

Consumer Preferences for *Postharvest-Processed Raw Oyster* Products in Coastal Mississippi



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INTRODUCTION

U.S. per capita oyster consumption has declined from about 0.35 pound during 1971–1989 to less than 0.25 pound starting in 1990 (Figure 1). Oyster consumption may be affected by many factors: region, ethnicity, age, gender, income level, and awareness of potential risks. Results of recently conducted national surveys revealed several reasons consumers gave for not eating oyster products or not eating them more frequently. Hanson et al. (2003) reported that taste, texture, and smell were the most widely cited reasons for not consuming oyster products. Respondents who ate oyster products considered price, product safety concerns, and lack of fresh products as the top three reasons for not eating them more frequently.

In surveys conducted in Houston, Texas; Baltimore, Maryland; Boston, Massachusetts; and Gulfport, Mississippi, respondents who did not eat raw oysters cited several limiting factors that influenced their consumption decisions (Posadas et al., 2002). These reasons included perceptions of oyster taste, appearance, sliminess, smell, safety, color, grittiness, and internal waste. Hanson et al. (2003) concluded that oyster consumers would increase consumption if the product was sold at a lower price, product safety was guaranteed, and fresh oysters were more available.

The Mississippi State University Coastal Research and Extension Center

(CREC) and the Mississippi Department of Marine Resources (DMR) Seafood Technology Bureau jointly undertook a collaborative research and outreach program on oyster postharvest processing. The primary goals of this program were to evaluate consumer acceptance of postharvest processing (PHP) of raw oyster products and to determine economic viability of processing systems that comply with federal and state regulations. As of summer 2004, four of the five commercial raw oyster PHP plants operating in the United States were located in the Gulf of Mexico states. The three commercially available PHP systems include heat-cool pasteurization (HCP), high-hydrostatic pressure (HHP), and individual quick freezing (IQF). These

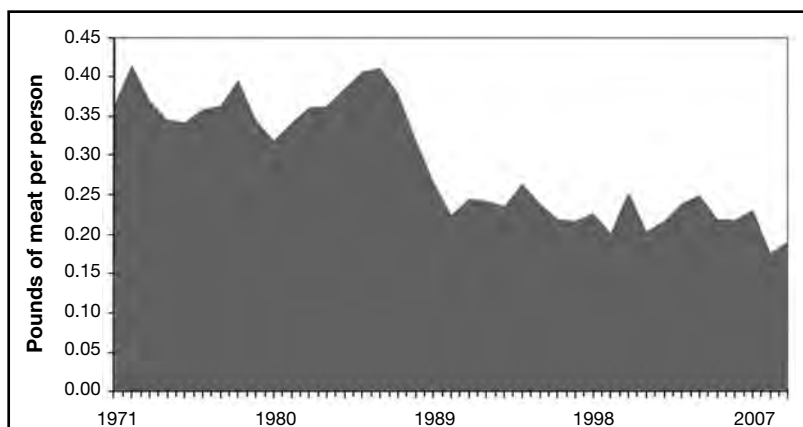


Figure 1. Apparent per capita consumption of oyster products, United States, 1971–2009. Sources of raw data: National Marine Fisheries Service (1977, 1987, 1997, 2007, 2010).

PHP technologies significantly reduce levels of certain bacteria that naturally occur in waters where oysters are found, provide quality raw oysters, and enhance the shelf life of raw oysters (Andrews, et al., 2000; Andrews, et al., 2002; Cook, 1997; Cook and Ruple, 1992).

The overall goal of this consumer survey was to evaluate consumer preferences for PHP raw oyster products in coastal Mississippi. There were five specific objectives of this study:

- (1) Determine socioeconomic characteristics affecting raw oyster consumption;
- (2) Determine reasons for not eating raw oysters and food safety concerns about eating them;

- (3) Evaluate consumption patterns and sources of raw oyster purchases;
- (4) Measure willingness to buy and to pay for PHP products; and
- (5) Evaluate packaging preferences for PHP products.

Results of this survey on PHP raw oyster consumption provided guidance to oyster processors, distributors, and researchers to concentrate on important quality attributes as perceived by the respondents for the development and promotion of PHP raw oyster products. Additional surveys on PHP raw oyster consumption were conducted in selected Metropolitan Statistical Areas (MSA).

METHODS

Consumer preferences for PHP raw oyster products were evaluated from results of a voluntary consumer survey conducted at the Jackson County Fair in Pascagoula, Mississippi, from October 21–25, 2002. The DMR Seafood Technology Bureau developed the questionnaire used in the survey, and DMR staff members conducted all the interviews.

Interviewers asked respondents to identify socioeconomic characteristics, including gender, marital status, age, household income, and educational attainment. Respondents stated whether or not they ate raw oysters and indicated their main reasons for eating or not eating them. Respondents also expressed their primary food safety bacteriological concerns about raw oysters, frequency of eating raw oysters, and sources of raw oyster purchases. Interviewers asked a series of

questions to determine respondents' awareness of, sources of information on, level of interest in, willingness to pay for, and packaging preferences for PHP raw oysters (Appendix A).

Results of the consumer survey were categorized by respondents who were consumers and those who were nonconsumers of raw oysters. Raw oyster consumers are respondents who answered "yes" to the question, "Do you eat raw oysters?" Chi-square analysis was used to compare qualitative responses between consumers and nonconsumers and socioeconomic characteristics of respondents. Analysis of variance (ANOVA) was used to compare quantitative responses between consumers and nonconsumers and types of PHP products.

RESULTS AND DISCUSSION

Socioeconomic Characteristics

A total of 511 respondents participated in the voluntary survey on PHP raw oyster consumption. Approximately 59% reported that they did not consume raw oyster products, while 41% stated that they did consume raw oyster products (Table 1). Coastal Mississippians' raw oyster consumption behavior was strongly influenced by the gender, age, and education. Marital status, race, and household income did not have significant influences on raw oyster consumption.

Table 1. Number and percent of all respondents by gender and raw oyster consumption.						
Gender	Nonconsumer (N=304)		Consumer (N=207)		Total (N=511)	
	no.	%	no.	%	no.	%
Female	193	38	66	13	259	51
Male	111	22	141	28	252	49
Total	304	59	207	41	511	100
Chi-square value = 49.206 ***						
*** Significant at 0.001.						

Approximately 49% of the respondents were male. There were significant gender differences in raw oyster consumption. More of the male respondents (28%) consumed raw oysters than female respondents (13%).

Most respondents (59%) were between 18 and 29 years old. For coastal residents, age strongly influenced raw oyster consumption. There were more nonconsumers than consumers of raw oysters in all the age groups except the 40–49 group (Table 2). Among respondents who were 40–49, 57% stated that they consumed raw oyster products.

A majority of respondents completed high school (35%) and some college (39%) (Table 3). Formal education had a strong influence on raw oyster consumption among coastal residents. There were more nonconsumers at all educational levels. About 12% of all high-school-educated respondents reported eating raw oysters. Among those who completed some college, 18% reported eating raw oysters.

Reasons for Not Eating Raw Oysters

Nonconsumers from the Mississippi Gulf Coast cited several reasons that influenced their consumption

decisions. The reason most frequently cited (42%) by nonconsumers was that oysters are slimy (Table 4). About 36% of nonconsumers considered the appearance of oysters to be a limiting factor. Another 27% of the nonconsumers mentioned smell as a negative characteristic of raw oysters. Twenty-five percent of nonconsumers said they considered personal safety and concerns/illness (other than allergies) as a constraint to raw oyster consumption. Other reasons cited by nonconsumers ranged from “Think oysters would taste bad” to “Don’t know what to do with them.”

Bacterial and Viral Food Safety Concerns

Coastal Mississippi respondents reported their primary food safety concerns about eating raw oysters. The most commonly mentioned concerns were Hepatitis virus (55%) and *Escherichia coli* (42%). More nonconsumers than consumers voiced such concerns (Table 5). About 18% of the respondents were concerned with Salmonella, 13% with *Vibrio vulnificus*, and 10% with Norwalk virus. Less than 10% of the respondents cited *Vibrio cholera* and *parahaemolyticus* and *Listeria monocytogenes*.

Table 2. Number and percent of all respondents by age group and raw oyster consumption.

Age group	Nonconsumer (N=304)		Consumer (N=207)		Total (N=511)	
	no.	%	no.	%	no.	%
18–29	186	37	112	22	298	59
30–39	43	8	22	4	65	13
40–49	26	5	34	7	60	12
50–59	26	5	22	4	48	9
60 & above	19	4	16	3	35	7
Total	300	59	206	41	506	100

Chi-square value = 9.690*

* Significant at 0.05.

Table 3. Number and percent of all respondents by education and raw oyster consumption.

Education	Nonconsumer (N=304)		Consumer (N=207)		Total (N=511)	
	no.	%	no.	%	no.	%
Elementary	14	3	2	0	16	3
High School	115	23	62	12	177	35
Some college	106	21	91	18	197	39
Completed college	40	8	34	7	74	15
Advanced degree	20	4	16	3	36	7
Total	295	59	205	41	500	100

Chi-square value = 11.103 *

* Significant at 0.05.

Table 4. Number and percent of nonconsumers by reason for not eating raw oysters.

Reason	Number (N=304)	Percent
Slimy	128	42
Appearance	110	36
Smell	82	27
Personal safety and concerns/illness, not allergies	75	25
Think would taste bad	68	22
Color	47	15
Think grit, sandy/internal waste is bad	44	14
Allergies (Doctor’s advice/ personal experience)	14	5
Doctor’s advice due to illness	13	4
Not sure where to get them	10	3
Aversion to new things (No specific reasons)	7	2
Don’t know what to do with them	7	2

Table 5. Number and percent of all respondents by food safety bacterial and viral concerns.

Concern	Nonconsumer (N=304)		Consumer (N=207)		Total (N=511)	
	no.	%	no.	%	no.	%
Hepatitis virus	159	31	122	24	281	55
<i>Escherichia coli</i>	133	26	82	16	215	42
Salmonella	59	12	33	6	92	18
<i>Vibrio vulnificus</i>	29	6	39	8	68	13
Norwalk virus	37	7	16	3	53	10
<i>Vibrio cholera</i>	23	5	17	3	40	8
<i>Vibrio parahaemolyticus</i>	20	4	14	3	34	7
<i>Listeria monocytogenes</i>	17	3	14	3	31	6

Table 6. Number and percent of consumers by reason for eating raw oysters.

Reason	Number (N=207)	Percent
Tastes good	156	75
Fun to eat	79	38
Nutritional benefits	32	15
Habit (Become use to eating oysters)	26	13
Believe to be an aphrodisiac	11	5
Image (Peer pressure)	4	2

Reasons for Eating Raw Oysters

Coastal Mississippi residents cited two major reasons for eating raw oysters. Seventy-five percent of the consumers stated that they ate raw oysters because they liked the taste (Table 6). About 38% of consumers said they thought oysters were “fun to eat.” Other reasons for liking raw oysters included nutritional benefits (15%), habit (13%), aphrodisiacal properties (5%), and image (2%).

Frequency of Eating Raw Oysters

Coastal Mississippi residents ate raw oysters about 4.77 times in 2001 but with a large standard deviation (SD = 24.15). Due to this high variance, there were no significant differences in raw oyster consumption frequency among respondents of different socioeconomic backgrounds. Fifty-two percent of the respondents reported not eating raw oysters in the year before the survey (Table 7). About 11% of the respondents reported eating raw oysters once a year; 17%, three times a year; 11%, six times a year; 7%, twelve times a year; 2%, weekly; 1%, daily; and 10%, 12 or more times a year.

Potential Risks of Eating Raw Oysters

Most respondents (73%) were aware of the potential risks of eating raw oysters (Table 8). Nonconsumers (40%) were more aware of the risks than consumers (33%). Awareness of the potential risks enabled consumers to make individual consumption decisions regarding raw oysters.

Changes in the perceptions of the potential risks associated with raw oysters would alter consumers’ preferences for raw oyster consumption. Approximately 47% of coastal Mississippi respondents said they would eat more raw oysters if their health and safety concerns were reduced or eliminated (Table 9). More oyster consumers (31%) than nonconsumers (16%) said they would eat more raw oysters if their concerns were reduced or eliminated. About 41% of all respondents said they were not interested in changing their raw oyster preferences.

Table 7. Number and percent of all respondents by frequency of eating raw oysters.

Frequency	Number (N=511)	Percent
Never	265	52
Once a year	56	11
Three times a year	87	17
Six times a year	54	11
Twelve times a year	35	7
Weekly	11	2
Daily	3	1
Total	511	100

Table 8. Number and percent of all respondents by awareness of potentials risks associated with eating raw oysters.

Awareness	Nonconsumer (N=304)		Consumer (N=207)		Total (N=511)	
	no.	%	no.	%	no.	%
Not aware	56	11	23	5	79	15
Aware	205	40	170	33	375	73
Don't know/not sure	43	8	14	3	57	11
Total	304	59	207	41	511	100

Chi-square value = 13.894 **

** Significant at 0.01.

Table 9. Number and percent of all respondents who would eat more raw oysters if health and safety concerns were reduced or eliminated.

Decision	Nonconsumer (N=304)		Consumer (N=207)		Total (N=511)	
	no.	%	no.	%	no.	%
Will not eat more	174	34	34	7	208	41
Will eat more	81	16	158	31	239	47
Don't know/not sure	49	10	15	3	64	13
Total	304	59	207	41	511	100

Chi-square value = 123.124 **.

Sources of Raw Oysters for Consumption

Coastal Mississippi oyster consumers said they preferred to buy most of their raw oysters from restaurants (27%) and seafood markets (21%). Some of them bought raw oysters directly from the dock (15%) and from oyster bars (15%). Other sources of raw oysters were recreational catch (7%) and retail grocery stores (4%) (Table 10). Fifty-one percent of the respondents indicated that they consumed Gulf Coast raw oysters, while 41% were not sure or did not know the regional source of their oysters.

Improvements in raw oyster availability would alter coastal Mississippi consumers' preferences for raw oyster consumption. Fifty-three percent of all respondents said they would prefer not to eat more raw oysters even if they become more widely available. However, 32% would eat more if raw oysters become available year-round (Table 11).

Consumer Awareness of PHP Raw Oysters

About 47% of all respondents said they believed that there are methods to make raw oysters safe and leave no detectable levels of harmful bacteria. More consumers (63%) than nonconsumers (36%) said they believed these methods were available.

Table 11. Number and percent of all respondents who would eat more raw oysters if they were available year-round.

Decision	Nonconsumer (N=304)		Consumer (N=207)		Total (N=511)	
	no.	%	no.	%	no.	%
Will not eat more	227	44	45	9	272	53
Will eat more	27	5	136	27	163	32
Don't know/not sure	50	10	26	5	76	15
Total	304	59	207	41	511	100

Chi-square value = 190.707 **

** Significant at 0.05.

Table 10. Number and percent of all respondents who ate raw oysters by sources of raw oysters for consumption.

Source	Number (N=511)	Percent
Restaurant	137	27
Seafood market	109	21
Direct from the dock	77	15
Oyster bar	78	15
Recreational catch	35	7
Retail grocery store	19	4

Coastal Mississippi residents were not widely aware of the availability of PHP raw oyster products. Nineteen percent of the respondents were familiar with HHP-processed raw oysters (Table 12). Fourteen percent of all the respondents also knew about HCP-treated raw oysters. Only 10% of respondents said that they knew of IQF raw oysters. Consumers were more aware of PHP raw oysters than nonconsumers were.

Coastal Mississippi residents received information about PHP methods for raw oysters through a wide variety of sources. The most common means of delivery were word of mouth (19%), television (14%), magazines (12%), and newspapers (12%) (Table 13). Delivery methods used by less than 5% of the respondents were radio, trade shows, brochures, scientific journals, conferences, and symposia. Consumers (22%) tended to believe word-of-mouth sources more than nonconsumers did (16%).

Willingness to Buy and Pay for PHP Raw Oysters

Less than 30% of coastal Mississippi respondents stated that they would buy PHP raw oysters. Nineteen percent of all respondents said they were interested in buying PHP whole and half-shell raw oysters, while

Table 12. Number and percent of all respondents by awareness of postharvest processed raw oysters.

Oyster product	Nonconsumer (N=304)		Consumer (N=207)		Total (N=511)	
	no.	%	no.	%	no.	%
Pressurized (HHP)	49	10	50	10	99	19
Pasteurized (HCP)	40	8	34	7	74	14
Quick frozen (IQF)	24	5	26	5	50	10

Table 13. Number and percent of all respondents by source of information about postharvest-processed raw oysters.

Source	Nonconsumer (N=304)		Consumer (N=207)		Total (N=511)	
	no.	%	no.	%	no.	%
Somebody told me	50	10	45	9	95	19
Television	44	9	30	6	74	14
Magazines	41	8	20	4	61	12
Newspapers	32	6	28	5	60	12
Radio	12	2	13	3	25	5
Trade shows	10	2	9	2	19	4
Brochures	9	2	10	2	19	4
Scientific journals	7	1	10	2	17	3
Conferences	1	0	4	1	5	1
Symposia	1	0	1	0	2	0

29% said they would buy PHP shucked raw oysters (Table 14). About 8% of consumers and about 10% of nonconsumers indicated they would purchase PHP whole raw oysters. Six percent of nonconsumers and 13% of consumers stated that they would purchase PHP half-shell raw oysters. About 14% of nonconsumers and consumers reported that they would buy PHP shucked raw oysters.

Coastal Mississippi residents' willingness to buy (WTB) postharvest-processed raw oysters was low. However, we observed statistically significant differences between consumers and nonconsumers in each of the three PHP raw oyster products. The scale used to measure WTB in the survey question was 0–5 (0 = not interested, 5 = very interested). For pressurized PHP raw oysters, the average WTB was 0.82 with 0.48 for nonconsumers and 1.32 for consumers (Table 15). Pasteurized PHP raw oysters attracted similar WTB ratings from all the respondents (0.84) — nonconsumers, 0.47, and consumers, 1.37. Frozen PHP raw oysters received a rating of 0.58 from all respondents — nonconsumers, 0.34; consumers, 0.94.

Table 15. Average and standard deviation of willingness to buy postharvest-processed raw oysters.

Product	Nonconsumer (N = 304)	Consumer (N = 207)	Total (N = 511)
Pressurized (HHP) ***	0.48 ± 1.31	1.32 ± 1.89	0.82 ± 1.62
Pasteurized (HCP) ***	0.47 ± 1.26	1.37 ± 1.94	0.84 ± 1.63
Quick frozen (IQF) ***	0.34 ± 1.07	0.94 ± 1.66	0.58 ± 1.37

*** Significant between consumers and nonconsumers at 0.001.

Table 14. Number and percent of all respondents who would purchase postharvest-processed raw oysters.

Product form	Nonconsumer (N=304)		Consumer (N=207)		Total (N=511)	
	no.	%	no.	%	no.	%
Whole	43	8	52	10	95	19
Half-shell	30	6	65	13	95	19
Shucked	73	14	74	14	147	29

Coastal Mississippi residents' willingness to pay (WTP) for the three PHP products did not significantly vary between raw oyster consumers and nonconsumers. Consumers stated that they were willing to pay \$4.44 per dozen for HHP half-shell oysters from a supermarket (Table 16). At the retail level, respondents valued a dozen IQF and HCP half-shell raw oysters at \$3.97 and \$3.89, respectively. Participating consumers' WTP for these raw oyster products appeared to be reasonable values. However, further research is needed to determine why nonconsumers were not eating raw oysters despite the appearance that they were as willing as consumers to pay the same prices for the three PHP products.

Packaging Preferences for PHP Oysters

Packaging of PHP raw oysters varies when sold at different market outlets. These products are labeled and tagged differently than traditional or non-PHP raw oysters. When asked about their preferences for packaging of whole PHP raw oysters at supermarkets or seafood stores, 31% of the coastal Mississippi

Table 16. Average and standard deviation of willingness to pay for a dozen postharvest-processed, half-shell raw oysters if purchased in supermarket.

Product	Nonconsumer (N = 304)	Consumer (N = 207)	Total (N = 511)
Pressurized (HHP)	4.43 ± 5.52 (N=52)	4.45 ± 4.21 (N=58)	4.44 ± 4.85 (N=110)
Pasteurized (HCP)	3.78 ± 5.13 (N=47)	4.00 ± 2.66 (N=48)	3.89 ± 4.05 (N=95)
Quick frozen (IQF)	3.80 ± 7.15 (N=42)	4.14 ± 4.31 (N=44)	3.97 ± 5.84 (N=86)

respondents said they preferred the traditional method of sacking the shellfish. Other preferred types of packaging for whole PHP raw oysters included packaged loose in plastic containers (15.7%), vacuum-packed (13.3%), clean plastic tubes (7.2%), and solid boxes (6.5%).

Respondents revealed a mix of preferences for packaging of half-shell PHP raw oysters at supermarkets or seafood stores. More than 15% selected “vacuum-packed in solid cardboard box with a window,” making it the leading preference. The second most preferred packaging method (14.7%) for half-shell PHP raw oysters was “shrink-wrapped trays in solid boxes.” More than 13% of the respondents opted for “shrink-wrapped trays in solid boxes with a window.” Almost 10% of the respondents preferred “vacuum-packed in solid cardboard box.”

More than 21% of the respondents selected traditional plastic containers as their preferred method for PHP shucked raw oyster packaging at supermarkets or seafood stores. In terms of plastic container sizes, the most preferred size (30.5%) was a quart, followed by a pint (18.4%), a gallon (13.7%), and a half-gallon (9.6%).

Consumption of PHP Raw Oysters

Coastal Mississippians reported only limited consumption of PHP raw oyster products during the year before the survey. Responses showed that 7.5% consumed HHP raw oysters; 4.1%, HCP oysters; and 2.2%, IQF oysters.

Respondents cited several factors that would change their minds about trying PHP raw oysters. Seventeen percent of respondents said that the guarantee of a safe product would lead them to consume PHP raw oysters, making this the most frequently listed type of inducement (Table 17). At least 12% of all respondents cited good presentation and education on health benefits. Eleven percent of respondents said they would consider trying PHP raw oysters if they were paid to eat them. Other selected types of inducements to eat PHP raw oysters are listed in Table 17.

Table 17. Number and percent of respondents by type of inducement to consume postharvest processed raw oysters.

Inducement	Nonconsumer (N=304)		Consumer (N=207)		Total (N=511)	
	no.	%	no.	%	no.	%
Guarantee of a safe product	64	13	21	4	85	17
Education on health benefits	46	9	21	4	67	13
Good presentation	38	7	21	4	59	12
Get paid to try eating	53	10	4	1	57	11
Product should be labeled as treated	35	7	13	3	48	9
Recommended by a friend or family member	23	5	22	4	45	9
Good advertising on nutritional values	22	4	8	2	30	6
Knowledge where to get or buy	18	4	10	2	28	5
Use of winter oysters	8	2	15	3	23	5

SUMMARY AND IMPLICATIONS

A voluntary survey of 511 coastal Mississippians showed that raw oyster consumption was strongly influenced by the gender, age, and formal education but not by marital status, race, and household income. More male respondents consumed raw oysters than female respondents. The percent of respondents who ate raw oysters was higher among older respondents, with the highest observed among the 40–49 age group. Respondents with high school and some college education reported higher levels of oyster consumption among respondents who ate raw oysters.

Survey participants ate raw oysters about 4.77 times in 2001. Due to large variations, however, no significant differences in frequency of raw oyster consumption were observed among different socioeconomic groups. About 41% of all respondents who did not consume raw oysters said they would prefer not to eat more if they become more widely available. However, 47% of raw oyster consumers said they would

tend to eat more if raw oysters become available year-round.

Awareness of the availability of PHP raw oysters was very limited. Respondents received information about PHP raw oysters through a wide variety of delivery methods. The most widely used means of delivery were word of mouth (19%), television (14%), magazines (12%), and newspapers (12%).

A segment of the respondents stated that they would buy PHP raw oyster products. Both the current consumers and nonconsumers said they were willing to pay about \$4 per dozen for PHP raw half shell oysters from a supermarket. Processors of PHP raw oyster products have the potential to increase sales quantity and revenue by responding to the market segment identified by the results of this survey. Additional surveys in other Metropolitan Statistical Areas are needed to validate the results in coastal Mississippi and to identify other market segments for the PHP raw oyster products.

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APPENDIX A. OYSTER CONSUMPTION SURVEY



The Mississippi Department of Marine Resources

Managing Your Marine Resources Today for a Sound Tomorrow

POSTHARVEST RAW OYSTER CONSUMPTION SURVEY

The aim of this survey is to evaluate consumer attitudes and preferences toward postharvest-processed raw oyster products. Your response to this survey is anonymous. Please answer the following questions, giving your best estimate where exact answers are not known. These questions are very important. They will help us relate your responses to characteristics of your household.

We thank you for your participation in this survey.

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POSTHARVEST RAW OYSTER CONSUMPTION SURVEY

Please answer the following questions by checking [] the appropriate box or boxes ().

RESPONDENT CHARACTERISTICS

Age

- 18-29
- 30-39
- 40-49
- 50-59
- 60 & above

Marital Status

- Single
- Married
- Divorced
- Widowed
- Separated

Race

- Caucasian
- African American
- Hispanic
- Native American
- Asian or Pacific Islander
- Others _____

Household Income (\$/year)

- <\$20,000
- 20-39K
- 40-59K
- 60-79K
- 80-99K
- 100-120K
- >\$120,000

Formal education completed

- Elementary
- High school
- Some college, Junior college, vocational school
- Completed college (BA, BS)
- Advance degree (MS, MBA, Ph. D, MD, Law degree, etc.)

Gender

- Male
- Female

Do you eat raw oysters?

- Yes
- No

RAW OYSTER CONSUMPTION

What are the main reasons you do not eat raw oysters? (Check all that apply)

- Appearance
- Smell
- Slimy
- Color
- Think would taste bad
- Think grit, sandy/internal waste is bad
- Aversion to new things (no specific reasons)

- Allergies (Doctor's advice/Personal Experience)
- Not sure where to get them
- Doctor's advice due to illness
- Don't know what to do with them
- Personal safety and concerns/illness, not allergies
- Price of raw oysters
- Others, please specify _____

What are your primary food safety bacterial and viral concerns about eating raw oysters? (Check all that apply)

- E. coli
- Vibrio vulnificus
- Vibrio parahaemolyticus
- Salmonella
- Listeria monocytogenes
- Vibrio cholera
- Hepatitis virus
- Norwalk virus
- Others, please specify _____

What are the main reasons why you eat raw oysters? (Check all that apply)

- Nutritional benefits
- Fun to eat
- Tastes good
- Habit (Become used to eating oysters)
- Image (Peer pressure)
- Believed to be an aphrodisiac
- Price of raw oysters
- Others, please specify _____

How often did you eat raw oysters during the past year?

- Never
- Weekly
- Three times a year
- Once a year
- Daily
- Monthly
- Six times a year
- Others _____

Are you aware of potential health risks with eating raw oysters?

- Yes
- No
- Don't know/Not sure

Would you eat raw oysters more often if they were readily available year round?

- Yes
- No
- Don't know/Not sure

Would you eat raw oysters more often if health and safety concerns were reduced or eliminated?

- Yes
- No
- Don't know/Not sure

SOURCES OF RAW OYSTERS

Where do you usually purchase raw oysters for consumption? (Check all that apply)

- Restaurant
- Oyster Bar
- Seafood market
- Retail Grocery Store
- Recreational catch
- Direct from the dock
- Do not purchase raw oysters
- Others, please specify _____

Do you know where the raw oysters that you ate last year came from? (Check all that apply)

- Gulf Coast
- Atlantic Coast
- Pacific Coast
- Don't know/Not sure
- Other, please specify _____

POSTHARVEST PROCESSING OF RAW OYSTERS

Presently, there are different methods of processing oysters that render them safe and leave no detectable levels of harmful bacteria. Are you aware of processed or treated raw oysters? (Check all that apply)

- Pressure treated (Whole/Shucked/Half shell)
- Pasteurized (In-shell/Shucked)
- Individually quick frozen (IQF)

How did you learn about processed or treated raw oyster products? (Check all that apply)

- Magazines
- Radio
- Newspapers
- Conferences
- Trade Shows
- Others, please specify _____
- Television
- Somebody told me
- Scientific Journals
- Symposia
- Brochures

Do you believe that there are methods that can safely render harmful bacteria to non-detectable levels in raw oyster products?

- Yes
- No
- Don't know/Not sure

If yes, would you like to purchase any of the processed or treated raw oyster products? (Check all that apply)

- Whole/Full Shell
- Half-Shell
- Shucked

Please indicate your interest in buying the following processed or treated raw oyster products. (Encircle all that apply, where 0= not interested ,..., 5= very interested)

Pressure treated	0	1	2	3	4	5
Pasteurized	0	1	2	3	4	5
Individually quick frozen	0	1	2	3	4	5

How much would you be willing to pay for a dozen processed or treated raw oysters in half shell if purchased in supermarkets? (Answer all that apply)

Pressure treated	_____	\$/dozen
Pasteurized	_____	\$/dozen
Individually quick frozen	_____	\$/dozen

Have you eaten the following processed or treated raw oyster products during the past year? (Check all that apply)

- Pressure treated
- Pasteurized
- Individually quick frozen

PACKAGING PREFERENCES

Packaging of processed or treated oysters varies when sold at different market outlets. They are differentiated from the traditional (unprocessed) oysters by the way the products are labeled and tagged. If you like to buy whole/full shell processed raw oysters, what type of packaging would you prefer when buying at supermarkets or seafood stores? (Check all that apply)

- Packed in sacks (Traditional)
- Packed in solid boxes
- Packaged loose in plastic containers
- Vacuum packed
- Clean plastic tubes
- Others, please specify _____

If you like to buy half shell processed or treated raw oysters, what type of packaging would you prefer when buying at supermarkets or seafood stores? (Check all that apply)

- Shrink wrapped trays in solid boxes
- Shrink wrapped trays in cardboard boxes with a window
- Vacuum packed in solid cardboard box
- Vacuum packed in solid cardboard box with a window
- Others, please specify _____

If you like to buy processed shucked raw oysters, what type of packaging would you prefer when buying at supermarkets or seafood stores? (Check all that apply)

- Packed in plastic containers (Traditional)
 - Gallon
 - Half Gallon
 - Quarts
 - Pint
- Others, please specify _____

If you don't eat raw oysters, what can change your mind to try and eat processed or treated raw oysters? (Check all that apply)

- Recommended by a friend or family member
- Good presentation
- Education on health benefits
- Good advertising on nutritional values
- Guarantee of a safe product
- Get paid to try eating
- Knowledge where to get or buy treated product (availability)
- Product should be labeled "treated"
- Use of winter oysters
- Others, please specify _____

Thank you very much for your participation. Please return this questionnaire to Booth Number 747 or 749.

Mississippi Department of Marine Resources
Mississippi State University-Coastal Research and Extension Center

Respondent's Number _____



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