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# Consumer Biotechnology Food and Nutrition Information Sources: The Trust Factor

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Although much has been written on consumer attitudes toward genetically modified foods, not much is known about how or where consumers get the information for the decisions they make about genetically modified foods. This paper reports on the media used by consumers in acquiring information about biotech food and nutrition issues, and examines how much trust consumers put in selected information sources. The paper also discusses how socio-economic variables affect level of trust in selected sources. Qualitative and quantitative techniques were applied to data collected from focus groups and a mail questionnaire survey. Analyses showed that consumers used newspapers (73.7%), television (73.2%), and magazines (71.2%) occasionally or more frequently than other sources to collect information about food and biotechnology. Health professionals, extension professionals, and University scientists were most trusted for providing information about GM foods. Findings of the study could provide information on choice of effective channels for communicating information about modified food and biotechnology.

The introduction of genetically modified foods in the marketplace ushered in unprecedented controversies and debates from differing interests regarding their safety. In addition to safety concerns, concerns about environmental and health effects of modification, the issue of plant diversity, the moral and social dilemma of tampering with nature, legal issues regarding ownership of genetic materials, and religious concerns have also arisen (Chen and Chern 2002; Pew Initiative on Food and Biotechnology 2001a, 2001b). Years after the introduction of GM foods, the debate has continued (Marks, Kalaitzandonakes, and Zakharova 2002; Krueger 2001; Tangley 1999; Nelson et al. 1999; Nuffield Council on Bioethics 1999). Since little is known

about long-term effects of GM foods on humans, focus groups were used to determine how ordinary consumers perceive risks and benefits associated with the new products of biotechnology. The perceptions and attitudes of consumers will continue to influence their behavior, which in turn will have serious implications for food marketing for years to come (Hurt 1994; Drabenstott 1994, 2000; Harl 2000; Chen and Chern 2002).

In a recent national study of Americans' knowledge and opinion of GM foods, researchers found that only 50% of American consumers were aware that the food they purchased contained genetically modified crops, and only 25% believed that they have consumed foods with genetically modified ingredients. Although awareness and specific knowledge of biotechnology was slightly higher than in a 2001 study, it was still considerably low. Ten percent of survey respondents were uncertain of their opinion of GM foods (Hallman et al. 2003). Overall, survey participants were more likely to respond favorably to genetically modified products with specific benefits than they were to an abstract and unfamiliar concept of food biotechnology. Similar results were also reported in a 2003 Pew Initiative on Food and Biotechnology, where 34% of respondents had "heard a great deal" or "some" about GM foods and 36% had "heard a great deal" or "some" about biotechnology use in food production. According to the nationwide survey of 1,000 American consumers by The Mellman Group and Public Opinion Strategies, 64% opposed a ban on GM foods and most respondents were more com-

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fortable with plant than with animal modifications. A majority of survey participants (81%) supported plant modifications that would lead to less-expensive pharmaceuticals and 71% supported modifications that would reduce the need for pesticides on crops. About 89% indicated that companies should be required to submit safety data to the Food and Drug Administration (FDA) for review and 74% agreed that no food product should be allowed on the market until the FDA had determined its safety. This was an indication of overwhelming support for the FDA as the agency consumers would look to in providing GM-food approvals. A similar conclusion was reached in a telephone survey of 1000 Americans conducted for the Washington, D.C.-based International Food and Information Consortium (IFIC 2003). The source of information and the degree of trust that consumers put on the source are powerful correlates of acceptance of biotechnology or predictors of the opinions and attitudes that influence acceptance. Most Americans surveyed in the study trusted the FDA, scientists and academics, farmers, friends and family, consumer groups, environmental groups, and government regulators as sources of information on genetically modified foods.

### **Objectives**

The objectives of this paper are to report on the media used by consumers in acquiring information on biotech food products and nutrition and to examine how much trust consumers put in selected agricultural-biotechnology information sources for their food-purchasing and -consumption decisions. The effect of socio-economic variables on these sources and the degree of trust will also be discussed.

### **Data and Methodology**

A total of seventeen consumer and producer focus-group meetings were used to collect responses to selected questions on agricultural-biotechnology issue in Arkansas, North Carolina, and Tennessee. The discussion from the focus-group meetings formed the basis for the survey instrument developed and pre-tested with students, research and extension professionals, and willing participants in the three states collaborating on the project. The pre-tested questionnaires were then modified into a 21-item questionnaire used for collecting the information reported in this paper. Data and results from two

hundred and fifty useable questionnaire surveys from respondents in the three states are presented in this paper.

The focus-group approach employed here is useful since the study is interested in finding a range of opinions across several groups (Krueger and Casey 2000; Edmunds 1999). The approach is also useful because it presents "a more natural environment than that of an individual interview because participants are influencing and influenced by others just as they are in life." This approach allowed collection of more information for designing the "large-scale quantitative study" (Krueger and Casey 2000:11, 24).

Since focus groups represent one method of collecting information prior to the development of a questionnaire, there was further justification for applying the focus-group approach in this research. Consumer focus groups in the three participating states provided input for the questionnaire developed and used in collecting the data reported in this paper. Additionally, the groups provided input on the meaning of biotechnology, perceptions of important issues considered when discussing GM foods, benefits and risks of agricultural biotechnology, and the role of government in regulating the use of genetically modified crops.

Qualitative analysis of focus-group discussions showed varying levels of knowledge of biotechnology. Based on a word-for-word transcription of the focus-group discussions, a majority of the respondents were in favor of government regulation and a strong regulation policy. Many respondents expressed fear of bio-terrorism. A small number of participants disagreed with the need for governmental regulation on the basis that "less government means better results" and the fear that too much politics would muddy the issues. These participants were in favor of people making their own choices. In summary, the focus-group meetings showed a wide range of opinions among consumers as to what constitutes agricultural biotechnology. There was agreement on what issues should be considered important when discussing genetically modified foods. Consumers were concerned about the health of their families, especially children's health. They were also interested in the increased nutritional values that these new foods would provide. Participants were divided when issues of benefits and risks of biotechnology were considered. For the most part, there also seemed to be a complete

lack of consensus on what the role of government should be in regulating GM foods. Many focus-group participants were confused about how much government intervention they could tolerate, wondering how much governmental intervention was good for consumers.

### Results of Pilot Study

Analysis was conducted on collected data using the Statistical Package for the Social Sciences (SPSS Version 11). A total of 250 consumer surveys were collected and analyzed; detailed results are displayed in Tables 1–3.

#### *Socio-economic and Demographic Information*

About 38.4% of the respondents were males and 61.1% were females. Respondents were asked to indicate the total number of people living in their households and the numbers that were below 18 years of age. On average, the majority of respondents (78.2%) indicated that they had 2–4 people living in their households, while a smaller number (8.4%) indicated that they had five or more. A little more than thirteen percent (13.4%) of respondents had one person living in their household. Most of the households that participated in the survey had someone below 18 years of age in the family. The survey showed that about 91.6% of respondents had 1–4 people younger than 18 living in the household. Ten percent of survey participants were less than 34 years old, 53.4% were between 35 and 54, and about 35.0% were 55 years or older; 1.4% did not respond to the question. Slightly more than twenty percent (20.1%) of respondents had a high school education (including GED) or less, 21.5% had trade or vocational school or some college but no degree, and 41.6% had an associate or bachelor's degree. About sixteen percent indicated that they had graduate or professional degrees. Fourteen percent of the participants in the survey were African-Americans, 74.0% were white, 5.6% American Indian or Alaskan native, and about 0.9% Asian. About 4.2% of the respondents did not identify themselves as belonging to any racial group. About one-half of survey participants lived in a rural area outside of town, 10.2% lived in towns with less than 2500 people, and 29.6% lived in towns with 2500–49,999 people. Only 3.2% lived in cities with 50,000–99,999 people, 5.1% lived in larger cities

of 100,000–499,999 people, and only 0.5% lived in cities with more than 500,000 residents. Respondents were presented with ten income categories and asked to identify an income category that would fit their 2002 pre-tax (gross) income. Most of the respondents (51.8%) indicated that their household incomes were between \$35,000 and \$74,999. On the extreme ends of the income range, 6.4% responded that their incomes were less than \$14,999 and about 5.9% selected incomes of between \$150,000 and \$199,999 (Table 1).

#### *Media Used to Obtain Information about GM Food Products and Nutrition*

Consumers were presented with six different media where information about food products and nutrition could be obtained, and were asked to indicate the frequency of use using a 4-point Likert-type scale (1 = “never used,” 2 = “rarely used,” 3 = “occasionally used,” and 4 = “frequently used”). Results are summarized in Table 2. The responses were re-categorized as follows: 0 = “never or rarely used” and 1 = “occasionally or frequently used.” Based on the re-categorization, results indicated that consumers occasionally or frequently used the following media to gather their information: newspapers (73.7%), television (73.2%), magazines (71.2%), and word-of-mouth (66.6%). Radio (48.6%) and the Internet (48.6%) were tied as the next media that consumers used for information.

#### *Level of Trust for Media Used in Collecting Bbiotechnology Information*

Consumers were asked to indicate the level of trust that they put in sixteen sources of biotechnology information. The sources of information are listed in Table 3. For purposes of analysis, responses of “no trust” and “low trust” were re-categorized with a value of “0” and “moderate trust” and “high trust” were re-categorized as “1.” The five most-trusted sources were health professionals (78.6%), extension professionals (77.9%), university scientists (76.4%), farm journalists (68.3%), and food industry professionals (65.7%). The three least-trusted sources were political officials (77.8%), television news reporters (60.3%), and radio news reporters (58.0%). Despite their choice of the sources, consumers were not sure how much they trusted farm journalists (12.6%), biotech-industry scien-

**Table 1. Demographic and Socio-economic Profile of Survey Respondents.**

Variable	Percentage of Respondents*
Gender	
.....	38.4
Male	61.1
.....	0.5
Female	
.....	
No response	
Number of People in Household	
.....	13.4
1	78.2
.....	8.4
2-4	
.....	
5 or more	
People in Household less than 18 years old	
.....	1.4
0	55.5
.....	34.7
1-2	6.4
.....	2.0
3-4	
.....	
5-7	
.....	
8 or more	
Racial Group	
.....	14.4
Black or African American	74.0
.....	5.6
White	0.9
.....	0.5
American Indian or Alaskan native	4.2
.....	
Asian	
.....	
Hispanic	
.....	
Other	
Age	
.....	10.1
Less than 34	53.4
.....	35.0
35-44	
.....	
55 and over	

**Table 2. Medium Used to Obtain Information About GM Food Products and Nutrition.**

Medium	Frequency of use (% of respondents)*			
	Never	Rarely	Occasionally	Frequently
Magazines	10.2	18.1	44.7	26.5
Newspapers	8.8	17.1	38.2	35.5
Word of mouth	4.2	28.2	37.0	29.6
Television	6.0	19.4	43.1	30.1
Radio	17.6	31.9	36.1	12.5
Internet	30.3	23.1	31.7	14.9
Other	60.9	5.4	16.3	17.4

\* May not add up to 100% due to rounding error and/or non-response to question.

**Table 3. Source of Biotechnology Information and Level of Consumer Trust.**

Source of Information	Level of Trust* (% of Respondents)				
	No Trust	Low Trust	Moderate Trust	High Trust	Don't Know
Farm journalists	5.6	13.6	47.7	20.6	12.6
Biotech industry scientists	9.3	20.9	43.7	15.3	10.7
Food industry professionals	8.3	19.4	47.2	18.5	6.5
University scientists	3.7	13.9	46.8	29.6	6.0
Extension professionals	2.8	12.3	38.7	39.2	7.1
Government scientist	12.6	22.8	43.7	15.3	5.6
Television news reports	22.9	37.4	28.5	7.5	3.7
Family/friends	4.2	18.5	39.8	30.6	6.9
Radio news reporters	18.4	39.6	27.2	7.8	6.9
Producer groups	11.6	33.3	37.0	11.6	6.5
Consumer groups	8.9	22.5	45.1	19.7	3.8
Environmental groups	17.9	26.4	35.8	15.1	4.7
Political officials	44.2	32.6	15.3	2.3	5.6
Health professionals	6.0	12.6	43.3	35.3	2.8
Regulatory agency officials	15.8	25.1	38.1	14.0	7.0
Grocers	15.4	32.2	36.4	8.9	7.0

\* May not add up to 100% due to rounding error and/or non-response.

For analysis, level of trust reclassified: 0= "low to no trust," 1 = "moderate to high trust."



tists (10.7%), or regulatory agency officials and grocers, tied at 7.0%.

Chi-square ( $\chi^2$ ) tests showed differences in source of information and selected demographic variables. There were differences in level of education in the choice of university scientists as the source of information. For extension professionals as a source, chi-square tests of independence showed significant difference in medium selection for the number in households and for the number in households less than 18 years of age. The highest number of socio-economic variables that showed differences were observed in health professionals as a source of information. All results were significant at the 5% level.

### Conclusions

Focus-group meetings in Arkansas, North Carolina, and Tennessee provided input for the development of a questionnaire used in collecting data for the study. Consumers provided information about issues of biotechnology and genetically modified foods and the sources used in gathering information on the issues.

Results from analysis of mailed questionnaire showed that consumers used a variety of sources to collect information about food products and nutrition, with the most frequently used media being newspapers, television, and magazines.

Level of consumer trust in the source used to obtain biotechnology information showed that consumers trusted health professionals, extension professionals, and university scientists the most, while the least-trusted were political officials, television news reporters, and radio news reporters. Despite the high trust level accorded these sources, an average of between 2.8% and 12.6% of consumers did not know if they trusted the source of biotechnology information presented to them.

The results of the pilot study presented here show that residents in rural areas are quite aware of the general issues facing producers and consumers in the area of genetically modified food and agricultural biotechnology.

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