ETB258

Household Preferences and Consumption Patterns for Farm-Raised Catfish in the U.S.

COOPERATIVE EXTENSION PROGRAM,
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Introduction

The United States is the third largest seafood market in the world, following Japan and China. U.S. consumers purchased a total of 4.8 billion lb of seafood in 2006, with total seafood expenditures of $65.2 billion. By 2025 demand for seafood is projected to grow by another 4.4 billion lb above what is consumed today. U.S. per-capita seafood consumption was approximately 15.4 lb through the late 1980s and 1990s, but it increased thereafter to a record 16.6 lb per capita in 2004 and continued at 16.5 lb per person in 2006 (National Fisheries Institute, 2007). The nation imports roughly 80 percent of its seafood, of which 40 percent is farm-raised. By the year 2020, over 50 percent of the U.S. seafood supply is projected to come from aquaculture (United States Department of Agriculture, 2005).

Farm-raised catfish is the largest segment of U.S. aquaculture, with 2006 production of 583 million lb, valued at $481 million (United States Department of Agriculture, 2007). Commercial catfish production accounts for over 46 percent of the total value of aquaculture production in the United States. Currently, catfish is the sixth most consumed species in the U.S. with a per-capita consumption of 0.97 lb per person (National Fisheries Institute, 2007) (Figure 1).

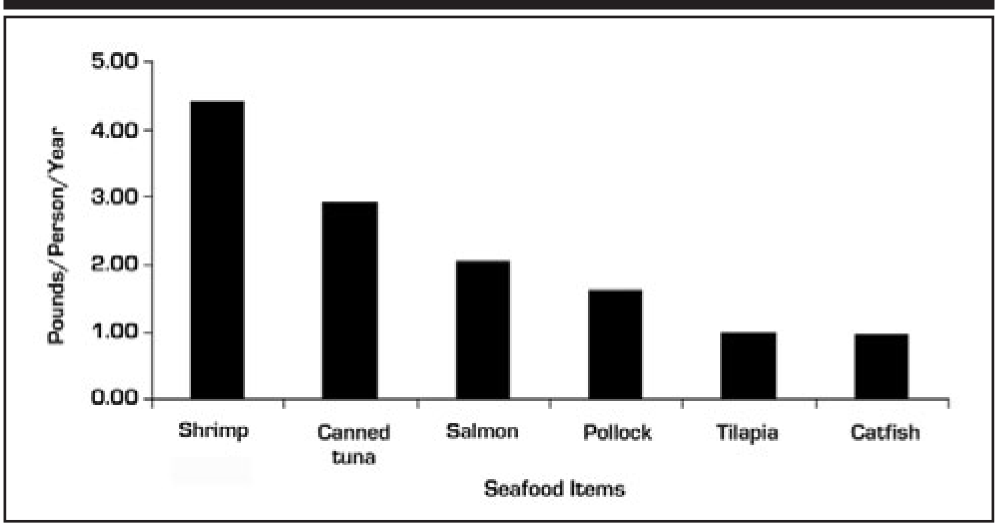
The United States Department of Agriculture National Agriculture Statistics Service reported 1,035 catfish farms (170,000 acres) in 16 states in December 2006 (United States Department of Agriculture, 2007). The majority of United States catfish production acreage and sales occurs in the southern states of Mississippi, Arkansas, Alabama and Louisiana. The combined production acreage of these four states makes up 94 percent of all catfish production acreage in the U.S. The catfish industry generates an economic impact of billions of dollars and is an important source of economic activity and employment (Kaliba and Engle, 2004). Low levels of economic development and high rates of unemployment characterize this region. Increased sales of catfish will lead to increased employment and economic development.

Household consumption is a significant contributor to seafood sales in the U.S. In 2005 U.S. households purchased $20.5 billion of seafood for home consumption, an increase of $1.6 billion over the previous year. Retail sales of catfish are important because the U.S. industry has an advantage in supplying fresh product to retail grocery stores. Moreover, the marketing strategy of emphasizing "U.S. farm-raised catfish" on the label can be better pursued at the retail market level (House et al., 2003).

Proper household-size retail packages for catfish could be used to provide labeling information on origin, price, quality, nutrition, product safety and other relevant product information to consumers. Enhancing the positive relationship between consumers and the U.S. catfish industry would contribute to brand equity and loyalty for U.S. farm-raised catfish. Successful development of such a brand could result in increased profitability for producers and processors, particularly if consumers are willing to pay a higher price for a U.S. farm-raised brand. Hence, understanding demand characteristics for catfish at various customer levels is of prime importance. Studies on the wholesale and retail level demand for seafood as well as catfish are available, but only a few studies have examined consumer-level demand for U.S. farm-raised catfish. Information on consumer perceptions and determinants of demand at the household level could be valuable to individual processing plants, for generic advertising programs and for retailers to better meet their customers' needs.

FIGURE 1

Top six seafood items consumed in the U.S. in 2006



Objectives and Benefits of the Study

The principal goal of this study was to understand the characteristics of demand at the consumer level for seafood in general and for farm-raised catfish in particular in key cities in the core catfish market area. Knowing who does and does not consume catfish, why they choose the seafood products they do and why they do not consume more can be beneficial for developing strategies to increase sales of catfish. Additional information on consumers' perceptions of catfish, product safety, nutrition, price and availability can be important to the industry in developing and expanding catfish markets. Therefore, the study will be helpful to the catfish industry in its efforts to target new consumers and increase sales to current consumers. This study evaluates and provides information on the changes in perceptions and preferences of consumers purchasing seafood from grocery stores in key cities in the core catfish market area. It also provides information from these cities on perceptions related to the types of catfish products handled, their availability, quality and packaging needs which will, in turn, help retailers cater to the needs of their customers.

Specific objectives include 1) identification of catfish consumer and non-consumer categories, 2) determination of each group's characteristics, attitudes and perceptions and 3) evaluation of potential for increased consumption. Improved understanding of existing consumers can lead to programs to increase sales to the current customer base, while information on non-consumers can be used to develop new markets and greater penetration of catfish products.

Materials and Methods

A telephone survey was conducted of customers in the major U.S. cities in the core catfish market area. Eleven traditional catfish-consuming cities – Baton Rouge, Birmingham, Chicago, Dallas, Houston, Jackson (MS), Little Rock, Memphis, New Orleans, Oklahoma City and San Antonio – were selected. The survey was conducted in 2004 by a professional market research company (Advantage Communication Inc. (ACI)), based in Little Rock, Arkansas. The sampling frame was each city's telephone directory. Two hundred individuals were selected randomly from each directory. The sample was stratified by city because region was expected to be a significant determinant of both the choice to consume and the choice of how often to consume catfish. Pretesting of the questionnaire was conducted by telephone in Little Rock by ACI with 20 individuals, and necessary modifications were made. At least 100 complete responses were collected from each city. The questionnaire was developed to analyze consumer demand for seafood in general and catfish demand in particular from the customers. It contained 37 questions with formats that included open-ended, closed-ended, interval rating scales and "yes" or "no" responses.

The first section of the questionnaire included questions on purchase of fish in general – questions pertaining to the species of fish bought most often, the frequency of purchases, the product form purchased most often, the method of preparation and serving, market outlets where fish were purchased and the quantity purchased. The same information was elicited for the second and third most frequently purchased fish species. Rated-scale evaluations were used to evaluate factors such as proximity of retail shops, freshness of product, appearance, aroma, product origin, expiration date, package type, product form, nutritional value, price, recipes, a USDA inspection label and brand image. Questions on preferred retail outlets and packaging were also included in the questionnaire.

The second section of the questionnaire dealt with purchases of catfish. Respondents were asked to select specific reasons that led to purchase and non-purchase of catfish from a list provided by the interviewer. Questions included the reason for preferring or not preferring catfish, opinions on the reputation of catfish and suggestions to enhance its reputation. The questionnaire included inquiries into possible ways to persuade a non-catfish buyer to buy catfish. Introduction of a new six-fillet retail pack, which would weigh 2 pounds net, its acceptance and affordable price ranges were also assessed in detail. Acceptance of resealable ziplock bags for catfish was also evaluated. Questions pertaining to demographic and socioeconomic parameters such as marital status, ethnicity, income, household size and age of the consumers were asked.

Results

The survey yielded 1,194 responses from 11 different cities for an average response rate of 54 percent. The highest response rates were from Chicago (61%), San Antonio (60%), Baton Rouge (60%) and Houston (56%), while lowest response rates were from Memphis and Birmingham (50%) (Table 1). Fifty-seven percent (679 respondents) of household respondents bought fish at least once from retail grocery stores in the last year. Forty-three percent of respondents did not purchase fish. The main reasons given for not buying fish were because they "did not eat fish" (38%) and "did not like fish" (32%) or because they were "allergic to fish" (13%) (Table 2).

When cross-tabulated by city, the percent of respondents who purchased fish varied from 49 to 68 percent. Among these, the highest percentage was for catfish (49%), followed by salmon (17%), tuna (15%), buffalo (5%) and cod (5%) (Table 3). Catfish was purchased by a higher percentage of respondents in all cities except San Antonio and Chicago. Birmingham (68%) and Little Rock (67%) had the highest percentages of fish buyers, while Houston (49%) had the lowest percentage of fish buyers.

TABLE 1

Response rate by city for telephone survey of households in selected cities, telephone survey, 2004

City	Total respondents	Response rate
Little Rock	102	51%
Oklahoma City	110	55%
Baton Rouge	119	60%
Memphis	100	50%
Birmingham	100	50%
Dallas	106	53%
Jackson	101	51%
Houston	112	56%
New Orleans	102	51%
San Antonio	120	60%
Chicago	122	61%
U.S. Average	**1,194**	**54%**

TABLE 2

Reasons for not buying fish from retail grocery stores, telephone survey, 2004

Reason	Percentage of non-fish buyers
Doesn't eat fish	38%
Doesn't like fish	32%
Allergic to fish	13%
Doesn't like the taste of fish	4%
Doesn't like seafood	4%
Doesn't like the odor of fish	3%
Doesn't eat seafood	2%
Vegetarian	1%
Can't eat fish	1%
Don't know, no reason, or refused	1%
Other reasons (bones, bad experience eating fish)	1%

TABLE 3

Top five purchased fish varieties by households in selected cities, telephone survey, 2004

City	Percentage of fish buyers	Catfish	Salmon	Tuna	Buffalo	Cod	Others
Baton Rouge	53%	60%	16%	8%	2%	8%	6%
Birmingham	68%	49%	15%	10%	7%	1%	18%
Chicago	52%	23%	27%	17%	2%	5%	27%
Dallas	55%	47%	28%	12%	0%	9%	5%
Houston	49%	44%	22%	20%	7%	5%	2%
Jackson	52%	49%	4%	23%	15%	4%	6%
Little Rock	67%	74%	9%	4%	6%	3%	4%
Memphis	59%	61%	2%	12%	17%	0%	8%
New Orleans	60%	39%	20%	28%	0%	10%	3%
Oklahoma City	63%	59%	12%	16%	3%	4%	6%
San Antonio	51%	26%	33%	23%	3%	8%	7%
U.S. Average	**57%**	**49%**	**17%**	**15%**	**5%**	**5%**	**9%**

Frequency of Purchase

Among those who purchased fish, 86 percent bought fish “at least once a month” while 60% bought fish “at least twice a month” and 39 percent of buyers bought fish “at least once a week” (Table 4). Only 14 percent of respondents purchased fish “less than once a month.” Frequencies of purchase were similar for catfish buyers with 85 percent of buyers purchasing “at least once a month,” 58 percent “at least twice a month” and 37 percent “at least once a week.” Only 13 percent of catfish buyers bought them “less than once a month.” The majority of catfish (58%) (Figure 2a) and non-catfish buyers (54%) (Figure 2b) purchased in small amounts of 1- to 3-pound packs rather than 4- to 6-pound or 7- to 9-pound packs, although 8 percent of catfish buyers purchased packages of 9 pounds or more. There were no measurable percentages of non-catfish buyers who purchased large packages of fish.

TABLE 4

Frequency of purchase of fish in general and catfish in particular, telephone survey, 2004

Frequency of buying	Fish in general	Catfish buyers
Less than once a month	14%	13%
At least once a month	86%	85%
At least twice a month	60%	58%
Once a week	39%	37%

Purchase Form, Mode of Preparation and Serving

Sixty-nine percent of respondents bought fish as a fresh product, 16 percent bought it frozen and 15 percent bought it already cooked (Table 5). Catfish buyers purchased them primarily as fresh (63%), followed by frozen (29%) and cooked (7%). The majority of fish buyers (53%) and catfish buyers (85%) prepared their dishes as fried and served it as a main dish (92% of fish buyers and 93% of catfish buyers).

TABLE 5

Consumer preferences for product form and mode of preparation and serving for fish and catfish, telephone survey, 2004

Category	Types	Fish	Catfish
Purchased as	Fresh	69%	63%
	Frozen	16%	29%
	Cooked	15%	7%
Prepared as	Baked	25%	11%
	Fried	53%	85%
	Broiled	5%	3%
Served as	Main dish	92%	93%
	Side dish	4%	4%
	Appetizer	2%	1%
	Snack	2%	2%

FIGURE 2a

Quantity of catfish purchased as a single purchase, telephone survey, 2004

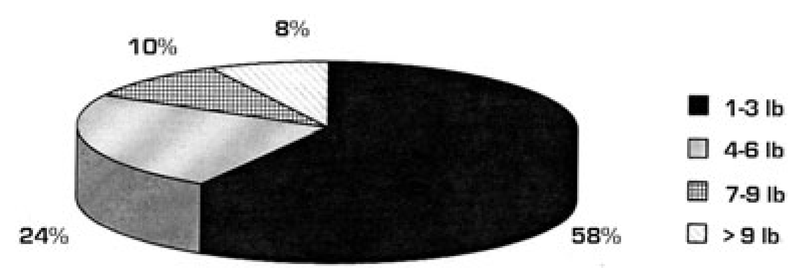
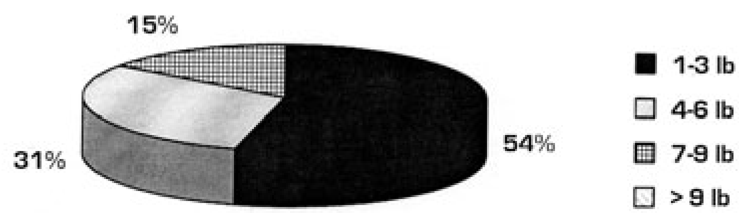


FIGURE 2b

Quantity of fish other than catfish purchased in a single purchase by non-catfish buyers, telephone survey, 2004



Catfish Purchases

Preferences for catfish were significantly different across cities (chi-square test, P = 0.00) (Table 6). Figure 3 shows that Little Rock (49%) had the highest percentage of respondents who preferred catfish to other fish followed by Oklahoma City (37%) and Memphis (36%), while Chicago (12%) and San Antonio (13%) had the lowest percentage of catfish buyers. Salmon was the second most preferred fish species in terms of percentage of buyers and was most preferred in San Antonio (17%) and Chicago (14%), while tuna was the third most preferred species with the highest percentage of buyers from New Orleans (17%) and San Antonio (12%).

TABLE 6

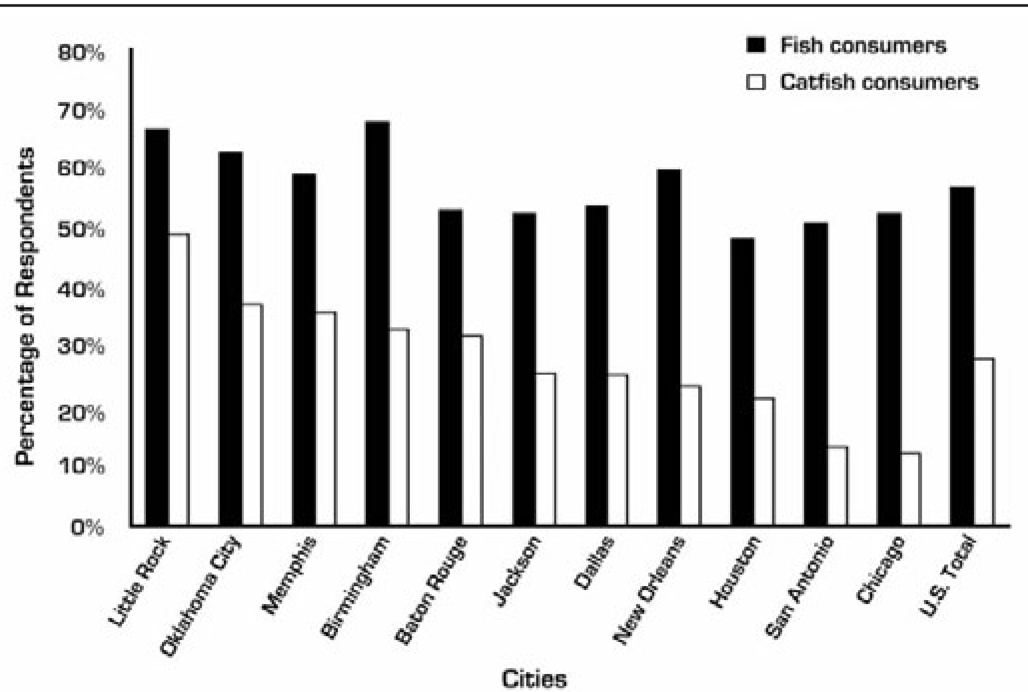
Species preferences by catfish and non-catfish buyers in different cities, telephone survey, 2004

		Catfish buyers		Non-catfish buyers	
City	**Total fish buyers**	**Number**	**%**	**Number**	**%**
Little Rock	69	50	15%	19	5%
Oklahoma City	69	41	12%	28	8%
Baton Rouge	63	38	12%	25	7%
Memphis	59	36	11%	23	7%
Birmingham	68	33	10%	35	10%
Dallas	57	27	8%	30	8%
Jackson	53	26	8%	27	8%
Houston	55	24	7%	31	9%
New Orleans	61	24	7%	37	11%
San Antonio	61	16	5%	45	13%
Chicago	64	15	5%	49	14%
U.S. Total	**679**	**330**	**100%**	**349**	**100%**

Note: Chi-square test indicated significant difference at 5% level of significance (P = 0.00).

FIGURE 3

Percentage of fish and catfish buyers in selected U.S. cities, telephone survey, 2004



Product attributes influencing catfish purchases were rated on a Likert scale of 1 to 5, with 1 being least important and 5 being the most important. The ratings were significantly different across product attributes as determined by the Wilcoxon/Kruskal-Wallis test (P = 0.00) (Table 7). The attributes rated the highest were freshness (4.46), followed by availability of catfish in retail stores (4.25), expiration date on the product (4.21) and appearance of the product (4.20) (Figure 4). There was no significant difference among these four highly rated product attributes (Nemenyi pair-wise comparison test). Aroma (3.61), price (3.54), a USDA label (3.19), origin of product (2.56) and cut (2.54) were also important. There was no significant difference between the rating of aroma and price, but a USDA label was rated significantly below that of

TABLE 7

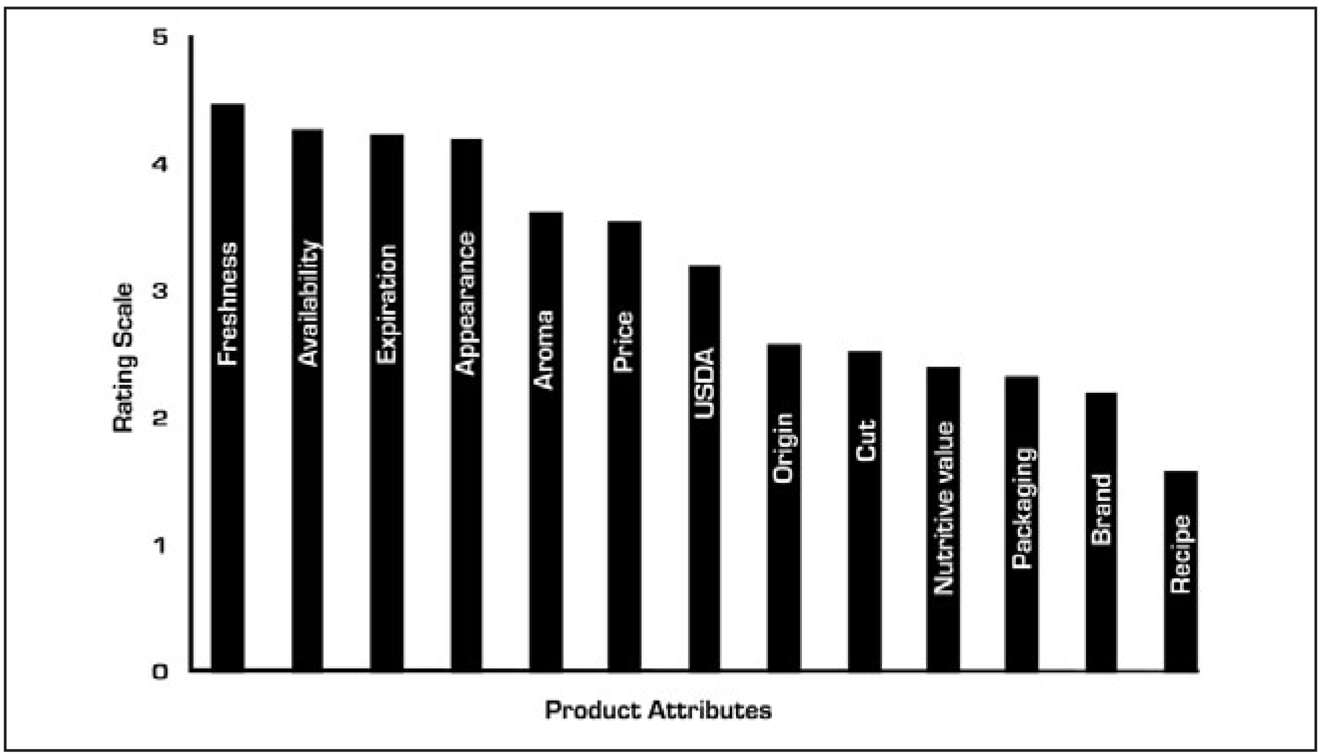
Pair-wise comparison of product attributes (Wilcoxon/Kruskal-Wallis test), telephone survey, 2004

Attributes	Number of responses	Average	Variance
Freshness	319	4.46 a	0.56
Availability	316	4.25 a	1.79
Expiration	318	4.21 a	1.02
Appearance	318	4.20 a	0.98
Aroma	320	3.61 b	1.88
Price	318	3.54 b	1.93
USDA	319	3.19 c	3.07
Origin	316	2.56 d	2.10
Cut	317	2.54 d	1.80
Nutritional value	315	2.40 d	2.16
Packaging	316	2.34 d	1.58
Brand	316	2.20 e	1.97
Recipe	318	1.58 f	1.49

Note: Attributes with different letters in the same column are significantly different (P < 0.05) as determined by the Nemenyi pair-wise comparison test.

FIGURE 4

Likert scale rating of factors affecting catfish purchase decisions, telephone survey, 2004



aroma and price. Ratings on the attributes of origin of product (2.56), cut (2.54), nutritional value (2.40) and packaging (2.34) were not significantly different. Product attributes such as recipes (1.58) and brand (2.20) were found to be of lesser importance to the buyer.

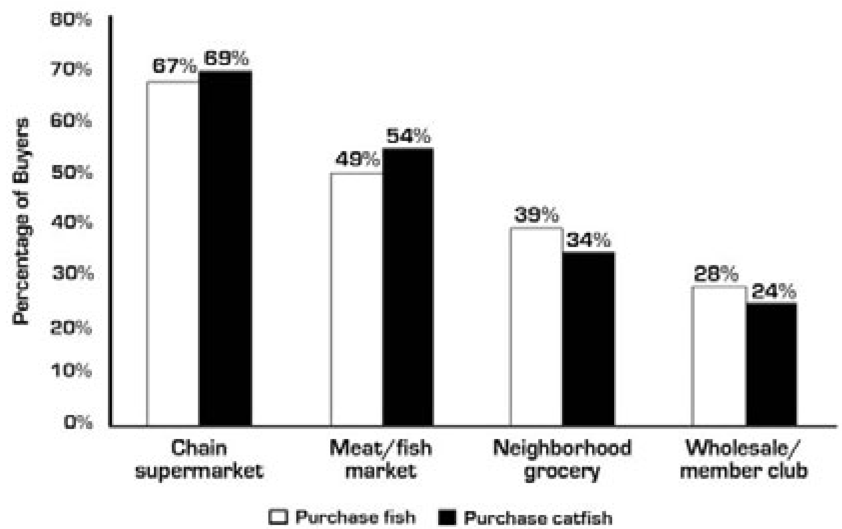
Retail Outlets

Chi-square tests showed significant differences in market outlet preferences for catfish purchases (P = 0.00). Respondents preferred to purchase fish and catfish products from chain supermarkets followed by fish or meat markets (Figure 5). For catfish buyers, 69 percent bought catfish from chain supermarkets at least once, while 54 percent bought from fish or meat markets. Percentages were similar for fish buyers, 67 percent buying from chain supermarkets and 50 percent from fish or meat markets. Respondents preferred to buy both fish in general and catfish more often from neighborhood grocery stores than from wholesale/member clubs.

Forty-one percent of respondents indicated that packaging material did not affect decisions to purchase catfish (Figure 6). Paper was the most important type of packaging material preferred by both catfish and non-catfish buyers. This is because buyers buying from fish or meat markets often prefer butcher paper. Vacuum-sealed packs and resealable packs were also popular.

FIGURE 5

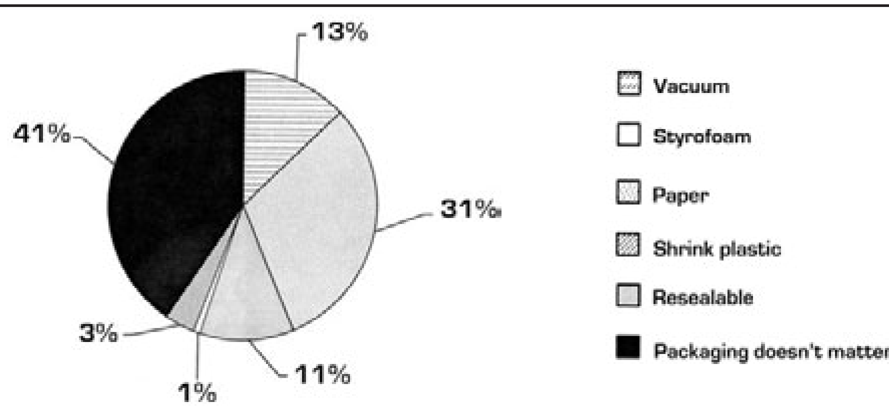
Choice for retail outlets for fish and catfish purchases, telephone survey, 2004



Note: Chi-square test indicated significant difference at 5% level of significance (P < 0.05) P = 0.00.

FIGURE 6

Catfish packaging preferences, telephone survey, 2004



Attitudes Towards Catfish

Taste was the most important reason (54%) for purchasing catfish more often than other fish (Table 8). Easy to fry (15%) and availability (10%) were the other main reasons for preferring catfish to other fish. However, not liking the taste was also the main reason (39%) for not preferring catfish (Table 9). While 16 percent believed catfish are bottom scavengers, 10 percent were of the opinion that catfish was hard to find and 9 percent believed that catfish has too many bones.

The overall reputation of catfish was viewed as positive by the majority of respondents (55%) (Figure 7). Thirty-three percent of the respondents did not have an opinion on its reputation. Only 12 percent of the respondents believed that catfish had a negative reputation. Of these, most did not know how to improve its reputation (Figure 8). The respondents who believed that catfish had a negative reputation indicated the best way to improve its reputation was to "get rid of the odor" and to "clean the fish better." The majority of non-catfish buyers (66%) believed they could not be persuaded to buy catfish, but 20 percent indicated that getting rid of the odor would entice them to buy catfish (Figure 9).

Opinion on Six-Fillet Packs and Resealable Packs for Catfish

Consumer acceptance of a new six-fillet pack for catfish was explored in the questionnaire. Among catfish buyers, 68 percent said they would like to buy

TABLE 8

Reasons for purchasing catfish more often than other fish, telephone survey, 2004

Reasons	Percentage of respondents
Like the taste	54%
Easy to fry	15%
Availability	10%
Raised eating it	4%
Know how to cook	3%
Freshness	2%
Light food	1%
Healthy food	1%
Batter/bread	1%
Catch and eat	2%
No opinion	8%

TABLE 9

Reasons for not purchasing catfish, telephone survey, 2004

Reasons	Percentage of non-catfish buyers
Did not like taste	39%
Scavenger/bottom feeder/dirty	16%
Hard to find/non-availability	10%
Too many bones	9%
Unhealthy/non-nutritious	6%
Bad odor	5%
Never eaten catfish	4%
Allergic	3%
Do not like texture	3%
Do not like whiskers	2%
Others	3%

FIGURE 7

Opinions on reputation of catfish, telephone survey, 2004

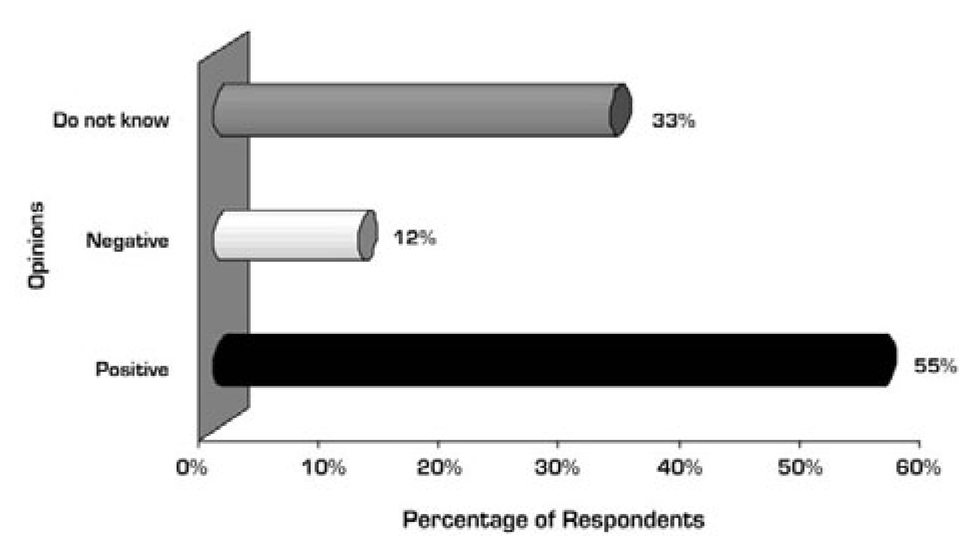


FIGURE 8

Suggestions for improvement from respondents who had a negative opinion of catfish reputation, telephone survey, 2004

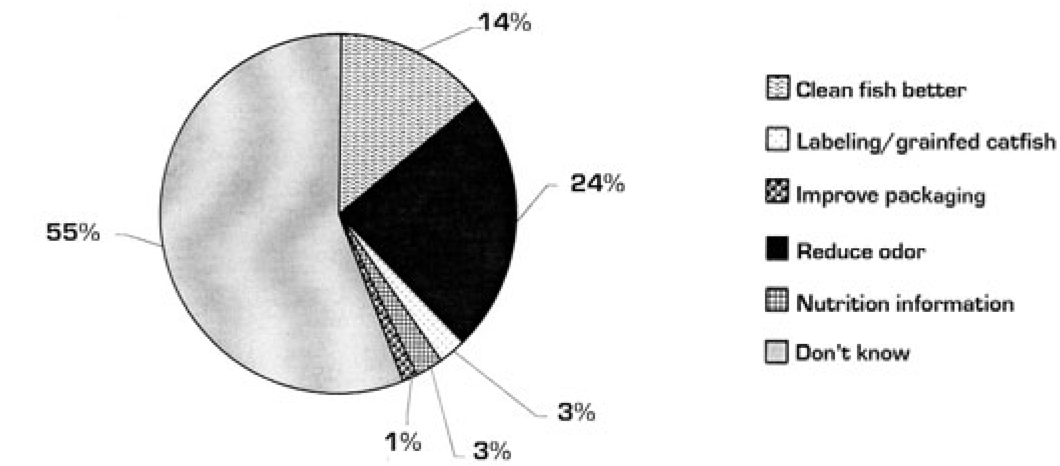
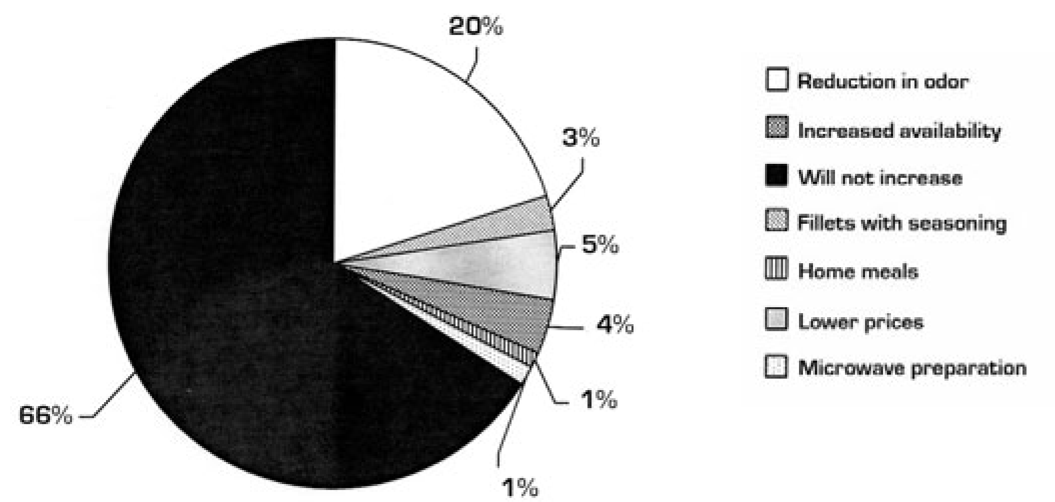


FIGURE 9

Alternatives that would increase catfish purchases among non-catfish buyers, telephone survey, 2004



the six-fillet pack, and 40 percent of the fish buyers in general would accept it (Figure 10). Similarly favorable responses were obtained for frozen catfish in a resealable pack. Of the catfish buyers, 67 percent would like to try the new resealable pack, while 39 percent of general fish buyers would purchase it.

The survey also analyzed household responses on willingness to pay for six-fillet packs for catfish. Figure 11 shows that 57 percent of the respondents would be willing to pay from $2.50-$5.00/lb for the six-fillet pack, while 18 percent were willing to pay between $5.00-$8.00/lb and 9 percent were willing to pay between $8.00-$15.00/lb. Overall, 74 percent of the respondents were willing to pay below $5.00 per pound. The willingness to pay for a six-fillet pack of catfish was highest among Little Rock buyers ($6.06/lb) followed by buyers from Dallas ($5.48/lb) and Birmingham ($5.22/lb). The average price consumers were willing to pay for a six-fillet pack was $4.37/lb (Table 10), with 70 percent not ready to pay an amount higher than $5.00/lb.

FIGURE 10

Opinions on purchase of resealable packs and six-fillet packs for catfish, telephone survey, 2004

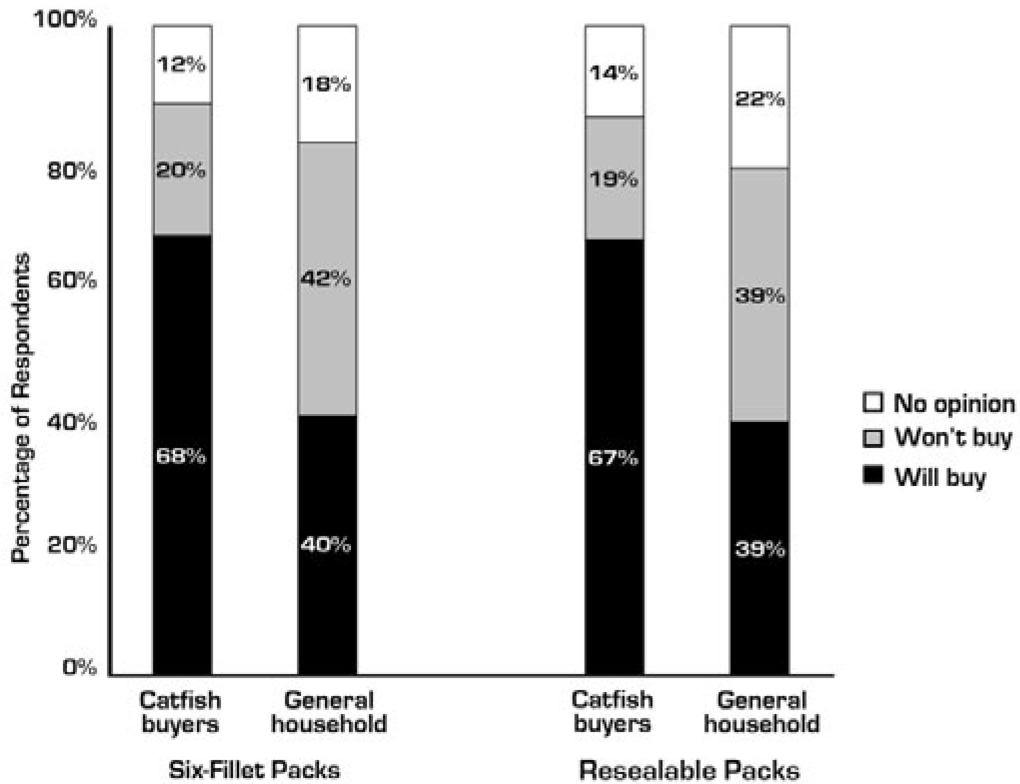


FIGURE 11

Willingness to pay for catfish six-fillet pack ($/lb), telephone survey, 2004

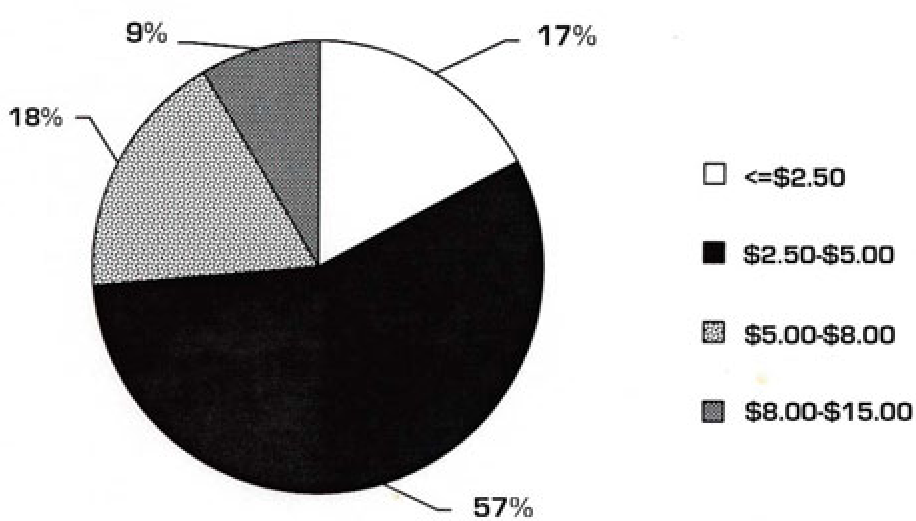


TABLE 10	
Willingness to pay for six-fillet packs of catfish ($/lb) in different cities, telephone survey, 2004	
City	**Willingness to pay for catfish six-fillet pack ($/lb)**
Little Rock	6.06
Oklahoma City	4.04
Baton Rouge	3.06
Memphis	3.46
Birmingham	5.22
Dallas	5.48
Jackson	3.07
Houston	3.31
New Orleans	4.69
Chicago	4.48
U.S. Average	**4.37**

Socioeconomic Parameters Influencing Purchase

Among the various age groups, the higher age class respondents appeared to have a greater preference for catfish than other fish, although the chi-square test showed no significant difference among the various age groups (P = 0.23) (Table 11). The age class 34-49 years had the highest number of respondents (44%) followed by 18-33 years (26%) and 50-65 years (18%), while the age class above 66 years had the least number of respondents (12%). Female heads of households composed 57 percent and 58 percent of the respondents of fish and catfish buyers, respectively. The highest nominal preference for catfish was among the age class above 66 years (56%) followed by 34-49 years (54%). The lowest nominal preference for catfish was among the age class 18-33 years (39%). The highest nominal preference for fish other than catfish was among the age class 18-33 years (61%), while the lowest nominal preference was among the age class above 66 years. There was no difference among the various marital groups with regard to their fish buying preferences (Table 12). Similarly, there were few preferences for catfish across the different household sizes (Table 13).

The survey evaluated responses on purchase of fish based on ethnicity. Among the various ethnic groups, Caucasians were in the majority (57%), followed by African Americans (25%), Hispanics (11%), other than one race (6%), Asians (1%) and Native Americans (0.5%) (Figure 12). Three percent of the total 1,194 respondents refused to report their

TABLE 11

Relationship between age and purchase preference of the buyers, telephone survey, 2004

Age class	Survey respondents		Catfish buyers		Non-catfish buyers	
	Number	%	Number	%	Number	%
18-33 years	136	26%	53	19%	83	29%
34-49 years	256	44%	139	49%	117	41%
50-65 years	115	18%	56	20%	59	20%
> 66 years	63	12%	35	12%	28	10%
U.S. Total	**570**	**100%**	**283**	**100%**	**287**	**100%**

Note: Chi-square test indicated no significant differences due to age group (P > 0.05) = 0.23.

TABLE 12

Preference for catfish based on marital status, telephone survey, 2004

Marital status	Total fish buyers	Catfish buyers		Non-catfish buyers	
		Number	%	Number	%
Married	392	191	61%	201	61%
Single	114	53	17%	61	18%
Widowed	59	30	10%	29	9%
Divorced	47	25	8%	22	7%
Unmarried	29	13	4%	16	5%
U.S. Total	**641**	**312**	**100%**	**329**	**100%**

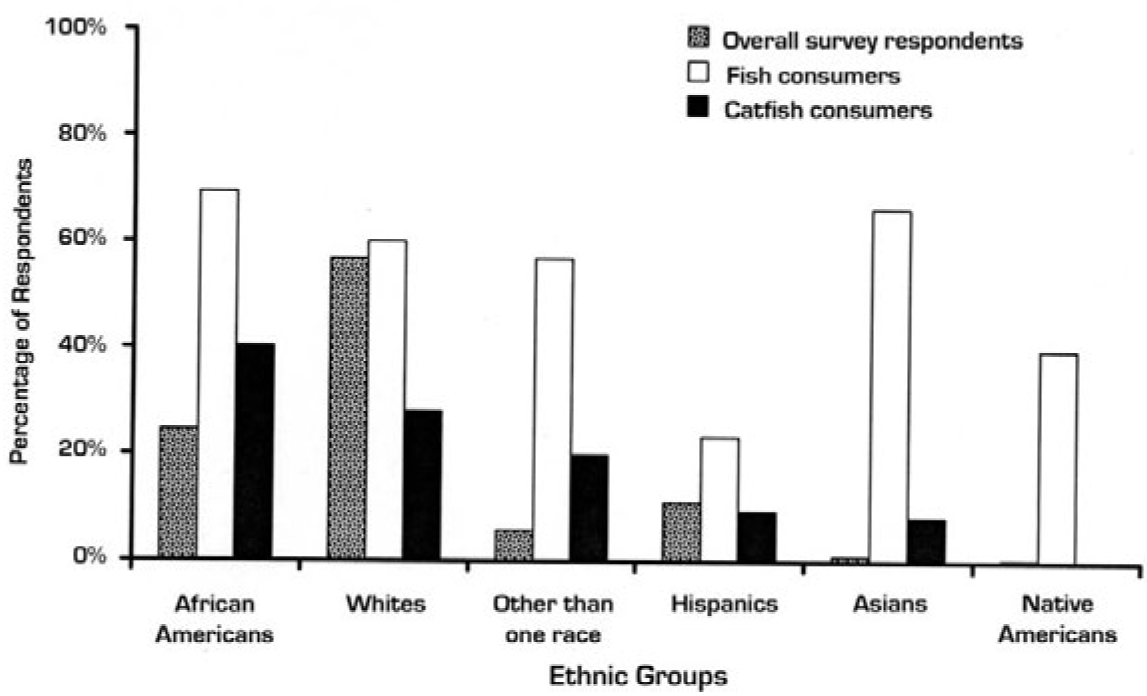
Note: Chi-square test indicated no significant differences due to marital status (P value > 0.05) = 0.99.

TABLE 13					
Catfish preference among different household sizes, telephone survey, 2004					
		Catfish buyers		**Non-catfish buyers**	
Number in household	**Total fish buyers**	**Number**	**%**	**Number**	**%**
1	125	65	20%	60	19%
2	165	75	24%	90	28%
3	180	89	28%	91	28%
4	116	63	20%	53	16%
5 and above	55	25	8%	30	9%
U.S. Total	**641**	**317**	**100%**	**324**	**100%**

Note: Chi-square test indicated no significant differences due to household size (P > 0.05) = 0.24.

FIGURE 12

Preference for fish and catfish across the different ethnic groups, telephone survey, 2004



ethnicity. The highest percentage of fish buyers were among African Americans (70%), followed by Asians (67%) and Caucasians (60%), while fewer Hispanics purchased fish (23%). Among fish buyers, preferences for catfish were strongest among African Americans (40%), followed by Caucasians (28%) and respondents with more than one race (20%), and were lowest among the Native Americans and Hispanics. Only 10 percent of the respondents provided responses on annual income; hence this parameter could not be used in subsequent analysis.

Summary and Conclusions

The nationwide telephone survey of households was conducted in 11 major cities in the U.S. to obtain additional information about markets for U.S. farm-raised catfish. The study documented purchase preferences and consumption patterns for fish in general and catfish in particular. This study also analyzed consumer attitudes towards catfish.

The survey indicated that cities like San Antonio and Chicago had the greatest potential for market expansion through increased awareness of farm-raised catfish. Cities like Birmingham and New Orleans, which had greater numbers of fish buyers, had greater chances for increased catfish sales in the future than cities like Houston, which had lower percentages of fish-consuming households.

Catfish product attributes such as freshness, availability, expiration date on packages and the appearance of fillets had the greatest influence on household purchases; hence these attributes need to be stressed in future promotional activities.

The overall reputation of catfish in the 11 surveyed cities was positive. Concerns related to quality need to be addressed at the processor level to increase catfish purchases.

Study results indicated potential acceptance of six-fillet retail packs among households. Retail packs at an affordable price to consumers may have potential to increase catfish consumption. Easy-to-reuse resealable packs were also received positively by the respondents. Awareness of the availability of catfish recipes needs to be emphasized through better promotional activities. Improved marketing through a target-oriented approach of existing customers and attracting new catfish consumers for market penetration will guide the catfish industry to improve sales. As long as the catfish industry continues to produce a consistently high-quality product, potential consumer demand will continue to support further growth of the U.S. farm-raised catfish industry.

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