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Low-income consumers, though less aware of genetically modified foods, are concerned and want labels

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Consumer attitudes about genetically modified foods have been reported in a number of studies in recent years, but little attention has been paid to the awareness and attitudes of low-income consumers. While land-grant universities and public health departments have targeted these consumers for nutrition education, it is not clear what their attitudes are, or how the subject should be addressed in education programs such as those offered by Cooperative Extension. We conducted focus groups with low-income consumers in California during spring and summer 2002. Their awareness of genetically modified foods was low, but ethical and safety concerns were fairly high; and they wanted genetically modified foods to be labeled. Consumer and nutrition education programs targeted at low-income consumers should address emerging food technologies.

Beginning in about 1994, the arrival and proliferation of genetically modified (GM) crops and foods in U.S. markets sparked a public policy controversy. Advocates say that agricultural biotechnology offers potentially substantial benefits, such as decreased susceptibility to crop damage from insects or disease, increased nutritional value, and a more plentiful supply. But critics of GM foods express concerns about the possibility that genetically altered organisms could have long-term negative impacts on an already precarious ecological balance (Brown 2001). Others raise concerns related to food safety, such as that



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Controversy over genetically modified foods erupted with introduction of the Flavr Savr tomato, above, in the mid-1990s, and continued as new products were introduced into agriculture and the food stream. Nonetheless, only about 15% to 20% of the low-income consumers in focus groups were familiar with the concept of agricultural biotechnology.

milk produced from dairies using rbST will have higher trace levels of antibiotics, thereby increasing antibiotic resistance among the general population (Heffern 2002). Some critics also cite concerns about the ethics of manipulating genetic material in the laboratory (Fukuyama 2002). Researchers have noted that acceptance of biotechnology, in principle, is fairly high among the U.S. public, and that it increases with greater knowledge and understanding of the science involved.

The views of low-income consumers have not been specifically examined in most polls. It might be expected that they would accept GM foods without much concern, especially if the modifications lead to greater availability, higher nutritional values or reduced prices for food. The lack of organized consumer activism among low-income consumers also suggests likely acceptance of GM foods. This population is less educated than the U.S. population as a whole, suggesting lower levels of scientific knowledge, including about biotechnology.

Opinion polls and surveys

Several surveys and polls of consumer awareness and acceptance of GM foods have been conducted in recent years in the United States. These studies generally show that awareness of GM foods is fairly low, but has increased over time (Shanahan et al. 2001). A poll conducted by the Mellman Group in March 2001 reported that 54% of 1,001 consumers in a nationally representative sample had heard "nothing" or "not much" about GM foods (Pew/Mellman 2001). The study reported that consumers of higher socioeconomic status had heard more about GM food than others. Fifty-nine percent of those with a college degree or higher had heard about GM foods, compared with only 36% of those with a high school diploma or less. Given the strong relationship between education and income in the United States, this poll suggests that low-income consumers might be less aware of GM foods.

Zogby International conducted a poll in 2001 that linked religious views

to general attitudes on biotechnology (Pew/Zogby 2001). The study found that Protestants, Catholics and Muslims were opposed to cross-species gene splicing in principle, and that women in all religious groups were more likely than men to oppose biotechnology.

Zogby International conducted another recent survey, which differentiated respondents by race and residence in California; it indicated that consumers believe the benefits of biotechnology in general outweigh the risks (Pew/Zogby 2002). Overall, Californians were similar to residents in the rest of the country in their belief that the benefits of biotechnology outweigh the risks, but residents of Northern California were more likely to say that the risks outweigh the benefits. However, African American respondents, both in California and nationally, were most likely to say that the risks of biotechnology outweigh the benefits (65%). Latino respondents were also somewhat likely to say the risks outweigh the benefits, although at a much lower rate than African Americans (49%).

Given the higher concentration of African Americans and Latinos among low-income Californians, these polls and surveys suggest that low-income Californians are likely to have heard little about GM foods, are not likely to understand the science initially and are somewhat likely to have concerns.

This study attempts to understand the awareness levels and nature of concerns about GM foods among low-income and minority California consumers. It evaluates whether the potential benefits of GM foods offset concerns, and if pricing influences acceptability. Finally, it considers what kind of information low-income consumers want to help them make informed choices about GM foods.

Focus on low-income consumers

We conducted focus groups to better understand and interpret data obtained from earlier polls. Also, the proliferation of terms used in the various polls signifying essentially the same issue (food biotechnology, agricultural biotechnology, genetically modified food, genetically engineered food and so on) could be associated with inconsistent results. It is not clear whether the sur-



After the concept of genetically modified food was introduced, concerns among the focus group participants focused on ethics and safety. Many felt that cross-species DNA splicing simply “wasn’t right,” while others worried that foods might cause unwanted bodily changes or be unsafe for children.

vey respondents understood any of the terms, or all of the terms in the same general way. Low-income and minority audiences in California often have limited English proficiency and limited educational backgrounds — especially in science — so we felt it would be important to explain the concept of GM food in language the participants could understand.

We held focus groups at the beginning or end of nutrition education classes offered by UC Cooperative Extension or WIC, the federally sponsored Women, Infants and Children’s Nutrition Program, around the state during April, May and August 2002. Focus groups were 20 to 25 minutes long and usually conducted at the beginning of a particular class. They constituted only a small part of the total nutrition information the participants received in a 4- to 6-week class series. Focus groups were held in Alameda, Los Angeles, Sacramento, San Francisco, San Jose, San Mateo and Shasta counties. One hundred thirty-seven consumers participated, with an ethnic composition of 55% Latino, 20% white, 15% Asian and 10% African American. All of the participants were low-income parents of children under 18, and only five were male. One focus group was held in a continuation high school program for parenting teens, but the other participants were adults.

The concept of genetic modification of food was explained to participants using an 11-by-17-inch picture of a

model of the DNA molecule. The model was chosen as a method of explaining the process of genetic modification, and to emphasize that the changes are made at the subcellular level. The explanation of the reasons for genetic modification of the food product was simple, and either positive or neutral from a consumer point of view. We used an example that had a positive impact on nutritional value (golden rice), one that reduced pesticide use (Bt sweet corn) and one that affected ripening (Flavr Savr tomato). No brand names of food products available in the market today were used as examples because we did not want to influence consumer behavior relative to any specific product. All of the examples were of plant products for direct human consumption, rather than ingredients in processed foods or products intended for consumption by animals.

Where English proficiency was in question, the focus groups were either translated into or conducted in Spanish. Nutrition educators who indicated that translation was needed were provided with the focus group guide in advance, so that they would be familiar with the information to be covered in the focus group. In some cases, the nutrition educator asked questions in Spanish, and follow-up questions and probes were asked in Spanish by the researcher. The focus groups were audiotaped and transcribed prior to analysis.

Low awareness of GM foods

About 15% to 20% of the participants said they had heard the term “genetically modified foods” or “food biotechnology” before our explanation of GM food was given. When asked what they had heard, few had any concrete responses related directly to actual issues in food biotechnology. Several said things like “food additives,” or “hormones and things like that added to food.” A small number mentioned a product, usually StarLink corn. About 10% mentioned modifications related to genetic engineering. Of those who had heard of GM foods, the majority said they got the information from the media, usually television news. A few, particularly the high school participants, received their information from school or an organized educational activity. Overall, awareness of GM foods was low, with over 80% of the participants indicating no prior knowledge or awareness of GM foods.

When asked whether they thought a few, some or a lot of foods on the market today were GM, most said a few or some. When probed further, most participants had no idea how many or which foods available today were GM. Some participants cited the foods offered as examples in the explanation, golden rice and the Flavr Savr tomato, even though they were told that these foods are not currently on the market. About half were concerned that meats they bought, such as chicken or beef, had been genetically modified, even after we explained that food additives or supplements in diets of animals raised for consumption were not related to genetic modification. A few consumers made the connection between the possible uses of GM grains in animal feed as a route to GM food. StarLink corn was mentioned infrequently, although many consumers remembered hearing “something about corn.” Because of the high number of Latino participants, and the importance and visibility of corn-derived products in Latino diets, concerns about the safety of corn and products containing GM corn could be significant in California.

The knowledge gap about GM foods is potentially worrisome, suggesting that this audience is susceptible to mis-

information or misinterpretation. Because most information they receive about food safety is from television news, it is possible that a negative headline or cautionary news story, combined with a lack of informative food labels, could cause them to reject certain foods.

Safety and ethics

The concept of GM foods was of concern to about 25% to 30% of the focus group participants, even if they had been unaware of GM food prior to the focus group. Their concerns fell into two general categories: ethics and safety. Those with ethical concerns believed that modifying foods genetically simply “wasn’t right” and that genetic selection through hybridization (plant breeding) was fundamentally different from genetic modification. These participants were especially troubled about cross-species DNA splicing, such as the prospect that DNA in a vegetable might come from an animal, especially one not intended for consumption. The concerns of these participants were not allayed by the description of DNA modifications as taking place at the subcellular level with material that is no longer distinguished as belonging to a particular animal or plant. What bothered these respondents was the overall ethics of replacing DNA across species. More than one participant paraphrased a line from an old margarine commercial, “Don’t mess with Mother Nature.”

This concern with the ethics of cross-species genetic splicing is not markedly different than for a U.S. adult population segmented by religion, as noted by Zogby in their 2001 poll. Ethical concerns were also raised without reference to specific religious belief by Fukuyama (2002). What is potentially of concern for this audience is that low-income consumers might be less likely to get information about the actual process of biotechnology that would inform their views, and could potentially help to change them. It is difficult to know without further study whether ethical concerns would be overcome by more scientific knowledge or understanding of the modification process. Our explanation to the focus groups was short and simple and not intended to convince participants one way or the

other of ethical values associated with genetic modification. The extent to which ethical concerns shape consumer choice is unknown, as current regulations do not require labeling unless the modification process introduces known allergens or substantially changes the product’s nutritional value. Although most (about 90%) of participants indicated that they read the labels of packaged foods they purchase, it is not clear whether this is the case for most low-income consumers. These participants were more likely to be aware of labels because they were enrolled and contacted in nutrition education classes with a curriculum that emphasizes reading nutrition information on food labels.

Those with safety concerns usually raised questions about whether GM food would cause an undesirable change in their body, whether it would be susceptible to the creation of harmful by-products during food preparation and whether the product’s shelf life would be unnaturally shortened or lengthened. Less frequently, participants mentioned safety concerns such as safe consumption by children, disease risks related to long-term use, and the length of testing before foods reach the market.

Some of the safety concerns were amorphous, and it was difficult to understand whether they were derived from a lack of knowledge or familiarity with scientific concepts, or due to the food industry’s past mistakes in declaring products safe that later were withdrawn from the market. For example, one participant commented, “Sure, it’s safe now, but then they’ll do a study and find out that it causes a disease or has a bad effect on something else, like DDT.” Overall, those with safety concerns did not have a high level of trust in or awareness of regulations used to keep the food supply safe, including the use of pesticides during the growth process, additives during processing or the sale of GM foods for human consumption.

Pesticides, nutrients, costs

Reduction in pesticide use. Participants voiced increased support for GM foods when the modification would result in the discontinuation of pesticides

or additives. Even participants with safety concerns were more supportive of GM foods if they reduced pesticide use. By contrast, participants with ethics concerns maintained their concerns even when faced with the possibility of reduced pesticide use. One participant suggested that a food might be modified for resistance to a particular disease or pest, but there was no guarantee that the modification might not increase its attractiveness to another disease or pest. For an audience composed of people with little scientific knowledge, this was a sophisticated insight.

Nutrition. Participants voiced the highest level of support for GM foods when the modification increased the food's nutrient value, especially if the product was intended for the developing world. It is somewhat puzzling that these low-income consumers did not perceive themselves as potential beneficiaries of improved nutritional value. In one focus group, the discussion explicitly turned on this point, after a participant said that genetic modification could be beneficial in countries where children have a difficult time getting all the proper nutrients, "... like India, Mexico, El Salvador."

"What about here?" another participant interjected. "We have the same kind of poverty here."

"No," the original speaker replied. "Here is different. The nutritious foods are available here, and they do not cost so much that families cannot get them." In general, it appeared that the group agreed with her, because most participants nodded in assent.

Food supply and costs. The participants were more favorably disposed when the possibility was raised that GM foods might cost less than comparable unmodified products. In most cases, those with safety concerns were more likely than those with ethical concerns to say that they would consider purchasing a GM food if its price was lower than a conventional unmodified food product. One participant with primarily ethical concerns stated, "They [the food industry] want to get us to accept the product, so they'll lower the price to get more people to try it."

Benefits to consumers. Overall, the participants' support of GM foods was strongest when the modification ap-

peared to have some direct benefit for them, such as a reduction in the use of pesticides or increased nutrients. They were more ambivalent about modifications that principally served grower or producer convenience or profitability, such as crop ripening, easier harvest or desirable postharvest traits. They were particularly skeptical about the impact GM foods might have on overall quality of the foods available to them in the market. In many cases, however, their negative attitude appeared to be related more to dissatisfaction with the quality and taste of currently available produce than to the genetic modification of any particular product.

Support for labeling GM foods

Participants were strongly supportive of labeling for GM foods and believed that they needed a lot of information about all aspects of the process. Alternate sources for information, such as pamphlets or brochures in supermarkets, were also discussed, but the majority wanted packaged products to be labeled. Principally, they wanted to see, printed prominently on the label, information on why the food was modified. Many also wanted to know the source of DNA used in the modification; this concern was apparently related to apprehension about cross-species DNA transfers. In addition, they wanted to see nutritional comparisons on the label between the GM food and a similar food that had not been modified. They wanted any differences in shelf life or handling needs between the GM food product and conventionally produced food product to be highlighted. For produce, or foods purchased in bulk, they wanted a prominently placed brochure or pamphlet with essentially the same information.

The high level of interest in labeling was something of a surprise, as it appears that most U.S. consumers do not read nutritional labeling currently provided on foods (Noussair et al. 2002), and especially given the public's overwhelming support of prepared foods. In particular, fast food is consumed uncritically, with the majority of purchasers apparently paying little attention to nutritional content.

The support we found for labeling is even more surprising given the high



Participants in the focus groups strongly supported the labeling of foods as genetically modified. Many wanted to know the source of the DNA as well as nutritional comparisons with the unmodified food.

percentage of participants who were Latino with relatively low English proficiency. Four of the focus groups were either entirely conducted in or translated into Spanish. It is possible that the relatively high level of concern reflected the fact that these focus groups were conducted as part of a nutrition class that emphasized increased awareness of nutrition labeling. But it is also possible that participants wanted more information to help familiarize themselves with a new food product. One participant said, "It's only needed when the product is new. Once people get used to it, they won't need to do so much education and information."

Our finding is consistent with the May 2000 and March 2001 Wirthlin polls conducted for the International Food Information Council (IFIC) on unsegmented groups of U.S. consumers, which found that 58% to 65% of consumers want GM foods labeled, even if the modification does not change allergenicity or nutritional content (IFIC/Wirthlin 2001). In our focus groups, about 80% indicated that they wanted the information on the label. More recent (August 2002) polling data collected by Cogent Research for IFIC indicated that 59% supported current U.S. Food and Drug Administration (FDA) regulations on labeling of GM

foods, but the item that asked about agreement with FDA was not included in the poll (IFIC/Cogent 2002). Current FDA policy does not require such comprehensive labeling unless the GM food causes allergenicity or is changed nutritionally, but as consumer awareness increases it seems likely that such labeling would enhance consumer acceptance of GM foods rather than retard it.

Consumer education implications

The focus groups were exploratory and the results must be interpreted with caution. Nonetheless, some intriguing inferences can be drawn, which can be useful in deciding how to include information on GM foods in nutrition education classes. First, the participants were somewhat more skeptical of GM foods than has been reported in opinion polls and surveys of general audiences to date. Although this concern was fairly low (25% to 30%), the focus groups were conducted 2 years after the negative publicity surrounding the June 2000 StarLink corn recall, and few of the participants cited that as their primary concern.

Second, the participants apparently based their concerns and beliefs about GM foods on very little information, either of the basic science involved or the frequency with which they faced GM foods. This concern is overt among the 20% to 25% who voiced ethical or safety concerns, and implicit among the

The participants apparently based their concerns and beliefs on very little information, either of the basic science involved or the frequency with which they faced GM foods.

80% who favor more stringent labeling requirements. Although a high percentage of the participants had not heard of GM foods, this lack of information should not be deemed uncritical support, because public opinion in this area is easily swayed. The lack of solid information on the subject could make this audience even more susceptible to misinformation and mistrust of the food production system.

Third, awareness of GM foods among low-income consumers, even

those with limited English proficiency, does not differ markedly from that of the general population, according to surveys and polls to date. The focus group participants indicated somewhat more awareness of GM foods than might have been expected from the polling results. Again, this awareness could be due to the self-selection bias inherent in the sample, which consisted of consumers who chose to take nutrition education classes.

Fourth, the most significant difference between the attitudes and concerns of low-income consumers and those reported by polls and surveys of general U.S. populations is the higher degree of ethical or principle concerns. These concerns are not mentioned in other U.S. polls and surveys, but are quite prominent in European opposition to GM foods. This distinction suggests that more education or scientific information alone may not be sufficient for a small but significant segment of the U.S. population, including low-income consumers.

Designers of nutrition and food-safety information programs that target low-income audiences need to plan how to introduce simple information on GM foods into their curricula. This information should include information that: explains the basic genetic modification process; helps consumers distinguish between GM foods and food additives or supplements; explains current FDA policy on labeling of GM foods; and describes which food products currently are most likely to contain GM food ingredients.

We found surprisingly strong support among the focus group participants for labeling of GM foods. Some producers may be concerned that labeling will cause consumers to avoid GM foods, but that outcome was not supported by our focus groups. The fact that GM foods are not currently labeled unless they introduce some potential for allergens or changes in nutritional value means that the opportunity for educating the consumer is limited. The focus groups were quite clear that information on the label (or, for bulk foods and produce, in the display area) would help them make an informed decision. As one participant said, "If it's not on the label, it makes me think they're trying to hide

something. Give me the information, so I can decide for myself."

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