



AgEcon SEARCH
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search

<http://ageconsearch.umn.edu>

aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

AMERICANS AND GM FOOD: --- KNOWLEDGE, OPINION AND INTEREST IN 2004

William K. Hallman
W. Carl Hebden
Cara L. Cuite
Helen L. Aquino
and
John T. Lang

Food Policy Institute · Cook College
Rutgers, The State University of New Jersey
ASB III, 3 Rutgers Plaza
New Brunswick, New Jersey 08901
Tel: (732) 932-1966
Fax: (732) 932-9544
hallman@aesop.rutgers.edu
<http://www.foodpolicyinstitute.org>
November 2004

FPI publication number RR-1104-007

Suggested Citation:

Hallman, W. K., Hebden, W. C., Cuite, C. L., Aquino, H. L., and Lang, J. T.. 2004. Americans and GM Food: Knowledge, Opinion and Interest in 2004. (Publication number RR-1104-007). New Brunswick, New Jersey; Food Policy Institute, Cook College, Rutgers - The State University of New Jersey.

EXECUTIVE SUMMARY

This report presents the results from the third in a series of studies examining public perception of genetically modified (GM) food in the United States. All three studies were based on survey results of separate, nationally representative samples of approximately 1,200 Americans taken in 2001, 2003, and 2004. While the survey instrument on which the current report is based maintained many of the same measures of awareness and attitude as its two predecessors, it also included several new queries that assess the ability of respondents to recall specific news stories related to GM food, their interest in the topic, and where they would go to look for new information.

Many questions that were repeated from previous years have changed considerably in the current survey. Some of the classic measures of awareness and opinion now incorporate an "unsure" response as choice supplied by the interviewer. While respondents were allowed to volunteer this response in the past, explicitly providing this option to respondents reduced guessing on knowledge-based questions and encouraged a more accurate representation of opinion than in the past.

The report begins with an investigation of Americans' awareness and knowledge about the topic in general, their ability to recall related news stories, familiarity with laws and regulations as well as other questions designed to get at highly specific knowledge about agricultural biotechnology. Next, it details the effect of the new survey methodology on reported opinions about plant-based and animal-based GM food. Finally, it delves into a number of novel findings about interest in hypothetical television shows about GM food, desire for information on food labels, and reported behavior with regards to information seeking.

Consistent with results from our previous studies and others, these findings suggest that the American public is generally unaware of GM food. Most Americans have heard or read little about it, are not aware of its prevalence in their lives, and are confused as to which type of GM products are available. Respondents struggled with factual questions related to GM food and the science behind it, could not recall news stories related to the topic, and were not very knowledgeable about laws regarding the labeling and testing of GM food. Americans are also unsure of their opinions about GM food and split in their assessments of the technology when forced to take a position.

Americans say they are interested in the topic of GM food, specifically those topics related to human health. Respondents say they desire more information on food labels and report that they would like to see GM foods labeled as such. The majority of Americans admit they have never looked for information about GM food and most say they will search the Internet should the need arise.

CONTENTS

ACKNOWLEDGEMENTS

iii

INTRODUCTION

| | |
|---------------------|---|
| Overview | 1 |
| Methods | 1 |
| Sample Demographics | 2 |

FINDINGS

What Americans Know

| | |
|------------------------------------|---|
| General Awareness | 3 |
| Awareness of Product Availability | 4 |
| Specific Knowledge | 4 |
| Recognition of Media Stories | 5 |
| Americans Unsure of Their Opinions | 6 |
| Knowledge of GM Food Regulation | 9 |

Topical Interest and Desired Information

| | |
|--|----|
| Topics of Interest | 10 |
| Desire for Information on Food Labels | 11 |
| Desire for Safety Information | 11 |
| Where Americans Would Go for Information | 12 |

CONCLUSIONS

12

WORKS CITED

13

QUESTIONNAIRE

15

ACKNOWLEDGEMENTS

Many individuals had a hand in the conception, design and implementation of this study. We wish to specifically thank:

Dr. Hans Peter Peters and Ms. Magda Sawicka of the Forschungszentrum Jülich, Germany for their contributions in designing the questionnaire.

Dr. Benjamin Onyango and Ms. Sarah Condry of the Food Policy Institute for their contributions in helping to design the questionnaire and helpful comments in reviewing this report.

Ms. Wendy Stelatella of the Food Policy Institute for her support in administering the contracts required to complete the surveys.

Messrs. Al Ronca, Jamie Munjack, Matt Moffre, and Marlon Forde of Schulman, Ronca & Bucuvalas, Inc. for their assistance in sample selection and weighting, interviewer training and in managing the telephone interview process.

Dr. Calum Turvey and the Board of Directors of the Food Policy Institute for their continued support of this important project.

This project is a multi-institutional, multidisciplinary effort. We wish to express our sincere thanks and appreciation for the sound input and advice from our colleagues and collaborative investigators: Drs. Hans Peter Peters, of the Forschungszentrum Jülich Germany; Lynn Brown, Joan Thomson and Nancy Ellen Kiernan, of the Pennsylvania State University; Diane Phillips of St. Joseph's University; Rudy Nayga of Texas A&M University; and Carol Byrd-Bredbenner, Caron Chess, Bill Hlubik, Robert Kubey, Michael Lawton, Claire McInerney, Karen O'Neill, Ramu Govindasamy, Benjamin Onyango and Linda Steiner of Rutgers, The State University of New Jersey.

We also wish to thank the many experts from industry, consumer organizations, government and academia who have provided valuable insights and suggestions concerning public perceptions of food biotechnology. These have improved our work immeasurably.

We would also like to express our sincere appreciation to the thousands of interested individuals who have requested or downloaded copies of the earlier reports in this series and to the many journalists who have contacted us about our work and have faithfully reported its results.

We also wish to express our gratitude to the United States Department of Agriculture (USDA) for its support of this project under the Initiatives for Future Agriculture and Food Systems Program (IFAFS) grant #2001-52100-11203 "Evaluating Consumer Acceptance of Food Biotechnology in the United States."



INTRODUCTION

OVERVIEW

This report presents the results of the third in a series of USDA-funded national surveys examining public awareness of, knowledge about, and feelings toward genetically modified (GM) foods in the United States.

This, the latest study in the series, retains many of the same measures as its two predecessors and includes several new explorations. These new measures go beyond simply asking consumers what they do and do not know about GM food, but also what they want to know and where they would go for that information. This study also includes detailed assessments of respondent interest in topics related to GM food.

GM foods are derived from plants or animals created through the process of DNA recombination, in which scientists transfer genes from one plant or animal into the genetic code of another plant or animal to take advantage of desirable traits such as disease, drought, insect, and herbicide resistance. While the subject of GM food is a major source of controversy in many countries around the world, the United States remains the largest producer of GM agricultural products, harvesting about two-thirds (63%) of the world's GM crops. More than 80% of the soy, three-quarters of the cotton, and 40% of corn produced in the United States and the majority of canola grown in Canada consist of GM varieties (Pew, 2004). Because these crops are the source of some of the most common ingredients used by American food processors, and because GM varieties are often mixed with ordinary varieties during shipping, processing and storage, most estimates suggest that between 60% and 70% of processed foods on American shelves contain ingredients derived at least in part from GM crops (GEO-PIE, 2003).

The first two investigations in the series (Hallman, Adelaja, Schilling & Lang, 2002; Hallman, Hebden, Aquino, Cuite & Lang, 2003) concluded that Americans are generally uninformed about GM food and largely unaware of its presence in the food system and their own diets. Most Americans say they

have heard or read little about GM food and admit that they do not know much about it.

Yet, this lack of familiarity with the technology and the issues surrounding it has not discouraged most respondents from expressing their views when prompted to do so in our earlier studies. However, because most Americans have given little thought to the issue, their opinions about GM foods are often equivocal and highly malleable. Individuals may take strikingly different positions from question to question in reaction to such things as the type of organisms used, the product's intended purpose, information about potential benefits or risks, even question wording. Within a short time frame a respondent may go from asserting strong opposition against GM food to saying she would buy them if they were cheaper than non-GM products.

Since many respondents have been willing to proffer opinions even after declaring that they have little knowledge of the technology or the issues surrounding it, the current study includes an "unsure" option in many questions (which in the first two surveys was a voluntary response only and not offered as a choice by the interviewer). The inclusion of an unsure option and the addition of several follow-up queries yield more precise and multifaceted measurements.

Thus, while the current study continues to explore the core questions related to American awareness and knowledge of GM food, opinions on mandatory product labeling and overall approval of the transgenic technique as it relates to animal and plant biotechnology, the current survey instrument was changed considerably from its predecessors. As a result, this report presents novel information about public opinion toward GM food from angles that were not previously explored in prior research.

METHODS

The Food Policy Institute contracted with the opinion polling firm, Shulman, Ronca, and Bucuvalas, Inc., to conduct 1,201 telephone interviews using computer-assisted telephone interview (CATI) technology. Interviewers

INTRODUCTION

were consistently monitored throughout the field period. The interviews were conducted between May 4, 2004 and June 14th, 2004. To reduce interview time, there were two versions of the survey which shared core questions but included different supplemental questions. Version A had 601 respondents with an average interview time of 19.5 minutes and Version B had 600 respondents with an average interview time of 21.9 minutes. Version assignments were random.

Potential respondents were selected using national random digit dialing across all 50 states. U.S. Census Bureau population estimates determined the distribution necessary for proportionate geographic coverage. The CATI program guided a random but balanced selection process to ensure that representative numbers of males and females were interviewed.

Many of the telephone numbers originally selected as part of the sampling frame were excluded as non-residential or non-working numbers. Only 25% of the numbers selected at random yielded completed interviews. However, calls to 66% of the working residential numbers resulted in completed interviews.

When weighted, the 1,201 completed interviews have a sampling error rate of $\pm 3\%$. For those questions asked of only half the sample (the adjusted sample size will be indicated in text and tables where appropriate), the sampling error rate increases to $\pm 4\%$.

SAMPLE DEMOGRAPHICS

Throughout this report, all of the descriptive results are estimates of the distribution of responses within the adult, non-institutionalized, English-speaking population of the United States and are derived from data weighted by gender, age, race, ethnicity, education and region based on figures from the U.S. Census Bureau.

Unweighted, the sample was 38% male and 62% female. Respondent ages ranged from 18 to 94 with a median age of 43.

Responding to standard U.S. Census questions concerning race and ethnicity, 79% of the sample identified themselves as White, 10% as Black, 2% as Native American and 2% as Asian with the remainder (4%) divided among other diverse racial or ethnic groups. A small percentage of the sample (3%) refused to answer this question or was not sure of the answer. Independent of race, 5% affirmed that they are of Hispanic descent, 92% said they were not, and 3% refused to answer or were not sure.

Most respondents (90%) had completed high school. High school was the highest level of formal education for more than a quarter of the sample (26%). About a quarter (27%) had completed some college or an Associates degree while 24% of the sample had completed a four year college degree and 13% had earned post-graduate degrees. The remainder (8%) had not obtained a high school diploma or GED (2% refused to answer).

More than half of the respondents (53%) said they were employed full time, 12% reported they were employed part time, about a third (33%) said they were unemployed or retired, and 2% were unsure or refused to answer. A little less than half (47%) said their total household income was less than \$50,000 while the other half (45%) said their total household income was greater than \$50,000 (the remaining 8% did not know or refused to answer).

Almost two-thirds of the respondents (63%) claimed to be their household's primary food shopper, 19% said somebody else was the primary shopper, and 18% said the task was equally divided, while three respondents (.2%) did not know.

Table 1: Sample demographics¹ (N=1201)

| | | | |
|-----------------|-----|-----------------------|-----|
| Sex | | Education | |
| Male | 38% | Less than High school | 8% |
| Female | 62% | High school | 26% |
| Race | | Some college | 27% |
| White | 79% | Four year college | 24% |
| Black | 10% | Post Graduate | 13% |
| Native American | 2% | Unsure/Refused | 2% |
| Asian | 2% | Employment | |
| Other | 4% | Full time | 53% |
| Unsure/Refused | 3% | Part time | 12% |
| Income | | Unemployed/retired | 33% |
| Under \$50,000 | 47% | Unsure/Refused | 2% |
| Over \$50,000 | 45% | | |
| Unsure/ Refused | 8% | | |

¹Because of rounding, figures in this report will not always equal 100%.

FINDINGS

WHAT AMERICANS KNOW

Consistent with results from our previous studies and others (IFIC 2001; Pew 2003b), these findings suggest that the American public is generally unaware of GM food. Most Americans have heard or read little about it, are not aware of its prevalence in their lives, and are confused as to which types of GM products are available. Respondents struggled with factual questions related to GM food and the science behind it, could not recall news stories related to the topic, and were not very knowledgeable about laws regarding the labeling and testing of GM food. Americans are also unsure of their opinions about GM food and split in their assessments of the technology when forced to take a position.

GENERAL AWARENESS

About three-quarters of Americans (77%) are aware that methods of modifying genes exist, and 56% say they have heard or read “some” or “a great deal” about GM foods (Figure 1). Yet, 63% of Americans report that they have never had a conversation about GM food, and 42% of those who did discuss it only did so once or twice (Figure 2).

Moreover, the public remains unaware of the prevalence of GM ingredients in everyday food products. For instance, less than half of the respondents (48%), realized that GM foods are currently available in supermarkets in 2004, while less than a third (31%) believed they had personally consumed GM food. These figures have not changed substantially between 2003 and the current study, though there has been a

Figure 1: Amount heard or read about GM food (n=1201)

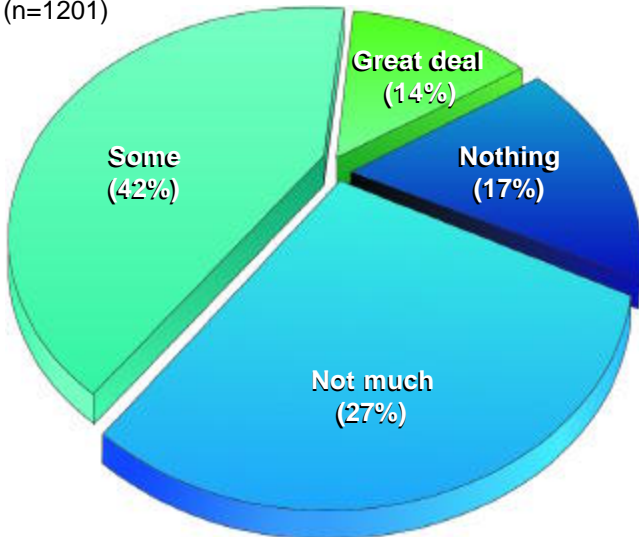
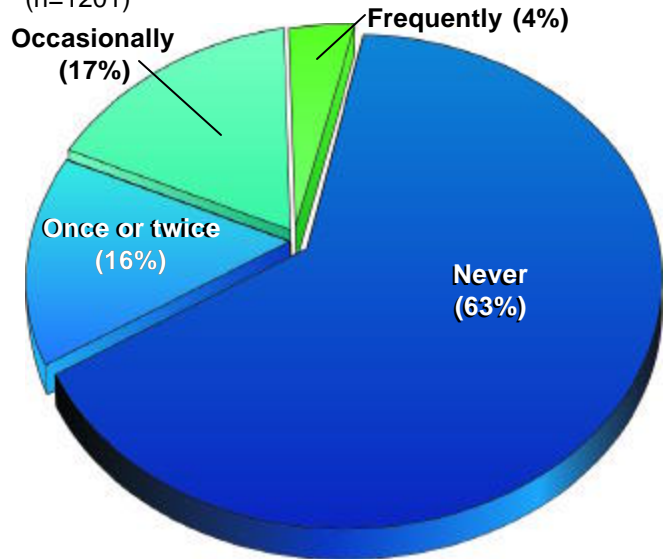


Figure 2: Frequency of discussion about GM food (n=1201)



small but significant increase in awareness since 2001.

Respondent awareness that GM products are available for purchase and that they may have consumed them has increased since 2001. The “unsure” response increased in frequency with its inclusion as an explicit response option, while the “no” response decreased in frequency in both of these questions. This suggests that respondents who are unsure if GM food products are available or if they have eaten them have a stronger tendency to believe that such products do not exist and have not been a part of their diets (Figures 3 & 4).

Figure 3: Awareness of GM food in supermarkets

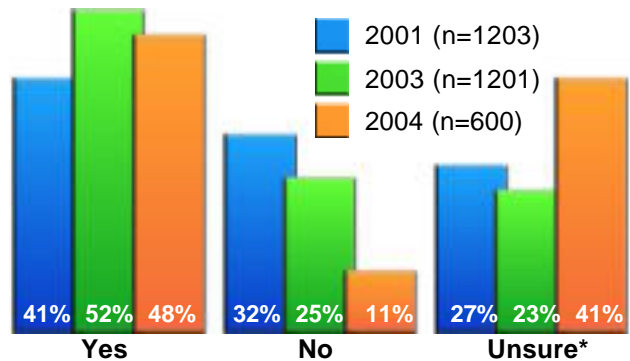
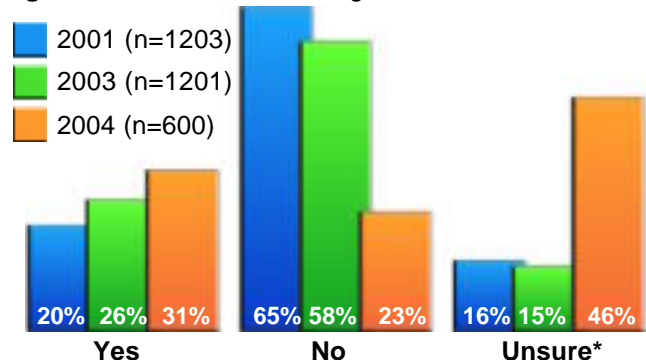


Figure 4: Awareness of eating GM food



*Read out loud by the interviewer in the 2004 survey only.

WHAT AMERICANS KNOW

AWARENESS OF PRODUCT AVAILABILITY

Those who said they were aware that some food products in supermarkets contained GM ingredients (n=301)² were asked to estimate how many years these products have been available to consumers. While estimates ranged from less than a year to a century, the median guess, 10 years, was surprisingly accurate.

These respondents (n=301) also received a follow-up question asking which, if any, of a sample of food products, including GM corn, GM rice, GM tomatoes, GM soy, and GM chicken, were currently available to American consumers in whole or processed form. The majority of these respondents believed at least one of the five listed products was currently available in supermarkets, though many were confused as to precisely which ones (Figure 5).

Figure 5: Belief in the availability of GM products (n=301)

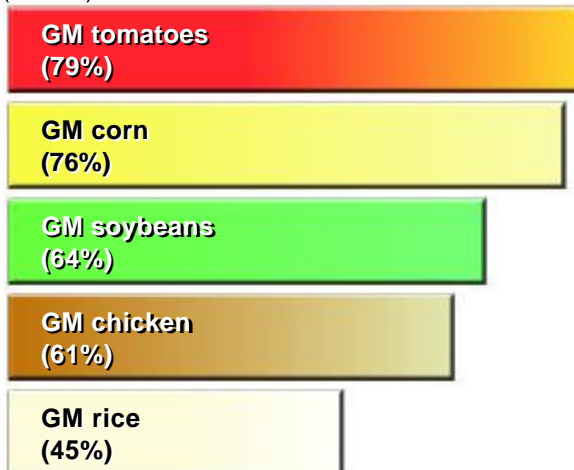
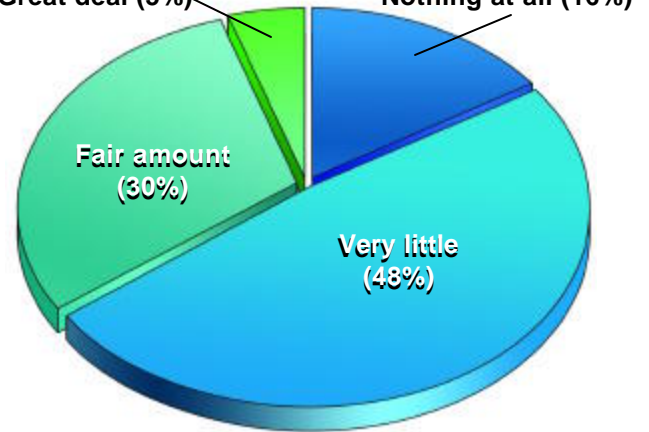


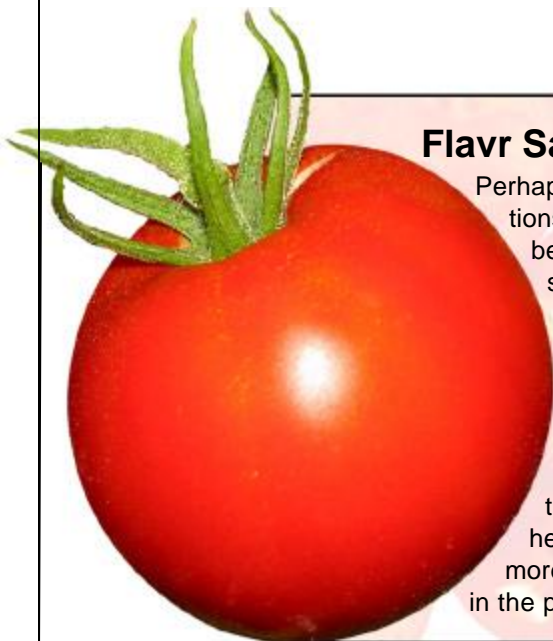
Figure 6: Self-rated knowledge of GM food (n=600)



While the majority (82%) appropriately recognized the availability of either GM corn or GM soy and more than half (58%) correctly acknowledged that both are currently on the market, many respondents incorrectly reported that GM rice (45%) or GM chicken (61%) are currently available to American consumers (Table 2). Widespread belief in the availability of GM tomatoes (79%), which were once sold in supermarkets but are not currently, may demonstrate the powerful effect media coverage can have on consumer awareness.

GM SPECIFIC KNOWLEDGE

To investigate how much respondents know about GM food, we began by asking respondents to rate their own knowledge of the topic. Most respondents said they know “nothing at all” (16%) or “very little” (48%) about it, while one in three (30%) said they knew “a fair amount,” and only 5% said they knew “a great deal” (Figure 6).



Flavr Savr™ gone but memories remain fresh

Perhaps the most striking finding to come out of the product availability questions, 79% of those who knew some GM food products are available believed GM tomatoes are presently available for purchase in American supermarkets. In fact, out of all the products listed, respondents were most likely to believe in the availability of GM tomatoes. This may be the result of the highly publicized marketing campaign and extensive media coverage of the Flavr Savr™ tomato, the first GM product with benefits marketed directly to consumers, introduced in 1994. Though the product was eventually taken off the market in 1997 by its manufacturer, Calgene, news of its withdrawal was not nearly as prevalent in the media as the original product launch.³ Now, a decade after its much heralded introduction and seven years after its removal from the market, more than one-third of Americans still believe that GM tomatoes are for sale in the produce section of their local supermarket.

² N = 600 for original supermarket awareness measure.

³ For an account of the Flavr Savr™ Tomato and Calgene, see Martineau 2001.

Table 2: Genetics and GM food quiz with longitudinal comparisons
 2003 (N=1,201)
 2004 (n=600)

| | 2003 | | | 2004 | | |
|---|---------|-----------|--------|---------|-----------|--------|
| | Correct | Incorrect | Unsure | Correct | Incorrect | Unsure |
| Ordinary tomatoes do not contain genes while GM tomatoes do | 57% | 21% | 22% | 40% | 9% | 51% |
| By eating a GM fruit, a person's genes could also become modified | 68% | 17% | 15% | 45% | 13% | 42% |
| The mother's genes determine whether a child is a girl | 73% | 18% | 9% | 57% | 12% | 31% |
| GM animals are always bigger than ordinary animals | 57% | 25% | 18% | 36% | 17% | 47% |
| It is not possible to transfer animal genes into plants | 48% | 34% | 18% | 30% | 18% | 52% |
| Tomatoes modified with genes from a catfish would probably taste fishy | 60% | 27% | 13% | 42% | 15% | 43% |
| Cloning produces genetically identical copies | 69% | 23% | 8% | 54% | 17% | 29% |
| More than half the human genes are identical to those of chimpanzees | 55% | 29% | 16% | 40% | 16% | 44% |
| New: Scientists sometimes genetically modify plants so that they cannot reproduce | N/A | N/A | N/A | 44% | 10% | 46% |
| New: Larger organisms have more genes | N/A | N/A | N/A | 38% | 14% | 48% |
| New: Most of the soybeans grown in the U.S. are a genetically modified variety | N/A | N/A | N/A | 27% | 11% | 62% |
| New: GM corn is required to be kept separate from non-GM corn | N/A | N/A | N/A | 12% | 39% | 49% |

In 2001 and 2003, our studies included a quiz on textbook genetics and some basic facts about GM food, based on a similar quiz used in the Eurobarometer studies (Gaskell, Allum and Stares, 2003) to gauge knowledge of the topic amongst Europeans. In this survey we repeated eight of the eleven prior items and added four new items designed to tap into more specific knowledge about GM food (Table 2). One purpose for these additions was to determine whether knowledge specific to GM food would be a greater predictor of opinion than knowledge of basic genetics, an issue that will be explored in a future publication.

Due to the inclusion of the new “unsure” response option for these true/false questions, quiz results for the current study differ considerably from those of the previous two studies. Although the prior surveys allowed respondents to volunteer an “unsure” response, we included it as a response read by the interviewer in this survey to reduce pressure on respondents to guess. As a result, knowledge may be more accurately represented in the current study. The “unsure” response increased in frequency while the correct and incorrect responses decreased in frequency.

On the 2004 survey, more than half of the respondents (58%) answered less than half of the questions correctly, and only three respondents (less than 1%) gave the correct answer to every question. The number of respondents getting less than 70% correct increased dramatically with the introduction of the “unsure” option, soaring from 52% in 2003 to 89% in 2004. It appears that many respondents in 2003 guessed their way to higher scores, possibly not wanting to volunteer that they were “unsure” of the correct answer.

As in past studies, there was only a moderate relationship between respondents' self-reported level of knowledge about GM food and their performance on the quiz ($r(600) = .36, p < .01$). However, this self-rating of knowledge did share a stronger relationship with awareness that GM methods exist ($r(600) = .47, p < .01$) and with the number of news stories the respondent claimed to have heard or read ($r(600) = .56, p < .01$), as described below.

MEDIA STORIES

Few Americans can recall news stories or events related to GM food. In 2003, only 19% of respondents could remember any events or news stories related to GM food, and less than 1% could remember specific details about any story related to the topic. However, those questions were open-ended and unstructured. In the current study we modified the approach when asking respondents if they recalled specific facts and stories about GM food. Seven stories were presented and the respondents were asked whether they had heard the story, then, whether they thought the story was believable or not. All seven stories had appeared in the media during the past decade, though two of the stories were based on false information that was circulated via the Internet and other media (Table 3).

Our findings suggest that none of the stories presented in our survey have caught much of the attention of American audiences. The greatest recognition was registered in response to the story about European demonstrations against GM food, with which only 36% of Americans reported familiarity.

Regardless of whether respondents could recall the stories or not, each query was followed by a question asking respondents to rate the believability of each

Table 3: Recognition and believability of stories related to GM food (n=600)

| | Heard of it | Believability ⁴ | | |
|---|-------------|----------------------------|---------------------|-----------------------|
| | | Very believable | Somewhat believable | Not at all believable |
| There have been demonstrations against GM food in many European countries ^(a) | 36% | 41% | 43% | 9% |
| Some African nations have refused to accept imports of GM grain from the United States ^(b) | 24% | 32% | 45% | 15% |
| GM crops only approved for animal consumption have accidentally been included in human food ^(c) | 26% | 30% | 51% | 11% |
| Some people have had allergic reactions to GM foods ^(d) | 25% | 41% | 46% | 7% |
| A large fast-food company used chickens so altered by genetic modification that they can't be called 'chicken' anymore ^(e) | 17% | 20% | 36% | 35% |
| GM crops have been detected in countries where it is not legal to plant them ^(f) | 16% | 30% | 50% | 13% |
| Pollen from GM corn was shown to kill butterfly larva in a laboratory ^(g) | 7% | 16% | 46% | 27% |

(a) An actual event, see Associated Press (2000) for an example.

(b) An actual event, see Cauvin (2002) for an example.

(c) An actual event, see Brasher (2000) for an example.

(d) A claim made in the aftermath of the Starlink event listed above (item c) that turned out to be false (CDC 2001; Sutton et al., 2003).

(e) This story originated as an email hoax of the "send a copy to ten friends" variety. For full story, see Weise (1999).

(f) An actual event, though sometimes claims are unsubstantiated. See Strom (2000) and Yoon (2001) for examples.

(g) First reported in a letter in the journal Nature and was soon picked up by mainstream media (Shelton & Sears, 2001).

story. The majority of respondents deemed every presented story at least somewhat believable, even the stories relating false information. Among the most notable findings from this section were reactions to the stories relating false information; 87% think it at least somewhat believable that people have had allergic reactions to GM foods and 56% find it somewhat or very believable that a large fast-food chain sold chicken products “so altered by genetic modification that they can't be called 'chicken' anymore.”

UNCERTAIN OPINIONS

Considering that Americans are uninformed about GM food and largely unaware of its presence in the food system, it is no surprise that they also are very uncertain of their opinions about the technology. By changing the methodology from the prior versions of this survey, we attempted to more accurately illustrate just how unsure Americans actually are about their opinions.

In the current study, we hoped to develop a more nuanced picture of the way the public feels about agricultural biotechnology through the inclusion of a number of new measures and the addition of “unsure” and “neither approve nor disapprove” response categories followed by clarification questions. The inclusion of the new categories and follow-up questions produced results necessarily different from the previ-

ous two studies, particularly in the knowledge and approval sections of the questionnaire.

A series of questions asked respondents how they felt about both plant-based and animal-based GM foods. For each type of GM food, respondents were given a choice between approval, disapproval, and the newly included “unsure” and “neither approve nor disapprove” categories. Respondents who said they either approved or disapproved of the GM product in question received a follow-up question soliciting the strength of that opinion: “Was that strongly or somewhat approve/disapprove?” Respondents who said they were “unsure” or they “neither approved nor disapproved” were asked to specify the direction in which they “leaned” (i.e. toward approval or disapproval). An illustration of this interview pattern with accompanying frequencies is shown in Figures 7 and 8.

This method produced a more accurate portrait of public opinion, as it separated those who had apparently made up their minds from those who were not sure or undecided.

The first question in the pattern asked whether respondents “approved,” “neither approved nor disapproved,” “disapproved,” or were “unsure” of their opinion about genetic modification. For plant-based food products, the most frequent response was unsure (38%), followed by approval (27%), then disapproval (23%) and finally neither approval nor disapproval

6 ⁴ Figures do not equal 100%; the remainder were unsure of whether they believed the story or not.

(11%). Approval and disapproval were further divided as follows: 11% of the sample strongly approved, 17% somewhat approved, 8% somewhat disapproved and 15% strongly disapproved. The follow-up question given to those respondents who said they were “unsure” or “neither approve nor disapprove” sought to force an opinion. The responses were roughly evenly divided. Ultimately, 19% of the sample said they lean toward approval of plant-based GM food, 18% said they lean toward disapproval, and 12% did not take a position.

Consistent with previous studies (Hallman, et al., 2002, Hallman, et al., 2003; Hossain and Onyango, 2004; Macnaghten, 2004; Pew, 2003b), the current study shows that Americans are less approving of the use of genetic modification techniques that involve

animals. The most common response was “disapprove” (43%), followed by “unsure” (33%), then “approve” (16%) and finally “neither approve nor disapprove” (8%). Approval and disapproval for animal-based GM products were further divided as follows: 5% strongly approved, 11% somewhat approved, 12% somewhat disapproved, and 31% strongly disapproved. Results of the forced opinion were as follows: 11% leaned toward approval of animal-based GM food products, 18% leaned toward disapproval, and 12% were completely undecided or unsure.

Though many more respondents in the current study initially said they did not have a strong opinion or were unsure of their opinion about GM food, the method did not affect the aggregate frequency of approval and disapproval of plant- or animal-based

Figure 7: Approval of *plant-based* GM food products, response pattern with frequencies (N=1201)

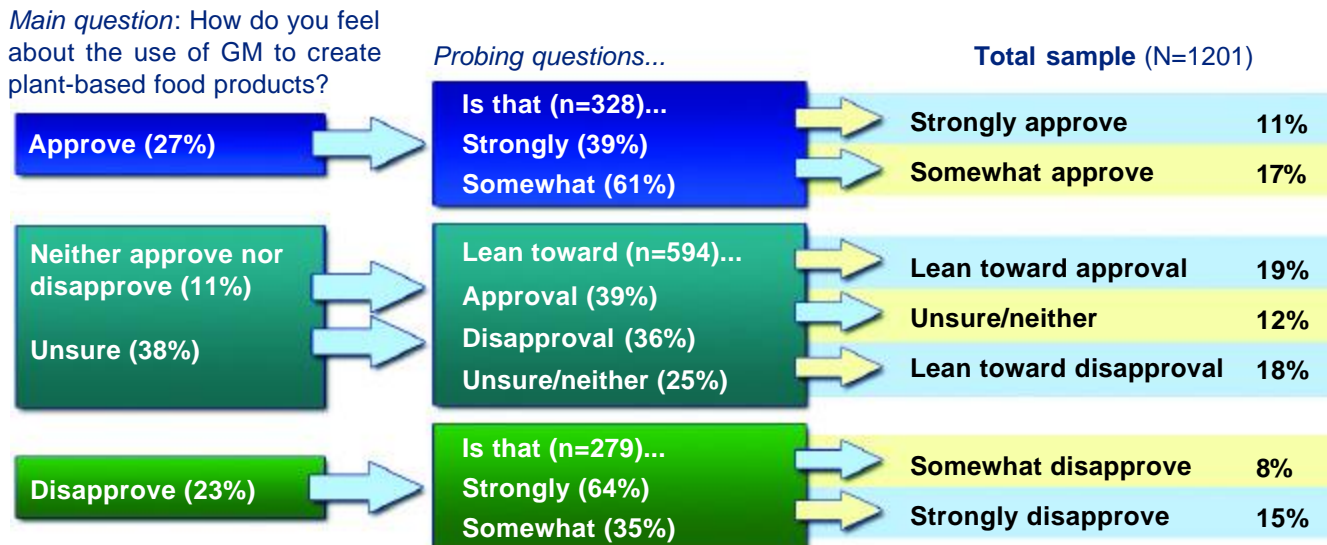
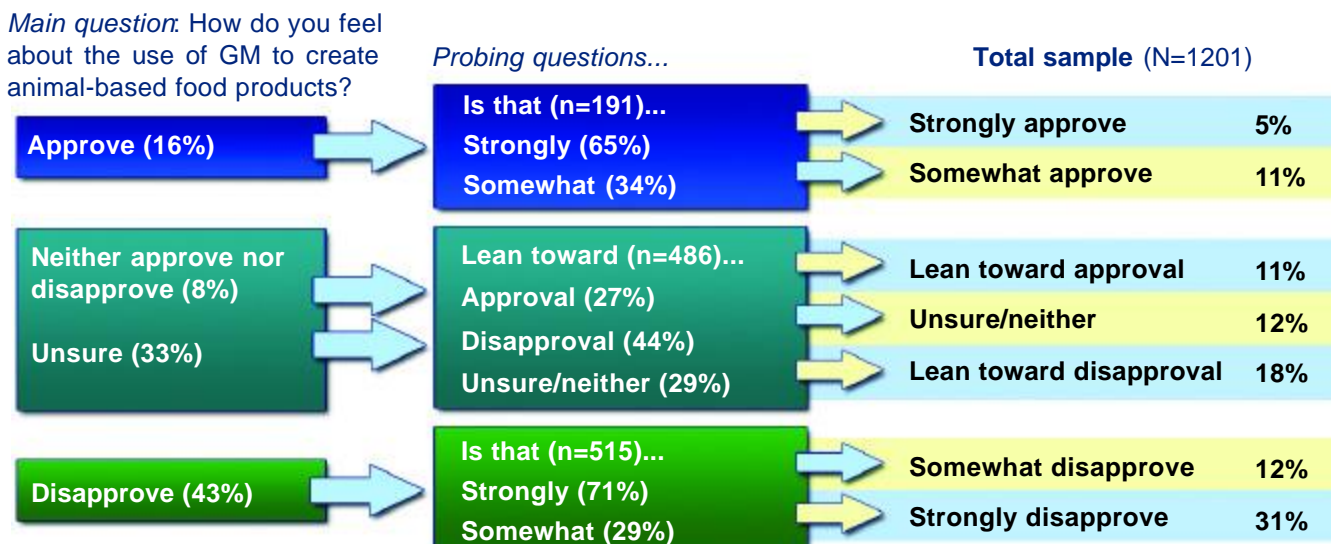


Figure 8: Approval of *animal-based* GM food products, response pattern with frequencies (N=1201)



GM food. Adding together the frequencies from all levels of approval and disapproval for plant-based GM food, a total of 47% leaned toward approval or approved, 41% leaned toward disapproval or disapproved, and 12% neither approved nor disapproved, or were unsure of their opinion. For animal-based GM products, 27% leaned toward approval or approved, 61% leaned toward disapproval or disapproved, and 12% neither approved nor disapproved or were unsure of their opinion. These figures do not represent a significant change (Figure 9). However, there is evidence that the seven-point scale created as a product of this new methodology is more closely related to knowledge, attitudes and other measures than its five-point predecessors. This issue will be further explored in a future publication.

NO OPINION

As mentioned above, the “unsure” response was the most common answer respondents gave when asked for their opinion of plant-based GM food products, and the second most common answer when asked about animal-based products. There do not appear to be substantial demographic differences between those who answered “unsure” to these questions and those who said they “neither approve nor disapprove,” therefore these two categories were collapsed into a general “no opinion” measure. Almost half of the respondents (49%) initially said they did not have an opinion about plant-based GM food, while 40% did not have an initial opinion about animal-based GM food, and almost a third (32%) said they did not have an initial opinion about either.

Allowing respondents to say that they have no opinion yielded a more precise picture of American attitudes. Comparisons to the 2003 data suggest that many of those who reported no initial opinion probably would have said “somewhat approve” and “somewhat disapprove” if the new categories were not

Examination of Those Without Opinions

Females were more likely than males to report having no opinion about plant- or animal-based applications. There were no substantial differences by race, ethnicity, religion or income.

Education appeared to have little impact, except that those with four-year college or post-graduate degree were less likely to use the no opinion responses compared to those with less education (this effect was more pronounced for opinions of plant-based applications). Having no opinion was only weakly related to performance on the quiz described in the knowledge section of this report ($r(600)=.19, p<.01$), and this correlation was the same for both plant- and animal-based applications.

Though self-described liberals and conservatives did not differ from one another in frequency of “no opinion” responses, those who describe their political views as “in-between” or only “leaning toward” one extreme or another were more likely to have no opinion when initially asked about either application.

Figure 9: Aggregate opinions of plant-based GM food (N = 1201 for both years)

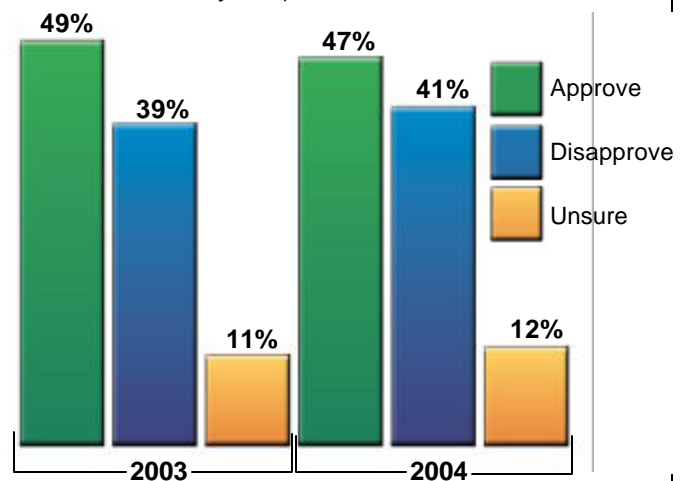
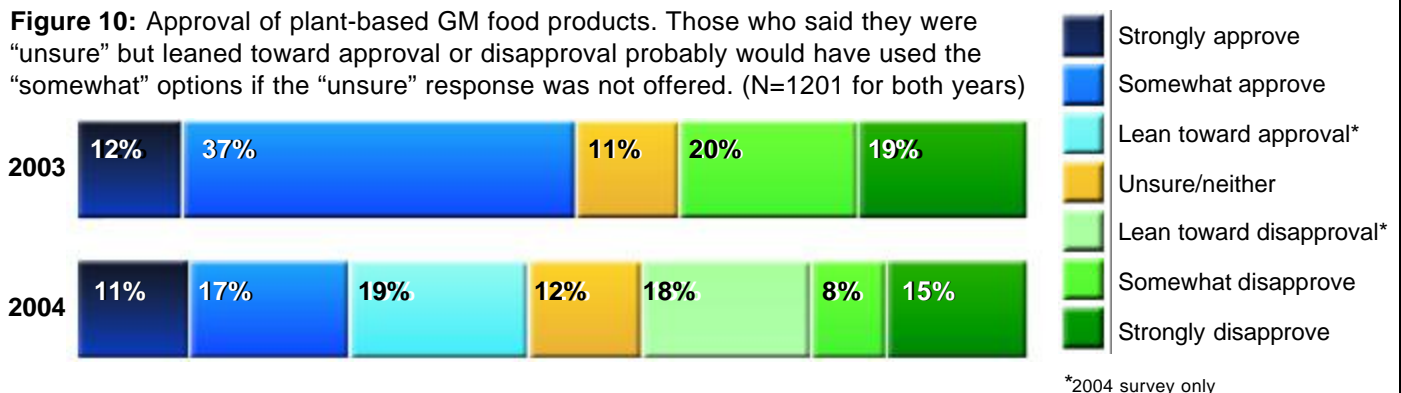


Figure 10: Approval of plant-based GM food products. Those who said they were “unsure” but leaned toward approval or disapproval probably would have used the “somewhat” options if the “unsure” response was not offered. (N=1201 for both years)



offered. For example, in the 2003 findings, we found that 37% of respondents “somewhat approved” and 20% “somewhat disapproved” of plant-based GM food products. In response to the current survey instrument, only 17% “somewhat approved” and 8% “somewhat disapproved,” while 19% were “unsure” but “leaned toward approval” and 18% were “unsure” but “leaned toward disapproval.” Frequencies of the “strongly approve” and “strongly disapprove” responses remain relatively unchanged (Figure 10).

GM FOOD REGULATION

Considering that most Americans know little about GM food, it is not surprising that many respondents were uninformed about the laws pertaining to the labeling and safety testing of GM foods.

Currently, foods derived from GM ingredients are not required to be labeled as such, though some food companies voluntarily label their products as “GMO-free.”⁵ Nevertheless, only about a third of the respondents (33%) knew that GM foods are not required to be labeled as such in the United States, while about a quarter (28%) incorrectly believed that GM foods are required to be labeled and the plurality (40%) was unsure (Figure 11).

In addition, almost three quarters (72%) did not know that GM crops are tested for human safety (Figure 12), and more than three-quarters (77%) did not know that GM crops are tested for environmental safety (Figure 13). However, most Americans do appear to understand which government agencies would oversee such safety testing. In response to an open-ended question about the subject, the majority (62%) were correctly able to identify one or more of the three agencies that may play a part in overseeing safety testing of GM food: the U.S. Department of Agriculture (USDA), the Food and Drug Administration (FDA), and/or the Environmental Protection Agency (EPA).⁶

Figure 11: Belief that GM food products are required to be labeled in the United States (n = 601)

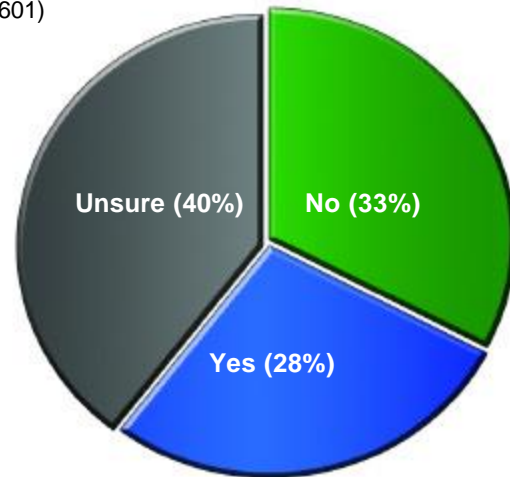


Figure 12: Belief that GM crops are tested for human safety (n = 1,201)

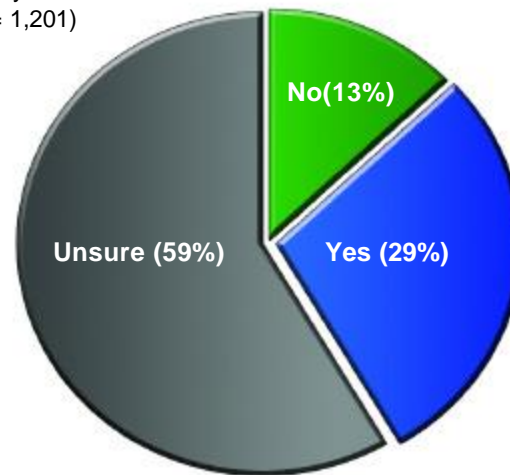
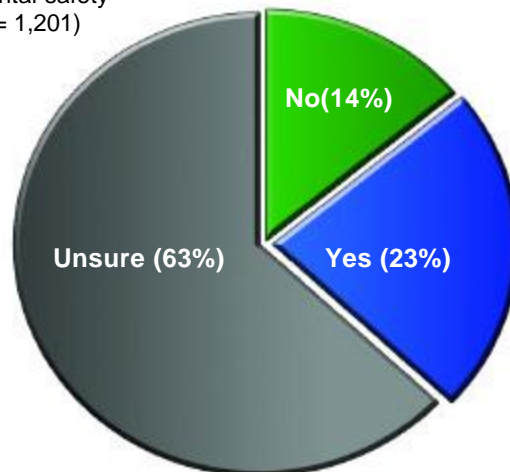


Figure 13: Belief that GM crops are tested for environmental safety (n = 1,201)



⁵ In 2001, FDA released draft voluntary guidelines for the food industry on ‘positive’ and ‘negative’ genetically engineered food labeling (FDA 2001). In effect, food manufacturers can voluntarily label their products as containing genetically modified ingredients but are not required to do so. Similarly, manufacturers can label their products as containing no genetically engineered ingredients if they choose to so long as the statement does not express or imply that the food is superior because it is not bioengineered.

⁶ The USDA and FDA play an integral role in overseeing safety testing for human and environmental safety. The EPA may become involved when there are special environmental concerns, such as when a GM crop is intended to be used in conjunction with a powerful herbicide.

TOPICAL INTEREST AND DESIRED INFORMATION

Americans say they are interested in the topic of GM food, specifically those topics related to human health. Respondents say they desire more information on food labels and report that they would like to see GM foods labeled as such. The majority of Americans report they have never looked for information about GM food and most say they will search the Internet should the need arise.

TOPICS OF INTEREST

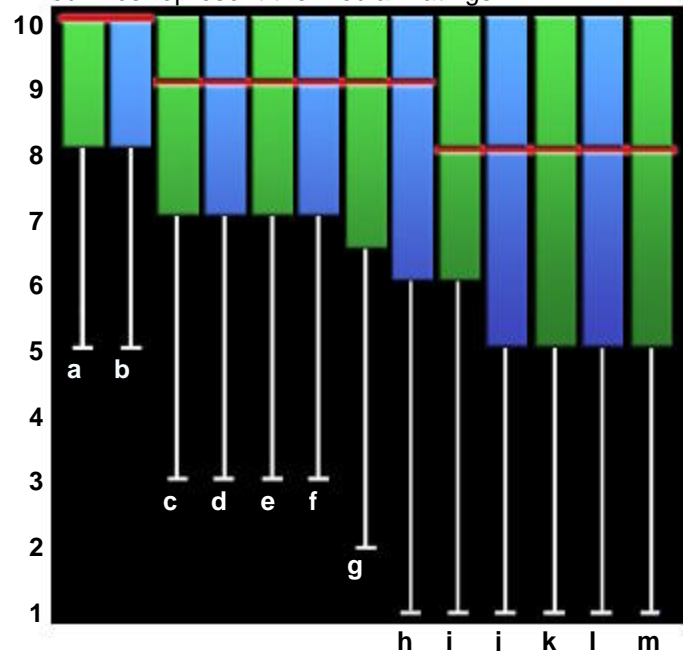
Since it is clear that Americans do not know much about GM food, we were interested in determining their level of interest in specific topics related to the technology. To gauge this interest, a series of 13 questions asked respondents to rate their interest in hypothetical television shows about various issues related to genetic modification. The respondents were told, “Imagine that we designed a television show especially for you on the topic of genetically modified foods.” They were then asked to rate their interest in each show using a scale of 1 to 10 where 1 represented “not at all interested” and 10 represented “extremely interested.”

Though most respondents expressed interest in all of these topics, the greatest interest seems to be in the two stories of most immediate personal import: the dangers of eating GM food and whether anyone has ever gotten sick from it (Figure 14).

After rating the 13 topics presented to them, the participants were asked if there were any additional topics related to GM food in which they had an interest. In response, one-in-five (20%) said “yes.” They were then asked to describe the topics they were interested in. The most commonly reported interests included: the types of foods affected, specific health concerns (such as dangers to pregnant women), information about the production process, information about regulation and testing, and general educational resources.

Preliminary investigations suggest that those interested in risk-related topics were more likely to disapprove of GM food, whereas interest in benefit-related topics was unrelated to opinions of the technology. A future investigation will further address these phenomena and their relevance to consumer attitudes toward GM food.

Figure 14: Ratings of interest in television shows about topics related to GM food (n=1201). Horizontal red lines represent the median ratings.



- a. The potential dangers of eating GM food on personal and family health (median = 10).
- b. Whether anyone has ever gotten sick from eating GM foods (median = 10).
- c. How likely it is that something bad will happen as a result of GM foods (median = 9).
- d. Who regulates and monitors GM foods (median = 9).
- e. How GM foods might affect the environment (median = 9).
- f. Whether GM food will affect world hunger (median = 9).
- g. The potential benefits of eating GM food on personal and family health (median = 9).
- h. Which foods or brands of food contain GM ingredients (median = 9).
- i. Whether genetic modification affects the cost of food for consumers (median = 8).
- j. Whether GM food affects the farmers' cost of producing food (median = 8).
- k. The companies involved in the production of GM foods (median = 8).
- l. The science involved in the genetic modification of food products (median = 8).
- m. Which foods or brands of food specifically do not contain GM ingredients (median = 8).

DESIRE FOR INFORMATION ON FOOD LABELS

During the interview process, respondents were informed that there are no laws that require GM foods to be labeled. After being informed of this, most respondents (89%) said that they should be labeled, while 10% felt labeling should not be required and 1% were unsure. This figure represents a slight change from 2003 when 94% said they wanted GM foods labeled, possibly indicating that there is a small subset of the population who feel comforted by the fact that government regulators do not see a need for it. However, no conclusive statements can be made since this change falls within the sampling error.

Though it appears that most Americans want GM foods labeled, it is possible that their stated preference for such a label could stem from a more general desire for more information about the foods they eat. To test this, respondents were asked to rate how important it was that food labels indicated certain information using a 1 to 10 scale, where 1 meant “not at all important” and 10 meant “extremely important.”

The information rated as most important to put on a label was “whether pesticides were used in the process of growing the food.” Next in importance was information concerning “whether the food contains GM ingredients” and “if the food was grown or raised organically,” which were rated as equally important. “Country of origin” was rated as important to put on a label as information concerning “whether the food was grown or raised organically.”⁷ Rated as somewhat less important was information about “whether the food was grown using traditional crossbreeding methods,” “whether the food was grown locally,” and in “which state the food was grown within the United States.”

That the mean and median ratings for each of the additional pieces of information were 6 or greater suggests that the majority of respondents found each to be at least moderately important to put on a food label, indicating an overall preference for more information on food labels about the foods they eat. While these results imply that many consumers would like a variety of additional information on food labels, there is a clear hierarchy as to which types of information they want. At the top of this hierarchy is information about the use of pesticides and GM ingredients, the use of organic methods and country of origin. While it is likely that many would like GM labels on products so that they can avoid them, the support of such labels may be more an issue of “consumer sovereignty” rather than simple avoidance (Table 4).

DESIRE FOR SAFETY INFORMATION

Americans say they would be more willing to purchase GM foods if the labels on such products included information certifying their safety. Safety certification from a variety of entities positively influenced reported willingness to purchase GM products.

Respondents were asked how labels certifying food safety from various sources, including the USDA, FDA, EPA, the biotech industry, medical and scientific organizations, and environmental/consumer groups, would impact their willingness to purchase GM food. For every source presented, 40-50% of respondents indicated that the label would make them more willing to purchase the product.

The strongest positive influences on respondent willingness to purchase, were labels from the FDA (52% report increased willingness) and the USDA (52%), followed closely by medical/scientific organizations (44%), the EPA (43%) and

Table 4: How important is it that labels indicate...

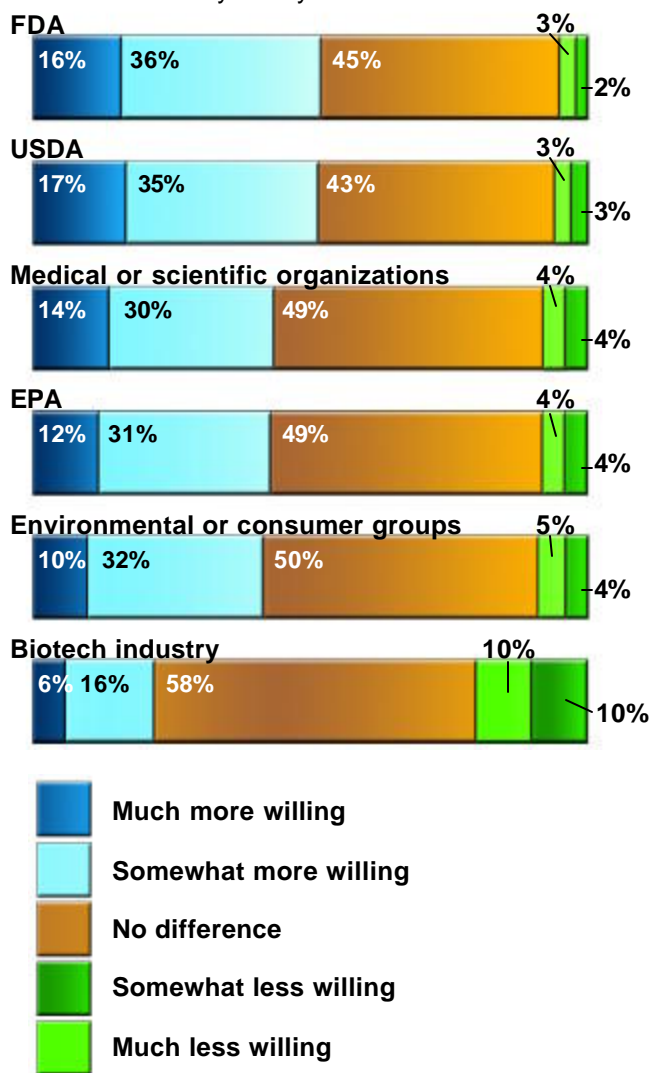
| | Mean | Std. Deviation | Median |
|--|------|----------------|--------|
| If pesticides were used in the process of growing the food? | 8.26 | 2.58 | 10 |
| If the food contains genetically modified ingredients? | 7.92 | 2.71 | 10 |
| If the food was grown or raised organically? | 7.72 | 2.82 | 9 |
| The country of origin of the food? | 7.44 | 2.78 | 8 |
| If the food was grown using traditional cross-breeding methods? | 6.96 | 3.02 | 8 |
| If the food was grown or raised in your local area? | 6.51 | 3.09 | 7 |
| The state it comes from for food grown or raised in the United States? | 6.04 | 3.19 | 6 |

⁷ “Whether the food contains GM ingredients” and “whether the food was grown or raised organically,” received mean ratings that were not significantly different ($t(587)=1.73, p<.09$). “Country of origin” and “whether the food was grown or raised organically” also received mean ratings that were not significantly different ($t(581)=1.81, p<.07$). However, “Whether the food contains GM ingredients” and “country of origin” did receive significantly different means.

INTEREST AND DESIRED INFORMATION

consumer/environmental groups (42%). The biotech industry had the strongest negative impact, with one-in-five respondents (20%) reporting a *decrease* in willingness to purchase GM products certified as safe by the biotech industry (Figure 15). When combined, about three quarters of respondents (74%) reported an increase in willingness to consume GM foods with the inclusion of some form of safety certification.

Figure 15: Reported change in willingness to buy GM foods that carry safety labels from....



WHERE AMERICANS WOULD GO FOR INFORMATION

Though Americans claim to be interested in the topic of GM food at least passively (e.g. say they would watch a TV show about the subject), most have never been inspired to actively seek such information. Nearly nine out of ten respondents (88%) said they had never looked for information about GM food, while 4% said they had looked for information once

or twice, 7% said they had looked more than three times and 1% said they were not sure how often they had looked for information about GM food.

Respondents were then asked to speculate where they would turn for information about GM food if they were so inclined. Most respondents (57%) said they would search the Internet for information, some respondents specifying a search engine such as Google or Lycos. One in ten respondents (10%) said they would go to the library for information. The remaining responses were mixed, and included going to a specific company or government agency's website (such as the FDA) or otherwise contacting a company or agency by mail or telephone to ask for information about GM food, while a few respondents said they would look to the media (such as newspapers or magazines) for information about GM food.

CONCLUSIONS

Americans are largely unaware of GM foods, both of its presence in their lives and of its wide application in food production. In addition, most Americans have little understanding of general facts about transgenic technology. Many Americans report familiarity with some factual and mythical news stories about GM food, and many said that they found even the myths to be at least somewhat believable. Americans are unfamiliar with the laws and safety testing regarding GM food, but are generally familiar with which agencies are responsible for such oversight.

Approval and disapproval of GM products has not changed much over the past three years. The current survey instrument, with added response options for those who are "unsure" or "neither approve nor disapprove" provide a more nuanced snapshot of American public opinion. The plurality of Americans initially report no opinion in this matter, though are willing to venture an opinion when further prompted to do so. In general, Americans are split in their opinions of GM food. There were some minor demographic differences for those choosing the "no opinion" option rather than supplying an immediate opinion (males and those with college education were more likely to supply an opinion). In addition, respondents who performed poorly on a quiz related to facts about GM food were more likely to be uncertain of their opinions.

Americans report interest in a variety of topics related to GM food, and say they would watch television shows about the topic, though most report they

have never actively sought information about agricultural biotechnology. Most respondents said they would search the Internet if looking for information about GM food.

Americans state a desire to have more information on food labels, rating pesticide use, genetic modification, organic methods and country or origin as the most important pieces of information. Consistent with prior studies, the majority of Americans, when asked directly, say they think GM food products should be labeled as such. Americans also express a desire for safety certification from a variety of sources, reporting that such information on food labels would make them more inclined to purchase GM foods.

American opinion toward GM foods remains uncrystallized and uninformed, though new measures in this study shed light into some of the interesting facets of American opinion. While Americans say they are interested in the topic, they have not yet been stimulated enough to actively seek information about the technology, and have had little passive exposure to the topic. We will investigate these findings in greater depth in future studies.

WORKS CITED

- Associated Press. 2000. U.S. crop protest in France. *New York Times*: December 14, 2000.
- Blizzard, R. 2003. Genetically altered foods: Hazard or harmless? Gallup Poll Tuesday Briefing; 8/12/2003.
- Brasher, P. 2000. Biotech corn pulled from market. Associated Press State & Local Wire: September 26, 2000.
- Cauvin, H. 2002. Between famine and politics, Zambians starve. *New York Times*: August 30, 2002.
- Centers for Disease Control and Prevention (CDC). 2001. Investigation of human health effects associated with potential exposure to genetically modified corn. Accessed August 6, 2003: <http://www.cdc.gov>.
- Food and Drug Administration (FDA). 1992. Statement of policy: Foods derived from new plant varieties. Federal Register, May 29, 1992. (57 FR 22984).
- Food and Drug Administration (FDA). Guidance for industry: Voluntary labeling indicating whether foods have or have not been developed using bioengineering - Draft Guidance. U.S. Food and Drug Administration, Center for Food Safety and Applied Nutrition. January 2001.
- Food Standards Australia New Zealand. 2003. Oil derived from glufosinate-ammonium tolerant and pollination controlled canola: A safety assessment. Technical report series no. 16. ISBN 0 642 34603 8.
- Gaskell, G., Allum, N.C. and Stares, S.R.. 2003. Europeans and Biotechnology in 2002: Eurobarometer 58.0. Brussels: European Commission.
- Genetically Engineered Organisms Public Issues Education (GEO-PIE) Project. 2003. GE foods in the market. Cornell Cooperative Extension. Accessed October 2003: <http://www.geo-pie.cornell.edu/>.
- Hallman, W.K., Adelaja, A.O., Schilling, B.J. & Lang, J.T.. 2002. Public Perceptions of Genetically Modified Foods: Americans Know Not What They Eat. Food Policy Institute, Cook College, Rutgers - The State University of New Jersey.
- Hallman, W.K., Hebden, W.C., Aquino, H.L., Cuite, C.L. and Lang, J.T.. 2003. Public perceptions of genetically modified foods: A national study of American knowledge and opinion. (Publication number RR 1003-004). Food Policy Institute, Cook College, Rutgers - The State University of New Jersey.
- Hossain, F. and Onyango, B. 2004. Product attributes and consumer acceptance of nutritionally enhanced genetically modified foods. *International Journal of Consumer Studies* 28(3): 255-267.
- International Food Information Center (IFIC). 2001. US consumer attitudes toward food biotechnology. Accessed July 2004: <http://www.ific.org>.
- Macnaghten, P. 2004. Animals in their nature: A case study on public attitudes to animals, genetic modification and 'nature'. *Sociology* 38(3): 533-551.

Martineau, B. 2001. First fruit: The creation of the Flavr Savr tomato & the birth of biotech foods. McGraw-Hill.

Mitchell, P. and Lee, K. 1998. Concern grows over genetically modified food. World Socialist Website. Accessed August, 2004: <http://www.howstuffworks.com>.

Pew Initiative on Food and Biotechnology. 2003a. Fact sheet: Genetically modified crops in the United States. Accessed July, 2004: <http://pewagbiotech.org/resources/factsheets>.

Pew Initiative on Food and Biotechnology. 2003b. 34% of Americans know something about GM foods. *Outlook on Science Policy* 25(9): 100-101.

Shelton, A.M. and Sears, M.K. 2001. The monarch butterfly controversy: scientific interpretations of a phenomenon. *The Plant Journal* 27: 483.

Strom, S. 2000. Bioengineered corn reportedly detected in Japan. *The New York Times*: October 26, 2000.

Sutton, S., Assa'ad, A., Steinmetz, C., and Rothenberg, M. 2003. *Journal of Allergy and Clinical Immunology* 112 (5): 1011.

Weise, E. 2000. Caught in the grips of an e-mail hoax. *USA Today Cyberspeak*: Jan. 18, 2000.

Wu, F. 2004. Explaining public resistance to genetically modified corn: An analysis of the distribution of benefits and risks. *Risk Analysis* 24 (3): 715-726.

Yoon, C.K. 2001. Genetic modification taints corn in Mexico. *The New York Times*: October 2, 2001.

WORDING FOR DISCUSSED SURVEY QUESTION

The following section lists the exact wording of the questions discussed in the body of this report. Please note that this is NOT the order in which these questions were asked by the interviewer and this is NOT a comprehensive list of all questions asked in the survey. This is a reference for those readers interested in how the questions were worded, listed in the order in which they are referenced in the text. Following each question is a parenthetical indication of where the item is discussed in this report.

INTRODUCTION

Hello, I'm (first and last name) calling for the Food Policy Institute at Rutgers, the State University of New Jersey. We're conducting a survey on a number of topics with a special focus on food and technology for the U.S. Department of Agriculture. We're interested only in your opinions. There are no right or wrong answers. All of your responses will remain confidential. Because we must interview an equal number of males and females, may I please speak: [CATI ROTATE RESPONDENT SELECTION CHOICE "A" AND "B"]

A. ...with a male, 18 years of age or older who had the most recent birthday in your household? [IF MALE NOT AVAILABLE ARRANGE CALLBACK. IF NO MALES EXIST, ASK:] May I speak to the female who is 18 years or older who had the most recent birthday?

B. ...with a female, 18 years of age or older who had the most recent birthday in your household? [IF FEMALE NOT AVAILABLE ARRANGE CALLBACK. IF NO FEMALES EXIST, ASK:] May I speak to the male who is 18 years or older who had the most recent birthday?

INTERVIEWER RECORD SEX OF RESPONDENT (page 2):

- 1 - Male
- 2 - Female

What was your age on your last birthday (page 2)?

(IF UNSURE/REFUSED) I don't need to know exactly. Are you:

1. 18 to 24
2. 25 to 34
3. 35 to 44
4. 45 to 54
5. 55 to 64
6. 65 or older

What is the last year or grade of school you completed (page 2)?

1. No formal schooling
2. 1st thru 7th grade
3. 8th grade
4. Some high school (at least 9th but didn't finish 12th)
5. High school graduate/GED
6. Some college/2 year Associate Degree
7. Four year college degree
8. Post graduate

Are you presently employed full-time, part-time, retired or are you unemployed (page 2)?

1. Employed full-time
2. Employed part-time
3. Unemployed/Retired

Are you of Hispanic origin or descent that is Mexican, Puerto Rican, Cuban, Central American, South American or some other Spanish background (page 2)?

1. Yes
2. No
8. (vol) DK
9. (vol) REF

Are you white, black/African-American, Asian or Pacific Islander, Native American or of some other race (page 2)?

1. White
2. Black/African-American
3. Asian or Pacific Islander
4. Native American
5. Other (specify _____)

Would you say your total household income for 2003 was... (page 2)

1. below \$50,000?
2. above \$50,000?

Would you say that you do most of the food shopping for your household, that someone else does most of the food shopping, or would you say that the task is equally divided (page 2)?

1. I do most of the food shopping
2. Someone else does most of the shopping
3. Equally divided
8. (vol) Don't know

INTRODUCTION OF GENETIC MODIFICATION

The remainder of this interview is going to focus on GENETIC MODIFICATION which can be used for food production. Genetic modification involves methods that make it possible for scientists to create new VARIETIES of plants and animals. They do this by taking parts of the genes of one plant or animal and inserting them into the cells of another plant or animal. This is sometimes called genetic engineering or biotechnology.

Before this interview, were you aware that these methods of genetically modifying food existed (page 3)?

1. Yes
2. No

How much would you say you've heard or read about genetically modified foods (page 3)?

1. Nothing at all,
2. Not much,
3. Some, or
4. A great deal?

Before this interview, have you ever discussed genetically modified food with anyone (page 3)?

1. Yes (GO TO NEXT QUESTION)
2. No (SKIP NEXT QUESTION)

Would you say you have discussed genetically modified foods (page 3):

1. Frequently,
2. Occasionally, or
3. Only once or twice?

As far as you know, are there any foods containing genetically modified ingredients in supermarkets right now (page 3)?

1. Yes,
2. No,
3. Or are you unsure?

As far as you know, have you ever eaten any food containing genetically modified ingredients? Would you say...(page 3)

1. Yes,
2. No,
3. Or are you unsure?

IF AWARE GM PRODUCTS ARE AVAILABLE IN SUPERMARKETS (page 4)

For about how many years would you say these products have been available to consumers?

Please tell me which, if any, of the following genetically modified food products are currently available to American consumers, in either whole or processed form.

[RANDOMIZE]

Genetically modified corn... Would you say:

1. Yes, it's available
2. No, it's not available, or are you
3. Unsure?

Genetically modified rice... Would you say:

1. Yes, it's available
2. No, it's not available, or are you
3. Unsure?

Genetically modified tomatoes... Would you say:

1. Yes, it's available
2. No, it's not available, or are you
3. Unsure?

Genetically modified soybeans... Would you say:

1. Yes, it's available
2. No, it's not available, or are you
3. Unsure?

Genetically modified chicken... Would you say:

1. Yes, it's available
2. No, it's not available, or are you
3. Unsure?

How much do you know about genetically modified food? Would you say you know (page 4):

1. Nothing at all,
2. Very little,
3. A fair amount, or
4. A great deal?

For each of the following statements, please tell me whether you think it is true or false or are you not sure (page 5).

Ordinary tomatoes do not contain genes, while genetically modified tomatoes do.

1. True
2. False
3. Not Sure

By eating a genetically modified fruit, a person's genes could also become modified.

1. True
2. False
3. Not Sure

It is the mother's genes that determine whether a child is a girl.

1. True
2. False
3. Not Sure

Genetically modified animals are always bigger than ordinary animals.

1. True
2. False
3. Not Sure

It is not possible to transfer animal genes to plants.

1. True
2. False
3. Not Sure

Tomatoes genetically modified with genes from catfish would probably taste fishy.

1. True
2. False
3. Not Sure

The cloning of living things produces genetically identical copies.

1. True
2. False
3. Not Sure

More than half of the human genes are identical to those of chimpanzees.

1. True
2. False
3. Not Sure
9. (vol) REF

Scientists sometimes genetically modify plants so that they cannot reproduce.

1. True
2. False
3. Not Sure

Larger organisms have more genes

1. True
2. False
3. Not Sure

Most of the soybeans grown in the US are a genetically modified variety

1. True
2. False
3. Not Sure

GENETICALLY MODIFIED corn is required to be kept separate from non-genetically modified corn.

1. True
2. False
3. Not Sure

Some of the following stories have appeared in the news, on the Internet, and have been circulated by word of mouth.. Please tell me if you have heard them (page 5).

[RANDOMIZE]

Pollen from genetically modified corn was shown to kill butterfly larva in a laboratory.

1. Yes, I've heard of it
2. No, I haven't heard of it

How believable would you say this is ?

1. Very believable
2. Somewhat believable
3. Not at all believable

Some African nations have refused to accept imports of genetically modified grain from the United States.

1. Yes, I've heard of it
2. No, I haven't heard of it

How believable would you say this is ?

1. Very believable
2. Somewhat believable
3. Not at all believable

There have been demonstrations against genetically modified food in many European countries.

1. Yes, I've heard of it
2. No, I haven't heard of it

How believable would you say this is ?

1. Very believable
2. Somewhat believable
3. Not at all believable

A large fast-food company used chickens so altered by genetic modification that they can't be called "chicken" anymore.

1. Yes, I've heard of it
2. No, I haven't heard of it

How believable would you say this is ?

1. Very believable
2. Somewhat believable
3. Not at all believable

Some people have had allergic reactions to GENETICALLY MODIFIED foods.

1. Yes, I've heard of it
2. No, I haven't heard of it

How believable would you say this is ?

1. Very believable
2. Somewhat believable
3. Not at all believable

Genetically modified crops only approved for animal consumption have accidentally been included in human food.

1. Yes, I've heard of it
2. No, I haven't heard of it

How believable would you say this is ?

1. Very believable
2. Somewhat believable
3. Not at all believable

Genetically modified crops have been detected in countries where it is not legal to plant them.

1. Yes, I've heard of it
2. No, I haven't heard of it

How believable would you say this is ?

1. Very believable
2. Somewhat believable
3. Not at all believable

How do you feel about the use of genetic modification to create plant-based food products. Do you (page 6)

1. Approve,
2. Neither approve nor disapprove,
3. Disapprove, or are you
4. Unsure of your opinion

**If approve or disapprove:
Is that...**

1. Somewhat or
2. Strongly

If any "neither approve nor disapprove" or "unsure of opinion":

You said you [neither approve nor disapprove/are unsure of your opinion] of plant-based genetically modified food products. **If you had to say which way you lean on that issue, would you say that you lean toward approving or lean toward disapproving?**

How do you feel about the use of genetic modification to create animal-based food products. Do you (page 6)

1. Approve,
2. Neither approve nor disapprove,
3. Disapprove, or are you
4. Unsure of your opinion

**If approve or disapprove:
Is that...**

1. Somewhat or
2. Strongly

If any "neither approve nor disapprove" or "unsure of opinion":

You said you [neither approve nor disapprove/are unsure of your opinion] of animal-based genetically modified food products. **If you had to say which way you lean on that issue, would you say that you lean toward approving or lean toward disapproving?**

We're interested in whether people know about labeling requirements in the United States. To the best of your knowledge, are foods that contain genetically modified ingredients currently required by law to be labeled as such in the U.S. (page 9)?

1. Yes
2. No

As far as you know, has the government tested genetically modified food products for their safety to human health? Would you say...(page 9)

1. Yes,
2. No,
- 3 Or are you unsure?

Again, as far as you know, has the government tested genetically modified food products for environmental safety? Would you say...(page 9)

1. Yes,
2. No,
3. Or are you unsure?

Who do you believe is responsible for regulating genetically modified foods?

(RECORD VERBATIM)

Imagine that we designed a television show especially for you on the topic of genetically modified foods. On a scale of 1 to 10 where 1 is not at all interested and 10 is extremely interested, and using any number in between, please rate your interest in the following (page 10)....

[RANDOMIZE]

Who regulates and monitors genetically modified foods

Which foods or brands of food contain genetically modified ingredients

The potential benefits of eating genetically modified foods for your health and your family's health

The potential dangers of eating genetically modified foods for your health and your family's health

How genetically modified foods might affect the environment

Whether the genetic modification affects the cost of food for consumers

Whether the genetic modification affects the farmers' cost of producing food

Whether genetically modified food will affect world hunger

The companies involved in the production of genetically modified foods

The science involved in the genetic modification of food products

Whether anyone has ever gotten sick from eating genetically modified foods

Which foods or brands of food specifically DO NOT contain genetically modified ingredients

How likely it is that something bad will happen as a result of genetically modified foods

Other than the topics you just rated, are there any other topics regarding genetically modified foods that you'd like to learn more about (page 10)?

1. Yes (GO TO NEXT QUESTION)
2. No (SKIP NEXT QUESTION)

Which topics would you like to learn about (page 10)?
(RECORD VERBATIM)

Current regulations do NOT require genetically modified foods to be labeled in the US. Do you think that genetically modified foods should be required to be labeled (page 11)?

1. Yes
2. No

Now I'd like to ask you about any additional information you might find important to see on food labels. On a scale of 1 to 10 where 1 is not at all important and 10 is extremely important, and using any number in between, please tell me (page 11)...

[RANDOMIZE]

...how important is it that labels indicate if pesticides were used in the process of growing the food?

How about if the food contains genetically modified ingredients?

How about if the food was grown or raised organically?

How about if the food was grown or raised using traditional cross-breeding methods?

How about the country of origin of the food?

How important is it that labels indicate the state it comes from for food grown or raised in the U.S.?

How important is it that labels indicate if the food was grown or raised in your local area?

If a genetically modified food had a label indicating that the FDA, that is the Food and Drug Administration certified it as safe, would you be (page 11)...

1. More willing
2. Less willing,
3. Would there be no change in your willingness to purchase the food?)

(IF MORE WILLING) Is that somewhat or much more willing?

(IF LESS WILLING) Is that somewhat or much less willing?

If a genetically modified food had a label indicating that the USDA, that is the US Department of Agriculture certified it as safe, would you be (page 11)...

1. More willing
2. Less willing,
3. Would there be no change in your willingness to purchase the food?)

(IF MORE WILLING) Is that somewhat or much more willing?

(IF LESS WILLING) Is that somewhat or much less willing?

If a genetically modified food had a label indicating that the EPA, that is the Environmental Protection Agency certified it as safe, would you be (page 11)...

1. More willing
2. Less willing,
3. Would there be no change in your willingness to purchase the food?

(IF MORE WILLING) Is that somewhat or much more willing?

(IF LESS WILLING) Is that somewhat or much less willing?

If a genetically modified food had a label indicating that biotechnology industry representatives certified it as safe, would you be (page 11)...

1. More willing
2. Less willing,
3. Would there be no change in your willingness to purchase the food?)

(IF MORE WILLING) Is that somewhat or much more willing?

(IF LESS WILLING) Is that somewhat or much less willing?

If a genetically modified food had a label indicating that environmental or consumer advocacy groups certified it as safe, would you be (page 11)...

1. More willing
2. Less willing,
3. Would there be no change in your willingness to purchase the food?)

(IF MORE WILLING) Is that somewhat or much more willing?

(IF LESS WILLING) Is that somewhat or much less willing?

If a genetically modified food had a label indicating that Medical or scientific organizations certified it as safe, would you be (page 11)...

1. More willing
2. Less willing,
3. Would there be no change in your willingness to purchase the food?)

(IF MORE WILLING) Is that somewhat or much more willing?

(IF LESS WILLING) Is that somewhat or much less willing?

Imagine that you wanted to find further information about genetically modified foods. Can you tell me where you would go first (page 12)?

(RECORD VERBATIM)