.edu.

I understand that:

- (1) I will be asked to consume six (6) oysters.
- (2) The oysters consumed will be from the Gulf of Mexico (Apalachicola, Florida).
- (3) The oysters consumed will be raw and post harvest processed.
- (4) The post harvest process methods are U.S. Food and Drug Administration (FDA) approved and in active use throughout the United States.
- (5) The specific post harvest processing methods are:
  - a. Individual quick frozen
  - b. Low heat pasteurization
  - c. High hydrostatic pressure
  - d. Irradiation
  
- (6) I will be asked to complete a short survey about the taste experience and my attitudes regarding shellfish consumption risks.

- (7) The focus group, taste experience, and survey will take no longer than 90 minutes of your time.
- (8) I will receive a \$100 honorarium for my participation.
- (9) I may discontinue participation in this study at any time without penalty.

**III. Potential Risks of the Study:**

- (1) As with the consumption of any raw animal protein there is a risk of contracting a foodborne illness.
- (2) There is a risk with consuming raw oysters. If you have chronic illness of the liver, stomach or blood or have immune disorders, you are at greater risk of serious illness from raw oysters and should eat oysters fully cooked. If unsure of your risk, consult a physician.
- (3) Post harvest processing by the methods listed above eliminates the risk from consuming traditional raw oysters.

**IV. Potential Benefits of the Study:**

- (1) Information obtained from this study may provide a better understanding of attitudes and preferences for raw versus processed Gulf of Mexico oysters.
- (2) The U.S. Food and Drug Administration (FDA) is considering a ban on the sale of raw Gulf of Mexico oysters during the warm weather months (April through October) unless they are post-harvest processed as is currently done in California. This study will help determine the economic consequences of such an action.

**V. Statement of Consent:** I certify that I have read and fully understand the Statement of Process given above and agree to participate in the research project as described. Permission is given voluntarily and without coercion or undue influence. It is understood that I may discontinue participation at any time without penalty or loss of any benefits to which I may otherwise be entitled. I will be provided a copy of this consent form.

\_\_\_\_\_  
Participant's Name (Please Print)

\_\_\_\_\_  
Participant Signature

\_\_\_\_\_  
Date

**ASSESSMENT STUDIES FOR POST-HARVEST (PHP) OYSTERS:  
Part 2. Buyer and Seller Assessments**

**Attachment 3: Video Release Document**

**VIDEO DOCUMENTARY INTERVIEW RELEASE FORM**

My signature below will confirm my agreement with filmmaker/photographer, Scott Bartel, his legal representatives and assigns and The University of West Florida (UWF) regarding the disposition of video documentary and photographs of interviews conducted with me, \_\_\_\_\_, on September 13, 2010 for the Oyster Focus Group at the Florida Restaurant and Lodging Show at the Orlando Convention Center in Orlando, FL.

I understand that the video images of me and transcripts (if transcribed) of the interview(s) audio will be maintained and made available indefinitely by the filmmaker/photographer and UWF for such research, production (e.g., radio, television, film festivals, World Wide Web, exhibitions, related advertisements), and educational purposes as the filmmaker/photographer shall determine.

I hereby grant, and transfer to the filmmaker/photographer and UWF all rights, title, and interest in the interview and video documentary, including without limitation the literary rights and the copyright. I hereby release filmmaker/photographer, his legal representatives and assigns, and UWF from all claims and liability relating to said documentary and photographs.

The filmmaker/photographer and UWF agree to retain the integrity of the interviewee's image and voice, neither misrepresenting the interviewee's words nor taking them out of context.

I attest that I have voluntarily agreed to be interviewed and that this document contains the entire and complete agreement concerning the use and preservation of my interview.

Signature of Interviewee: \_\_\_\_\_ Date \_\_\_\_\_  
Name (printed): \_\_\_\_\_  
Address: \_\_\_\_\_  
Telephone: \_\_\_\_\_

Signature of Interviewer: \_\_\_\_\_ Date \_\_\_\_\_  
Name (printed): \_\_\_\_\_

**ASSESSMENT STUDIES FOR POST-HARVEST (PHP) OYSTERS:  
Part 2. Buyer and Seller Assessments**

**Attachment 4: Honorarium Receipt**

**Honorarium Receipt**

**Assessment Study for Post-Harvest Processed (PHP) Oysters**

This is to acknowledge that I participated in the focus group activities described below and received a \$100.00 (One-Hundred Dollars, cash) honorarium form the University of West Florida (UWF) Researchers for participation in an audio and video recorded Focus Group at the 2010 Florida Restaurant and lodging Show at the orange County Convention Center in Orlando, FL on Monday, September 13, 2010. The focus group was part of a research project studying the market characteristics of post-harvest processed oysters. The research was funded by the Interstate Shellfish Sanitation Conference through a grant to the University of Florida and the University of West Florida. The Principal Investigator at UWF is William Huth, Ph.D. ([whuth@uwf.edu](mailto:whuth@uwf.edu); 850.474.2826)

---

Full Name Printed

---

Signature

Date

## ASSESSMENT STUDIES FOR POST-HARVEST (PHP) OYSTERS:

### Part 2. Buyer and Seller Assessments

#### Attachment 5: PHP Information Document

##### **Oyster Consumption Risk and Post-Harvest Processing (PHP)**

*Vibrio vulnificus* is a naturally occurring bacterium that grows in warm saline waters. The Gulf of Mexico provides a good habitat especially from April through October. Filter feeders, like oysters, can become contaminated with *V. vulnificus* and if a contaminated oyster is consumed raw by a person who is “at risk” it can cause that person to become ill and in half of the illnesses die. Based on CDC records there are about 15 deaths in the US each year. Diabetes, immune deficiencies, liver disease, stomach problems, et cetera can cause a person to be at risk of dying from eating a contaminated raw oyster. Healthy individuals are not at risk of death from eating traditional raw (**TRAW**) oysters on the half shell and no one is at risk if the oyster is cooked.

Similarly, no one is at risk if the oyster has been Post Harvest Processed (PHP).

There are four FDA approved PHP methods; freezing, low thermal heating, high pressure, and irradiation. There are companies actively involved in processing oysters using all the methods.

**Individual Quick Freezing (COLD) involves rapid freezing of half shell oysters on trays, then adding a thin glaze of ice to seal in the natural liquor before storing them frozen.**

**Low Thermal Heating (HOT) is a process where live oysters are placed in warm water for a certain time period and then immediately dipped in cold water to stop the cooking process.**

**High Hydrostatic Pressure (PRESS) is a patented process that subjects oysters to high pressures (35,000 to 40,000 pounds per square inch) for 3 to 5 minutes.**

**Irradiation (RAD) involves exposing oysters, either packaged or in bulk, to high energy gamma rays. This is done in a special processing room or chamber for a specified duration.**

Each PHP processing method has economic costs and benefits associated with it. All methods have the benefit that *V. vulnificus* and other potential pathogens are reduced to non-detectable levels. All methods also increase the shelf life of the product and all methods increase the cost of the oysters relative to the traditional raw product. The COLD product is already shucked and is ready for consumption immediately after thawing. Both HOT and PRESS weaken the adductor muscle and reduce shucking time and effort, these products are usually banded to prevent the whole shell from opening. COLD, HOT, and PRESS all result in a product that is no longer “live.” RAD, however, does not kill the oyster and so shucking effort is the same as for the TRAW product. When delivered there is no visual difference between the two products.

Since 2003, California has required PHP for all Gulf of Mexico oysters from April through October destined for the raw, half shell markets. In 2009, the FDA announced that they were going to adopt the California PHP requirement for the entire US. That proposal met with significant political resistance and a month later the FDA postponed its implementation indicating that further study on the impact of the proposed requirements was needed. This

discussion and tasting today is a part of that information gathering process. As university researchers, we are not for or against PHP and we are indifferent between the various PHP methods.

### Images from Various PHP Facilities



Low Thermal Heating (HOT)



Irradiation (RAD)



High Pressure (PRESS)



Individual Quick Freezing (COLD)

**ASSESSMENT STUDIES FOR POST-HARVEST (PHP) OYSTERS:  
Part 2. Buyer and Seller Assessments**

**Attachment 6: Taste Experience Survey Document**

**Oyster Focus Group Product Comparison Sheet**

Name: \_\_\_\_\_

	TRAW		COLD		HOT		PRESS		RAD	
	Traditional Raw Oyster		Individual Quick Frozen		Low Thermal Heating		High Hydro-Static Pressure		Irradiation	
<b>Appearance</b>	Very	Very	Very	Very	Very	Very	Very	Very	Very	Very
For example, color	Good	bad	Good	bad	Good	bad	Good	bad	Good	bad
	1 2 3 4 5 6 7		1 2 3 4 5 6 7		1 2 3 4 5 6 7		1 2 3 4 5 6 7		1 2 3 4 5 6 7	
<b>Aroma</b>	Very	Very	Very	Very	Very	Very	Very	Very	Very	Very
	Good	bad	Good	bad	Good	bad	Good	bad	Good	bad
	1 2 3 4 5 6 7		1 2 3 4 5 6 7		1 2 3 4 5 6 7		1 2 3 4 5 6 7		1 2 3 4 5 6 7	
<b>Plumpness</b>	Very	Very	Very	Very	Very	Very	Very	Very	Very	Very
	Good	bad	Good	bad	Good	bad	Good	bad	Good	bad
	1 2 3 4 5 6 7		1 2 3 4 5 6 7		1 2 3 4 5 6 7		1 2 3 4 5 6 7		1 2 3 4 5 6 7	
<b>Flavor</b>	Very	Very	Very	Very	Very	Very	Very	Very	Very	Very
	Good	bad	Good	bad	Good	bad	Good	bad	Good	bad
	1 2 3 4 5 6 7		1 2 3 4 5 6 7		1 2 3 4 5 6 7		1 2 3 4 5 6 7		1 2 3 4 5 6 7	
<b>Texture and Mouth feel</b>	Very	Very	Very	Very	Very	Very	Very	Very	Very	Very
	Good	bad	Good	bad	Good	bad	Good	bad	Good	bad
	1 2 3 4 5 6 7		1 2 3 4 5 6 7		1 2 3 4 5 6 7		1 2 3 4 5 6 7		1 2 3 4 5 6 7	
<b>Saltiness (salinity)</b>	Very	Very	Very	Very	Very	Very	Very	Very	Very	Very
	Good	bad	Good	bad	Good	bad	Good	bad	Good	bad
	1 2 3 4 5 6 7		1 2 3 4 5 6 7		1 2 3 4 5 6 7		1 2 3 4 5 6 7		1 2 3 4 5 6 7	
<b>After taste</b>	Very	Very	Very	Very	Very	Very	Very	Very	Very	Very
	Good	bad	Good	bad	Good	bad	Good	bad	Good	bad



1 2 3 4 5 6 7

1 2 3 4 5 6 7

1 2 3 4 5 6 7

1 2 3 4 5 6 7

1 2 3 4 5 6 7

**Overall was the oyster product acceptable?**(circle one answer for each product)

Yes No

Yes No

Yes No

Yes No

Yes No

Which product was your: **Favorite?**

Which product was your: **Least Favorite?**

Some of the questions below are best answered BEFORE consuming the oysters. Please indicate your opinion on the various oyster products you tasted using the scales below (circle your answers)

## **ASSESSMENT STUDIES FOR POST-HARVEST (PHP) OYSTERS: Part 2. Buyer and Seller Assessments**

### **Attachment 7: Economic Experiment Recruitment Email**

**Email Subject:** Earn \$\$ by Participating in an Upcoming Study for Oyster Eaters

**Email Body:** On Thursday, September 16th researchers in the UWF Marketing and Economics will be conducting a study on consumers' preference for various raw oysters. If you are an oyster eater, we invite you to participate in this study. Participation includes a short instruction period and then a market simulation exercise for buying and consuming oysters. You will be given money just to participate in the experiment and you also will be given money that can be used to purchase and consume oysters. The entire session will last 45 minutes and you will be paid in cash at the end of the session. You'll earn \$5 just for showing up and up to an additional \$15 from participating. All of your decisions will be made in confidence and will remain confidential.

If you decide to participate, you will be expected to consume a limited number of fresh, raw oysters. The oysters will be harvested from the Gulf of Mexico (Apalachicola, Florida) and are all United States Food and Drug Administration (FDA) approved. If you are not willing to consume at least a very limited number of oysters, or you have any of the conditions listed on the signup sheet, please do not sign up to participate.

There are four available sessions on Thursday, September 16. You may sign up for only one session. To sign up, click the link and fill out the form (should take you one minute). Once the session is full you will receive a confirmation email that will confirm your participation and instruct you of the specific room at the University of West Florida Conference Center. You will also receive a reminder email the day before the study.

To sign up to participate in the 12:00 PM - 1:00 PM session click here:

<http://tinyurl.com/oystersession1>

To sign up to participate in the 2:00 PM - 3:00 PM session click here:

<http://tinyurl.com/oystersession2>

To sign up to participate in the 4:00 PM - 5:00 PM session click here:

<http://tinyurl.com/oystersession3>

To sign up to participate in the 6:00 PM - 7:00 PM session click here:

<http://tinyurl.com/oystersession4>

Please direct all questions or concerns to Dr. David McEvoy at [mcevoydm@appstate.edu](mailto:mcevoydm@appstate.edu)

Thank you.

Thank you for participating in this oyster consumer information session.



**Both raw and cooked**

---

We are interested in your view of the risk involved with consuming raw oysters. Please answer the following questions to the best of your ability. Select the option closest to your view.

---

8) What do you think your chances are of getting sick from eating a traditional raw oyster?

(Please circle one)

**Not at all likely**

**Somewhat unlikely**

**Somewhat likely**

**Very likely**

**I don't know**

9) What do you think your chances are of getting sick from eating a single traditional raw oyster meal? (Please circle one)

**1 in 5,000,000    1 in 500,000    1 in 50,000    1 in 5,000    1 in 500    1 in 50**

10) What do you think your chances are of getting sick at least once from eating 10 traditional raw oyster meals? (Please circle one)

**1 in 5,000,000    1 in 500,000    1 in 50,000    1 in 5,000    1 in 500    1 in 50**

---

Raw oysters can be Quick-Frozen in order to reduce the illness to the individual from consuming a raw oyster. Please answer the following questions regarding this process to the best of your ability. Select the option closest to your view.

---

11) What do you think your chances are of getting sick from eating an oyster that has been treated by the Quick-Freezing process? (Please circle one)

**Not at all likely**

**Somewhat unlikely**

**Somewhat likely**

**Very likely**

**I don't know**

12) What do you think your chances are of getting sick from eating a single oyster meal that has been treated by the Quick-Freezing process? (Please circle one)

**1 in 5,000,000    1 in 500,000    1 in 50,000    1 in 5,000    1 in 500    1 in 50**

13) What do you think your chances are of getting sick at least once from eating 10 oyster meals that have been treated by the Quick-Freezing process? (Please circle one)

**1 in 5,000,000            1 in 500,000    1 in 50,000    1 in 5,000    1 in 500    1 in 50**

14) How much do you know about the Quick-Freezing process used to treat raw oysters?

**Nothing at all            Very little            Somewhat familiar            Well informed**

15) Do you expect that traditional raw oysters taste different from oysters that have been treated by the Quick-Freezing process? (Please circle one)

**Y    N**

16) If yes, which do you expect would taste better? (Please circle one)

**Traditional            Quick-Frozen**

## ASSESSMENT STUDIES FOR POST-HARVEST (PHP) OYSTERS:

### Part 2. Buyer and Seller Assessments

#### Attachment 9: Economic Experiment Instructions

##### Experiment Instructions

Please follow along as we read this set of instructions aloud. You will have the opportunity to ask questions during the instruction period.

You have been given **\$15** for participating in this experiment. In this experiment you will have the opportunity to use some of this money to purchase fresh, raw oysters which you will consume at the end of the session. The money you have left over after purchasing oysters is yours to keep.

You must buy oysters in a set 3. The oyster sets will be sold using an auction method. Here is how the auction works:

1. Two types of raw oysters will be auctioned. Details regarding the specific oyster types will be given to you before the actual auction begins. One set of three oysters will be auctioned for each of the two types. **Reminder: All oysters are fresh, raw oysters perfectly suitable for human consumption and U.S. FDA approved.**
2. After being presented with the information regarding the oyster types, the auction will begin. At this time you will simply write on a card provided to your **bid** for each set of three oysters (you will have one card for each of the two oyster types you are presented with). Your **bid** is the amount of money you would be **willing to pay** for the set of three oysters. You will have 60 seconds to make your decisions. The amount you can write down will be constrained from **\$0 to \$5.00** and you will be reminded of this.

The card will look like this for the two oysters types (called A and B in this example):

XX-YY-ZZ
<i>Information regarding oyster Types A and B.</i>
<b>My bid for 3 Type A oysters is _____ (From \$0 to \$5.00)</b>
<b>My bid for 3 Type B oysters is _____ (From \$0 to \$5.00)</b>

The information regarding the two oyster types will appear on the top left. Your bid amounts for each type will be entered below. Note that the amounts you can enter are constrained between \$0 and \$5.00 for the set of three oysters. You can ignore the numbers in the top right, they are participant ID numbers. Your answers will not be linked to your name or email address.

3. After the 60 seconds, the auction closes and your cards will be collected by one of the researchers. The bids from each participant in the room will be tabulated from highest (1<sup>st</sup>) to lowest ( $n^{\text{th}}$ , where  $n$  is the number of participants).
4. Then the next round of bidding will begin. There will be a number of rounds of bidding in the experiment. After all of the rounds of bidding are complete, one of the rounds will be randomly chosen using a bingo ball cage. **Only your decisions in that single randomly chosen round of bidding will be binding.** It is important that you take each round of bidding seriously. You will not know the total number of rounds until the last auction.
5. After the final round of bidding is complete, the binding round will be selected. At that point one of the researchers will turn the handle of a bingo cage until a ball is selected at random. The randomly selected ball will represent the binding round. At that point, the bids from the binding round will be projected on a screen in the front of the room from highest (1<sup>st</sup>) to lowest ( $n^{\text{th}}$ , where  $n$  is the number of participants).
6. Then the bingo cage will be used again to select the price for both of the auctions in the binding round. The handle will be turned until a ball is selected. The first ball selected will determine the price for the Type A oysters. The ball will be replaced. Then the handle will be turned again until a ball is selected. The second ball selected will determine the price for the Type B oysters. The number appearing on the selected ball will indicate which of the ranked bids will be chosen as the price for that oyster type.

Here is an *example* of ranked bids for Types A and B oysters. Note the bids are arbitrarily chosen just for illustration. There are 20 participants in this example.

Rank	Participant ID	Example Bid for 3 Type A Oysters	Example Bid for 3 Type B Oysters
1	13	\$5.00	\$5.00
2	3	\$4.75	\$4.75
3	7	\$4.50	\$4.50
4	11	\$4.25	\$4.25
5	5	\$4.00	\$4.00
6	8	\$3.75	\$3.75
7	17	\$3.00	\$3.00
8	12	\$2.75	\$2.75

9	1	\$2.50	\$2.50
10	20	\$2.25	\$2.25
11	16	\$2.00	\$2.00
12	4	\$1.75	\$1.75
13	12	\$1.50	\$1.50
14	6	\$1.25	\$1.25
15	9	\$1.00	\$1.00
16	14	\$0.75	\$0.75
17	18	\$0.50	\$0.50
18	2	\$0.25	\$0.25
19	10	\$0.00	\$0.00
20	15	\$0.00	\$0.00

In this example, let's assume the first turn of the bingo cage produced the number "12" for Type A oysters. Since the 12<sup>th</sup> highest bid for Type A is \$1.75, that is the selected price for the set of 3 Type A oysters. Assume the second turn of the bingo cage produced the number "7" for Type B oysters. Since the 7<sup>th</sup> highest bid for Type B is \$3.00, that is the selected price for the set of 3 Type B oysters.

- Once the price is announced, those participants that submitted bid amounts **equal to or greater than** the chosen price have agreed to purchase and consume the set of 3 oysters at the chosen price. Note that if your bid exceeds the chosen price, you pay the chosen price, not your bid amount.

To illustrate, suppose there are three auctions in total and the results of the three auctions for an individual participant are the following:

<i>Auction Number</i>	<i>Your Bid for Type A Oysters</i>	<i>Selected Price of Type A Oysters</i>	<i>Will You Purchase Type A Oysters?</i>	<i>Your Bid for Type B Oysters</i>	<i>Selected Price of Type B Oysters</i>	<i>Will You Purchase Type B Oysters?</i>
1	\$2.50	-	-	\$1.25	-	-
2	\$0.95	\$1.00	No	\$4.50	\$3.50	<b>Yes</b>
3	\$4.25	-	-	\$5.00	-	-



After the third auction completes, one of the three auctions will be chosen randomly using the bingo ball cage (each with the same chance of being chosen). Suppose Auction 2 is chosen (as in the Table above). The bingo cage will be used again to determine the selected prices for Type A and B oysters. Suppose the selected price for Type A oysters is \$1.00 and the selected price for Type B oysters is \$3.50. Since the example participant's bid for Type A oysters (\$0.95) in Auction 2 is less than the selected price (\$1.00), he or she will not purchase and consume Type A oysters. However, since the example participant's bid for Type B oysters (\$4.50) is greater than the price (\$3.50), he or she will purchase three Type B oysters at the price of \$3.50 and be required to consume them.

In this example, at the end of the experiment, the participant will be presented with **\$15 – \$3.50 = \$11.50** in cash (plus any winnings from the lottery choice exercise) and three Type B oysters by one of the researchers.

8. With this auction format it is possible to purchase 0 (minimum), 3 or 6 (maximum) oysters in this experiment.
9. Included with these instructions is a **record sheet** in which you can keep track of: your bids, the selected prices from the bingo cage, whether you will be purchasing oysters and the total cost.
10. Once you have consumed any oysters you may have purchased, you will be paid your cash in private and you are free to leave. You must consume your oysters in the lab. Feel free to take your time. If you did not purchase any oysters, you will be paid \$15 (plus any winnings from the lottery choice task) and you are free to leave.

**ASSESSMENT STUDIES FOR POST-HARVEST (PHP) OYSTERS:  
Part 2. Buyer and Seller Assessments**

**Attachment 10: Bid Sheet Examples for Frozen (LTF) Product**

T1-A1-01

The two types of oysters available for purchase through the auctions are:

Set of 3 - *Traditional* raw oysters

Set of 3 - *Quick-frozen* raw oysters

**My bid for 3 *Traditional* raw oysters is \_\_\_\_\_ (From \$0 to \$5.00)**

**My bid for 3 *Quick-frozen* raw oysters is \_\_\_\_\_ (From \$0 to \$5.00)**

**ASSESSMENT STUDIES FOR POST-HARVEST (PHP) OYSTERS:  
Part 2. Buyer and Seller Assessments**

**Attachment 11: Supplier Willingness to Carry Survey**

Q1.1 Thank you for taking a look at our request for your input. We are asking for your help with a research project that was funded by the Interstate Shellfish Sanitation Conference (ISSC) to measure seafood supplier willingness to offer post-harvest processed Gulf of Mexico oysters to consumers. The U.S. Food and Drug Administration (FDA) is currently considering a requirement that all Gulf of Mexico oysters destined for the raw (half-shell) market harvested from April through the end of October be post-harvest processed using one of several approved methods. We are university researchers interested in gathering market information from professionals like yourself to help with a national policy decision that is currently facing the FDA and that will influence the national market for oysters. Your participation in this survey is voluntary and your responses will be kept anonymous. You are free to quit your participation at any time. It should take less than 5 minutes to complete the survey. Thanks again for your help with this important project.

Q1.2 How would you categorize your organization?

Retail food products (1)

Wholesale food products (2)

Restaurant (3)

Institutional food service (4)

Food product producer (5)

Other (Please specify) (6) \_\_\_\_\_

Q2.1 What is your job title? [Open ended]

Q2.2 In what year did you begin working in the seafood industry? [choices 1950-2011]

Q2.3 In what year did you begin working in your present position? [choices 1950-2011]

Q2.4 In what zip code is your workplace located? [Forced 5-digit]

Q2.5 About how many employees work at your location?

fewer than 10 (1), 11 - 20 (2), , 1 - 30 (3), 31 - 40 (4), 41 - 50 (5), 51 - 60 (6), 61 - 70 (9), 71 - 80 (7), more than 80 (8)

Q2.6 Approximately how many pounds of raw (half-shell) oysters does your organization handle in an average month?

Please insert monthly pounds of oysters: (1) [open ended]

Q2.7 Please indicate the following:

\_\_\_\_\_ What percent of your business in an average month involves seafood? (1) [open ended]

\_\_\_\_\_ What percent of your seafood business in an average month involves raw (half-shell) oysters? (2) [open ended]

Q3.1 Please indicate your agreement with the following statement about post-harvest processed (PHP) oysters:

	strongly disagree (1)	disagree (2)	neutral (3)	agree (4)	strongly agree (5)
I am knowledgeable about PHP oysters. (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q3.2 About what percentage of the oysters that you sell in an average month are post-harvest processed (PHP)?

\_\_\_\_\_ PHP Oysters Sold (%) (1) [open ended]

Q51 Considering your seafood purchases next year with no new FDA restrictions in place, how likely are you to purchase the following items?

	April 1 through October 31						November 1 through March 31					
	Does not Apply (1)	Very Unlikely (2)	Unlikely (3)	Neutral (4)	Likely (5)	Very Likely (6)	Does not Apply (1)	Very Unlikely (2)	Unlikely (3)	Neutral (4)	Likely (5)	Very Likely (6)
Raw (half-shell) oysters (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Shucked Oysters (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Post-harvest processed (PHP) oysters (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q3.4 There is a risk to people with health issues (liver problems, diabetes, immune deficiencies) from consuming raw oysters from the Gulf of Mexico. The risk is due to a naturally occurring bacterium (*Vibrio vulnificus*) that is present in warm saline waters, especially during summer months. While healthy individuals are not affected, approximately 20 at-risk people die annually from Gulf of Mexico raw oyster consumption. The FDA has approved several "post-harvest processing" (PHP) methods that have been proven to eliminate *V. vulnificus* risk in raw oysters. The FDA is currently considering a requirement that all Gulf of Mexico oysters destined for the raw, half-shell, market from April through October be post-harvest processed. This processing comes at a cost but reduces risk to at risk consumers (it eliminates the risk of death). It also makes for easier and safer shucking, and in some cases results in longer shelf life. A taste test study at the University of Florida has suggested that consumers find PHP oysters acceptable although there was still a preference for the traditional raw product. Focus group results from individuals like you indicated a supply chain willingness to include PHP product given an FDA requirement. We would like to ask you a few questions about the willingness of oyster retailers and wholesalers to include PHP oysters in their product lines.

Q3.5 How important to raw (half-shell) oyster sellers do you think the following post-harvest processed (PHP) oyster characteristics are?

	Unimportant (1)	Somewhat Unimportant (2)	Neutral (3)	Somewhat Important (4)	Very Important (5)
Easier to shuck. (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Less chance of injury while shucking. (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Less risky to at risk consumers. (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Price relative to traditional oysters. (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q3.6 How sensitive do you think your raw (half-shell) oyster consumers are to changes in price? Please indicate the degree to which you agree or disagree with the following statement:

	Strongly Disagree (1)	Disagree (2)	Neither Agree nor Disagree (3)	Agree (4)	
My customers are very sensitive to price changes. (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q3.7 A common wholesale raw (half-shell) oyster purchase quantity is 60 pounds. Approximately what price do you pay per 60 pound quantity (about 15 dozen) of raw oysters in the shell? [open ended]

Q3.8 Approximately what is the average price that you receive per raw oyster that you sell? [open ended]

Q4.1 Thinking about a dozen raw (half-shell) oysters, suppose that by adopting post-harvest processed (PHP) oysters: The price you Pay goes up by [\$.25, \$.60, \$1.00] per dozen

Without an FDA requirement, would you choose to adopt PHP oysters and, if so, in what combination?

- Yes and only PHP oysters (1)
- Yes and both PHP and traditional oysters (2)
- No, stick with traditional oysters only (3)

Q5.1 Suppose that the FDA bans the sale of raw (half-shell) oysters from the Gulf of Mexico from April through October. Given the same change in prices received and paid, what would you choose to do?

- Change the source of my raw (half-shell) oysters (1)
- Serve PHP oysters as raw (half-shell) (2)
- Stop serving raw (half-shell) oysters completely (3)

Q5.2 You indicated you would change your raw oyster source and purchase raw (half-shell) oysters from other fisheries, how much do you expect the price you pay would change? Please choose the quantity level you are most familiar with and enter the price change in the box:

- Price change per dozen: (1) \_\_\_\_\_
- Price change per oyster: (2) \_\_\_\_\_
- Price change per 60 pound container: (3) \_\_\_\_\_

Q5.4 What is the most you would be willing to pay per oyster for a PHP (post-harvest processed) half-shell oyster?

With the FDA proposed ban: (1) [open ended]

Without the FDA ban: (2) [open ended]

Q5.5 What is the maximum selling price you would expect to receive per oyster for a PHP (post-harvest processed) half-shell oyster?

With the FDA proposed ban: (1) [open ended]

Without the FDA ban: (2) [open ended]

Q52 Considering your seafood purchases next year, how likely are you to purchase the following items if the proposed FDA restriction on raw (half-shell) oysters is in effect from April through October?

	April 1 through October 31						November 1 through March 31					
	Does not Apply (1)	Very Unlikely (2)	Unlikely (3)	Neutral (4)	Likely (5)	Very Likely (6)	Does not Apply (1)	Very Unlikely (2)	Unlikely (3)	Neutral (4)	Likely (5)	Very Likely (6)
Raw (half-shell) oysters (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Shucked Oysters (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Post-harvest processed (PHP) oysters (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q5.6 Again, as we mentioned earlier, the FDA is considering a requirement that all Gulf of Mexico oysters destined for the raw, half-shell, market from April through October be post-harvest processed. Overall, what kind of impact do you think this requirement would have on your business were it to be implemented?

- Very negative impact (1)
- Negative impact (2)
- Somewhat negative impact (3)
- Not sure (4)
- Somewhat positive impact (5)
- Positive impact (6)
- Very positive impact (7)

**ASSESSMENT STUDIES FOR POST-HARVEST (PHP) OYSTERS:  
Part 2. Buyer and Seller Assessments**

**APPENDIX 1**

**A selected set of annotated version of the group responses is arranged per question.**

**Question 1: What were your expectations about the taste of the different oysters and how did the actual taste compare with what you expected? *Probed for overall impression of the types.***

Question 1, Group 1

FSMGR1.1: Expected the traditional raw (T) to be saltier and found them to be. "...some of the other ones didn't have that very briny thing that we come to know from oysters."

CHEF 1.1: "The traditional (T) had a nice salinity, if you're looking for that." With respect to the aroma... "I thought all were close."

CHEF1.2 "The freshness and the flavor is what I expected, and the traditional (T) is the one that really came through. And then, I thought the press (HP) and the irradiated (GI) ones had a poor color in the liquid that was remaining in the shell. It was dark and didn't look appetizing."

RESOWN1.1: "The pressurized one (HP) was good."

CHEF 1.1: "It (HP) was plump."

RESOWN 1.1: It looked best to me, the pressurized (HP). *(followed by general agreement from 4+ of the participants)*

Key part of the discussion:

FSMGR1.1: "If you're talking about taste, and that aroma and flavor of the traditional that everyone here knows an oyster should taste like, I would go with the traditional (T), but if you're talking combined with appearance and everything else, the pressure (HP) was the one that really stood out."

CHEF1.3: "That's exactly what I was thinking."

CHEF1.1: "And that's what I was thinking too."



FSMGR1.1: And the pressure (HP) was the one that looked like we expect it to look when the guy behind the bar is opening it up and sitting it in front of you.”

RESOWN1.1: Yep.

#### Summary of Question 1 from Group 1

A majority of the participants agreed that among the PHPs, the pressure treated (HP) stood out favorably – they looked better than traditional (T) (were plumper) and compared favorably to the traditional (T) on aroma and flavor. The irradiated (GI) was the least appealing in terms of color; and was referred to as “unappetizing.” Two participants (CHEF1.3, FSMGR1.1) indicated that the frozen (LTF) was the least salty. One participant (FSMGR1.1) indicated that the heat treated (MH) tasted artificial.

#### Question 1, Group 2

CHEF2.1: “I think my first expectation was that there would be a visual difference. That between the various processes, there would be a difference in plumpness, and maybe with the heat process (MH) there would be some curling of the edges or something like that. Essentially, they all looked pretty much the same. I was really kind of surprised about that.”

WHSE2.1: “I felt there was a little difference in some of the color. I could see that some looked more natural, their natural color, and some looked a little paler. The pressured (HP) looked a lot paler in color. It looked like something had happened to it.”

CULSTD2.1: “I think my favorite of the textures was the irradiation (GI) and I think one of the ones I didn’t like as much was probably the traditional raw oyster (T), and I was surprised at that.”

FSMGR2.1: “I always thought that the traditional (T) I would find the best, but to be honest, I was amazed to find that my favorite amongst them was the frozen (LTF).”

WHSE2.2: “The traditional (T) was my favorite out of all of them. ...This was my first time trying a PHP oyster and I thought that they lost a lot of the saltiness to them.” “My least favorite was the irradiated (GI).”

RESOWN2.1: “Honestly when I looked at them, I thought they all looked quite different....As a restaurateur, I’m looking at it from a customer standpoint. ...I love traditional (T). ...But I really, really liked the pressured (HP). For a customer, for selling it, I would sell the pressured (HP). It was visually nice, really plump...it had good flavor.” “I didn’t like the heat (MH), frozen (LTF) or the irradiated (GI).”

#### Summary of Question 1 from Group 2

Although there was little consensus as to a favorite type of PHP, 50 percent of the participants indicated that they preferred the traditional raw (T) to the PHPs. Pressure treated (HP) was rated by one participant as the favorite and by another as least favorite. Irradiated (GI) was mentioned twice as the least favorite.

#### General findings from Question 1, Groups 1 and 2

Of the PHPs, pressure treated (HP) received the most favorable mentions across the groups and irradiated (GI) was viewed as the least favored across the groups. When saltiness as a favorable attribute is taken into consideration, frozen (LTF) was also perceived unfavorably, with four mentions across the groups.

**Question 2: When you consider the risks associated with eating traditional raw oysters, how well do PHP oysters reduce this risk? How important is it for you in your business to mitigate or reduce this risk?**

#### Question 2, Group 1

CHEF1.1: "If you are somebody who is eating oysters, you know the risk. I've eaten oysters. I've know the risk for a lot of years. I still go in there and I want the raw oysters. I don't want them steamed, lightly steamed. I want the taste. I want the mouth feel. Because when you steam them, it changes the mouth feel."

FSMGR1.1: "Yes."

RESOWN1.1: "Uh-huh."

CHEF1.1: "So am I worried about risks? Sure. But you've got to notice it. You look at any menu today out there and they tell you, 'If you eat these, you're taking them at your own risk.' "

RESOWN1.1: "Well where I'm from, we're not near the ocean. A lot of people have never had oysters, and to get them to try them, even sometimes, is tough, especially when they've heard you can die from eating oysters. Now, maybe it's over-exaggerated. But in the area I come from, we sell a lot of beef, and there have been great strides in that to make sure you don't get various problems with beef. So, the oysters that would be guaranteed, pretty much, to not have this problem [risk of death] would be easier for us to sell."

CHEF1.2: "As far as the risk goes, if you can take it down to zero, that's great. And you never want to be the one that had one out of the 15 die on your property. That's not a good thing."

#### Summary of Question 2 from Group 1

Risks are known and an important issue in selling raw oysters to end customers. Reducing or mitigating the risks via use of PHP oysters would be favorable to the professionals in this group.

### Question 2, Group 2

FSMGR2.1: "I think it's real important to follow the labeling on your sacks of oysters to make sure they're fresh, know the conditions they've been stored and handled in, and if you know your suppliers, you follow your tags, that's the big way to keep yourself out of trouble...With the standards that the FDA has, and knowing that they're a processed oyster, that it's well-controlled, it goes a long way to your being able to assure yourself that it will be a safe oyster and a safe product to present to a customer."

WHSE2.1: I like the fact that there is reducing risk involved. I don't feel that some of the processes here (PHP), are investigated enough to really know how much they're reducing the risk. I mean, irradiating a product; it doesn't even sound good."

WHSE2.2: "I deal with a lot of chain business for some of the really big restaurant chains, and they require in the summer months that we test our oysters every month. ...So I think this PHP product would help allay those concerns of some of those chain buyers....Because for them, it is a big liability, serving oysters."

CHEF2.1: "I think that my clients would still demand the traditional (T). And to your point (gestures toward FSMGR 2.1), knowing your distributors is the real key. Proper handling of the product is really the key."

WHSE2.1: "The cost factor is important too, of the processed product with the extended shelf life. I mean we carry a frozen (LTF), a pressured (HP), and a traditional (T), and being able to tell my restaurant owners that I have this available for fresh, and by the time we get it, you're going to have 14 days in your cooler with this product with no chance of sickness. And after 10 days you can freeze it and pull them out as you need it that gives that customer a lot of ease. They know it's not going to cost them, they're not going to have to throw anything out. They don't have to worry about it at all. So, from a cost perspective, it saves the end user a lot of money and they're willing sometimes to sacrifice quality depending on who they're serving at that particular time. So that is good."

RESOWN2.1: "I like the processing. I mean from my point of view, I'm definitely going to spend more money if it costs more. I'm okay with that because of the extended shelf life. ...But just the idea of thinking at night, is somebody going to get sick off that tomorrow? Even though we have good food handling processes, this is something you can actually tell your customer. You can brag about the fact that, 'I'm taking these extra steps for you.'"

## Summary of Question 2 from Group 2

Risks are known and an important issue in selling raw oysters to most end customers. Reducing or mitigating the risks via use of PHP oysters would be favorable to most of the professionals in this group. There is at least one exception; some discriminating clients would still insist on being served traditional oysters (T). Whether for post-harvest processed (PHP) or traditional (T) oysters, controlling risk by having in-depth knowledge of the supply chain is viewed as important by many participants in this group.

## General findings from Question 2, Groups 1 and 2

Risks are known and an important issue in selling raw oysters to most end customers. Reducing or mitigating the risks via use of PHP oysters would be generally viewed as favorable.

**Question 3: How well-accepted would PHP oysters be in the marketplace, in general, and by your customers, in particular?**

## Question 3, Group 1

FSMGR1.1: "I think part of this is going to be a cultural thing -- because, you know, some of us who have lived and grown up on the Gulf Coast, raw oysters are everywhere. ...But, we know that people eat oysters -- all year long if they can. There are thousands and thousands of oysters consumed a year, and he's right, if there are only 15 cases a year, you're not going to sell the irradiated (GI) oysters to people on the Gulf Coast. Your dyed-in-the-wool raw oyster eaters, your residents, I really don't think they're going to go for it."

*[General agreement]*

RESOWN1.1: "You know the irradiation, that word turns people off real fast. But in our area, on beef, like, I guess I know a lot more about beef, but most of the beef that we would buy -- in fact, all that we buy, has had that process done to it. It's just never mentioned. But when it goes through the houses where beef is cut, and the like, it automatically is on conveyor belts and it automatically goes through that. And the reason for it is the *E. coli*. And you've seen that on the news, and if you get that in your restaurant, you might as well lock the door up, you're gone. So that's an important thing to us, is having it pure.

RESOWN1.1: (As far as irradiated beef goes) "don't even mention it. I wouldn't use that word, irradiation, because that scares people."

CHEF1.1: "...chicken can kill -- they use the Cobalt radiation down outside of Miami, the plant down there. It's closing because nobody will buy the chicken, because once they say it's

radiated chicken, and everybody goes "Radiation," they back off. ...So, you're right. You're thinking of beef, but you're not telling them."

CHEF1.2: "And then, most of the people that...I can serve the oysters too wouldn't know one from the other, and then there's the other smaller groups that I get that if you don't have someone out there, and you don't have your fresh oysters and shucking them for them, that's half the sale, is the presentation. So, without that, you know -- if you're doing a buffet, and you're sending out tons and pans of oysters on the half shell, that's one thing, but just to have the presence of someone opening it and have it fresh in front of you, that's -- that's a big plus."

CHEF1.3: "Oh, yeah. I think my clients would be happier with an oyster that's free of contaminants and so forth, because of their age and -- you know, they take care of their health."

Key part of the discussion (marketplace acceptance of PHPs):

CHEF1.3: "I think they'll accept it."

CHEF1.2: "Yeah, and I agree. If you take the term irradiation away from there, it will be much more acceptable."

CHEF 1.1: "I agree. The people want safe food, and especially in today's day and age, you know, unsafe food gets news. I mean, you know, it's on there all the time... If you just say -- if you call it..."

FSMGR1.1: "Treated."

CHEF1.1: "Yeah, treated, or whatever you want to call it."

CHEF1.1: "If you just say these are post-harvest processed oysters -- and whatever you do -- then that will sell."

CHEF1.3: "Yeah."

FSMGR1.1: "Yeah. Yeah, you're right."

MODERATOR: "So you don't think they need to necessarily know how the post-harvesting took place?"

CHEF 1.1: "How? No."

FSMGR1.1: "No."

CHEF1.3: "No."

CHEF1.1: "It's too much information."

*[General agreement across all participants]*

FSMGR 1.1: "And you know, and your average person working in the restaurant, the server, whomever, they're not going to know what post treated is anyway, they just know that it's -- it's made safe."

CHEF1.1: "And the server says, you know, we got rid of the bacteria in here, so it's safer for you to eat it raw."

RESOWN1.1: "True."

RESOWN1.1: "Plus, there are a ton of people from my area that spend the winter here (in Florida). And if there's something in there that these are, you know, processed in a way that makes them very healthy, that means something to those people."

### Summary of Question 3 from Group 1

There was a high level of agreement among participants that PHP oysters, in general, would be accepted in the broader marketplace. However, there might be some cultural effects such that people in coastal markets who regularly consume traditional raw (T) oysters may be less accepting of PHP oysters. The amount and content of the information provided to customers about the safety and benefits of PHP oysters should be carefully considered to avoid information overload. Further, for irradiated oysters (GI), the use of descriptors such as "irradiated" and "radiation" should be avoided due to the strong negative connotation of those terms.

### Question 3, Group 2

WHSE2. 1: "Even in hotels, the appearance is that it is the best of quality from the outside, but that's the perception of somebody outside of that business: They're going to the Ritz Carlton to get the best. Well, those places are very much in tune with what's out there and this product and I'm guaranteeing that most of those facilities are using a product that's already pasteurized, especially in the State of Florida, because of the liability issue .... And they just don't tell the customer."

WHSE2.1: "...it just says oyster on the menu. But the perception is that you're at \_\_\_\_ Golf Club, and everything else is wonderful ..."

WHSE2.1: "And then that little sports guy bar that built his business off his oysters and shellfish, he will not compromise on this product. He is harder to sell this product to than any country club chef there is."

CHEF2.1: "I agree with that 100 percent."

RESOWN2.1: "Uh-huh, yeah, I do too."

WHSE 2.2: "You know, I deal with a lot of the expense account steak houses -- nationwide steak houses, and they don't care what the cost is for oysters as long as they're getting the absolute best oyster."

CHEF2.1: "And getting the absolute best, is that -- does that mean that they're always getting --"

WHSE 2.2: "Traditional raw (T). ... Raw, yeah."

WHSE2.1: "They're all acceptable for consumption."

CHEF2.1: "I'm dealing basically with the end consumer, so for -- because of the nature of my business, if people ask for oysters, they're generally purists, so they're going to want, you know, the traditional oysters (T),... I think that for my clients, they would still demand the traditional."

### Summary of Question 3 from Group 2

There are differences among participants about the degree to which PHP oysters, in general, would be accepted in the broader marketplace. These differences arise primarily from the differences in the profiles and preferences of their respective end users (consumers). There is some level of agreement that PHP oysters are, in general, acceptable for consumption.

### General findings from Question 3, Groups 1 and 2

There is a moderate level of agreement among participants across Groups 1 and 2 that PHP oysters, in general, would be accepted in the broader marketplace. However, the culture, profile, and preferences of the final user will be a strong determinant of the degree of acceptance of PHP oysters. Marketing issues such as the amount and content of information provided to end users should be carefully addressed. There is a general level of agreement that PHP oysters are acceptable for consumption.

**Question 4: What is the likely impact on retailers and restaurants of the various factors associated with carrying PHP oysters such as monetary and non-monetary costs, shucking, shelf life, and seasonality?**

### Question 4, Group 1

CHEF 1.1: "Are the pressured (HP) oysters still shelled? Do you have to open them up?"

FSMGR 1.1: "Yes."

CHEF 1.1: "So you could still do those shucking in front of the customer, right?"...You take the bands off, and you shuck them in front of them, and they get the impression they're being shucked, right?"

FSMGR 1.1: "Exactly. Yes."

CHEF 1.1: "I'm thinking -- about presentation, see."

CHEF 1.2: "And it's about the show."

FSMGR 1.1: "When you're doing the presentation, it is about the show."

CHEF 1.1: "It's all about the show."

FSMGR 1.1: "I've seen them at the regional food shows and, you know -- you don't need an expert shucker in order to get that done. Your average waitress can open one up."

MODERATOR: "So as long as you can have the show, .... that's not an issue? Do you guys agree with that?"

CHEF 1.3: "Yeah."

RESOWN 1.1: The cost of doing the different processes, which -- is the pressured (HP) one probably the most expensive? I would suspect that.

MODERATOR: "So would that be a factor? Would that additional cost be a factor?"

CHEF 1.3: "Oh, definitely."

CHEF 1.1: "Definitely."

RESOWN 1.1: Mine are Fed Ex'd in, so it ain't going to bother me much.

CHEF 1.1: "Hey, I guess if I'm doing catering, I definitely can pass off the cost. That's not a problem. And, you know, in a catering, we're going to do more display than something right in front -- unless it's ordered that way. Then I'm going to charge them for that. So you're looking at a whole different ball game. So, the cost is an issue in a sense, but not, for me."

CHEF 1.2: "It would seem like the labor costs would be a little bit less too, so I think that difference in the costs you can make up a little bit on your savings on the labor."

MODERATOR: "It would still remain competitive or even be more competitive if you decided to offer these -- types of oysters?"

CHEF 1.3: "Possibly."



CHEF 1.1: "Depends where you are. If you're sitting in New Orleans and eating, and you're talking about pressured (HP), and this and that, and you're a traditional (T), you're growing up with that, you know what I mean, you got to beat that culture. "

MODERATOR: So I'm getting the idea -- would you say that you have a favorable opinion or attitude in general towards these products?

CHEF 1.3: "Yeah."

CHEF 1.1: "Yes."

FSMGR 1.1: "Yes."

#### Summary of Question 4 from Group 1

Presentation (shucking) to the end customer is important. There is general agreement that the additional costs that may be associated with carrying and offering PHP oysters are a factor for consideration. Certain intermediaries may be able to pass on potential premiums to end customers, but it may depend on geographic location and the profile of the end user.

#### Question 4, Group 2

MODERATOR: "The cost factor seems to be very interesting here. But let's just say that there was a premium. Would that be something you could pass off to your customers, do you think?"

WHSE2. 1: "You mean, you charge them more?"

WHSE 2.1: "Well, honestly, I think the traditional oyster (T) is usually sold at a lot higher price than our processed product.

WHSE2.1: "So, I'm kind of surprised that the pressured (HP) is inexpensive in my opinion as a traditional (T), but people know that the seafood companies are easy to go in there and say, 'Hey, this is a fresh product; that's why it cost more.' There's a shorter life span for them to get that product to you ---- in those situations, and it is more expensive. So, I don't know why they're talking about charging more for this."

MODERATOR: "Let's say, the price did go up because of media hype or what have you, would that be something that you could pass on to your customers?"

WHSE2.1: "It would take a while. I think they could get it in the Midwest easily right away, and I think on the coast, it's going to be harder."

RESOWN2.1: "Yeah, maybe. Actually, it depends on what the percentage was. I would probably eat the cost."

CHEF2.1: “I would like to say that, I would be able to encourage my clients to go with a PHP product, but I think that it just involves more education.”

RESOWN2.1: “Yeah. I think overall people will accept it because they'll have to. Like anything that's ever thrown on us, we have to accept it at some point.”

WHSE2.2: “In terms for us to sell a PHP product, you need to really take a long, hard look at the marketing of it. We need to come up with a more user-friendly name for a lot of these terms, for the consumer. So, if it came down to it, yes, we could sell it, but we would really need to do a whole different thing with the marketing.”

WHSE 2.2: “Yeah. I think the fastest way this whole scenario will hit the everyday people is through their favorite restaurants. They're going to go there. Once they hear about it on the media, they're going to find out that their local restaurant has been serving a high pressured (HP) oyster for months. And they're not going to know the difference, and then they're going to be like, ‘Oh,’ and then they're going to talk to their friends about how so-and-so serves this, and that's how it's going to be around and be accepted. I mean, it will no matter what, and I think it is good at the end of the day.”

#### Summary of Question 4 from Group 2

There is general agreement that the additional costs that may be associated with carrying and offering PHP oysters are a factor for consideration. However, not everyone is in agreement that the market will bear a higher price for PHP oysters as compared to traditional raw oysters (T). Garnering end user acceptance will require a combination of education, marketing, and cost considerations. Ultimately, acceptance of PHP oysters in the broader marketplace may just be a matter of time.

#### General findings from Question 4, Groups 1 and 2

There is general agreement that the additional costs that may be associated with carrying and offering PHP oysters are a factor for consideration. Certain intermediaries may be able to pass on potential premiums to end customers, but it may depend on geographic location and the profile of the end user. Not everyone is in agreement that the market will bear a higher price for PHP oysters as compared with traditional raw oysters (T). Garnering end user acceptance will require a combination of education, marketing (including point-of-purchase presentation and the shucking “show”), and cost considerations. Ultimately, acceptance of PHP oysters in the broader marketplace may just be a matter of time.

**Question 5: What will be the likely impact of the proposed FDA ban on traditional raw (T) Gulf oysters from April 1 through October 31 on the willingness of retailers and restaurants to carry PHP oysters?**

Question 5, Group 1

RESOWN 1.1: "I don't ever like the government in my business we get enough of that."

CHEF 1.2: "Right. So then you're -- okay, we can get these now, and then next month, we can't get them fresh anymore."

CHEF 1.1: "What it's going to do is raise the prices year-round."

CHEF 1.3: "Prices are going to go up."

FSMGR 1.1: "I don't know. Like he said, it's a double-edged sword. You know, looking out for the protection of people and you know --"

CHEF 1.3: "I think anytime the government gets involved with anything, and they shoot the price up, we pay for it."

*[General agreement about price increases]*

MODERATOR: Interesting. So would you try to get some raw oysters from elsewhere?

CHEF 1.1: "Depends on the cost."

FSMGR 1.1: "Exactly. And if you look at the cost of let's say the pressure-treated (HP) one, as opposed to shipping something in from New England...You're buying pressure treated (HP)."

CHEF 1.1: "I'd be buying pressure treated (HP) ones. It's down to cost, you know, the bottom line is cost."

FSMGR 1.1: "And I think your average consumer would, say, if I want raw oysters, do I want to pay this exorbitant amount of money to get them from the Northeast. ...Personally, as a consumer, and as a chef, I would definitely go for the pressure treated (HP)."

CHEF 1.1: "Yeah."

RESOWN 1.1: "Yeah."

Summary of Question 5, Group 1

If the FDA ban should go into effect, costs will go up. There is general agreement that government involvement would mean higher prices. Some respondents indicated that they

would buy the pressure treated (HP) oysters, rather than seek traditional raw (T) from other regions beyond the Gulf of Mexico.

#### Question 5, Group 2

WHSE2.2: "It's a very big issue for us up north, because we feel that if they were to enact this ban on Gulf oysters, it's only a matter of time before they enact the ban on northern oysters no matter what, because there is a liability for eating raw oysters. We think that there's such a liability now with anyone, such a litigious climate out there, that they would eventually enact the ban for northern oysters."

WHSE 2.1: "I think seafood companies would pursue other avenues to get fresh oysters during that time period, even if it's not cold water. I mean, a lot of product is coming out of South America, Chile, those areas, those regions of the waters right now. ... I think that any smart business seafood owner or big house would go ahead and look at procuring product in those areas."

CHEF2.1: "I think that my clients would pay a premium to get the raw, wherever, it came from. You know, I have commitments to myself about where I get shrimp and things like that. You know, I use as much local product as I can. I use Gulf product as much as I can. But, the reality is, is that you know, people want to see big fat shrimp, so it's going to be the same with oysters. They want to see fresh raw oysters."

FSMGR2.1: "I would probably go the frozen (LTF) during the summer season and go back to the raw (T) after October."

WHSE 2.1: "I think ...the bulk of people are going to accept it. Most consumers are going to accept (it). And if they do end up going through with the ban, I think that there will be a lot of people upset in the beginning, and then people are going to say they understand why they made that decision, and they're okay with it, and then a year or two after it happens, nobody will even care."

CULSTD2.1: "I just don't think most people care. They just want good, quality food. And if it's good, then I think they will accept other types of oysters."

WHSE2.1: "...most processing facilities that are going to process it will probably end up investing money in to figuring out how to farm raise product year around in a sustainable environment."

WHSE 2.2: "They'll take that *vibrio* right out ... through aquaculture."

WHSE 2.1: "Exactly."

### Summary of Question 5, Group 2

There was not consensus as to the likely effects of the proposed FDA ban. Several participants indicated that they would attempt to procure raw oysters from other regions, even at a premium price. One participant said he would purchase PFP type frozen (LTF) during the months in which the ban on Gulf oysters is in effect, and then go back to traditional raw (T). A final potential response was that the ban might stimulate an aquaculture approach to develop a product that was resistant to *Vibrio vulnificus*.

### General findings from Question 5, Groups 1 and 2

There was not consensus across groups as to the likely effects of the proposed FDA ban. Several participants indicated that they would attempt to procure raw oysters from other regions, even at a premium price. Other respondents indicated that, with time, the ban, and PHP oysters, would come to be accepted in the marketplace. Several respondents across groups indicated that they would purchase some type of PHP oyster during the months in which the ban is in effect. The specific types mentioned included frozen (LTF), and pressure treated (HP). Some respondents indicated that they thought costs would go up. Another potential response to the ban was a stimulus to aquaculture, to farm-raise bacteria-resistant oysters that could be served as traditional raw (T).

### **Question 6: A summary of participants' opinions of PHP oysters.**

#### Question 6, Group 1

RESOWN 1.1: "The heated (MH) and, you know, the pressure (HP) ones, they look nice. When you're selling things, the appearance is half the eating of it. ...So that one (the HP) probably would be the best one."

CHEF 1.2: "I think that with my clients, if they want it, and if they want it fresh, they'll say bring it (T) in from wherever you need to get it. And that's what we would do."

MODERATOR: "Okay (Chef 1.3). I'm just asking, you know, to think about if you -- if the ban was in effect-- if you would choose to -- if you think your customers would accept the PHP type?"

CHEF 1.3: "Oh, they would. They would accept that."

RESOWN 1.1: "Well, the pressure (HP) one would be the best one for that....They would be the ones I want to sell."

CHEF 1.1: "I'm a traditionalist, so I like the traditional oysters (T), but I think the customers in this day and age, the pressured (HP) would probably be the way to go, especially with the

presentation that you can still keep, and the idea that they're going to be a bacteria-free type of thing.”

CHEF 1.2: “I agree that the pressured (HP) one can be used, and it wouldn't be a problem using them, or buying and purchasing them, selling them.”

CHEF 1.3: “I think any one of these would be fine. You know, I liked them all. They're all a product I could sell.”

FSMGR 1.1: “I think the pressure (HP) treated ones would probably go over better with the appearance and everything. It would definitely sell.”

#### Summary of Question 6, Group1

A majority of the participants in Group 1 have a preference for the pressure treated (HP) oysters. One participant indicated that cost is no consideration when clients strongly prefer traditional raw (T) oysters.

#### Question 6, Group 2

FSMGR2.1: “I think PHP will end up happening just as homogenized milk happened. My grandfather was a dairy farmer in New Jersey. I drank a lot of Golden Guernsey straight an hour ago from the cow and I tell you what, our family in New Jersey was a healthy family. You get good product that has been handled well, it's safe. You get a product (this PHP) that's been made safe, so at the end of the day we can all keep healthy by eating healthy product, whether it's the fresh traditional (T) or the one that's guaranteed healthy, PHP. Keep the customer happy, keep the customer healthy, keep the populace healthy, and we all live for a long time.”

#### Summary of Question 6, Group 2

The quotation above was reflective of the generally high level of supply-chain/value-chain orientation among the participants in Group 6.