

## CONSUMER PERCEPTIONS OF RISK: IMPLICATIONS FOR FOOD SAFETY POLICY

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When a subject appears in the comic strips, it's a sign that it has become part of the popular culture. "Cathy" (Sept. 4, 1994) eats only dessert at a potluck picnic because of fear of microbial and chemical hazards. What do we know of consumer concerns?

### Consumer Attitudes Toward Safety of Our Food

In the 1995 Food Marketing Institute Survey, 77 percent of shoppers were completely or mostly confident that foods in their supermarket are safe. This percentage is still lower than the 90 percent in 1985-88, or even the 82 percent in 1991, but is increasing. Respondents were asked to volunteer their concerns as to "threats" to the food supply. Spoilage was given by 52 percent (significantly higher than the 41 percent in 1994); the next most frequent was pesticides, residues, insecticides, herbicides for a total of 15 percent. When the list of hazards was presented one by one, 74 percent considered residues, such as pesticides and herbicides, to be serious hazards; 52 percent, antibiotics and hormones in poultry and livestock; 22 percent, additives, preservatives and artificial coloring. The authors suggest that a hazard may not be seen as a threat because it is perceived to be of low occurrence.

Public perceptions can also be judged by consumer purchases of "organic foods" or produce certified as "pesticide free." Although little used to date, the willingness-to-pay measure (WTP) to assess the value consumers place on avoiding foodborne illness is supported by a task force of the Council for Agricultural Science and Technology. Studies reviewed by van Ravenswaay found that those consumers who reported currently purchasing organic foods would be willing to pay 50 percent extra, and those who didn't, five percent; although it varied for specific produce items.

Consumers' WTP for selected assurances of seafood (flounder) safety was studied in an experimental design by Wessells and Anderson. Although their findings are limited to a single, familiar species, consumers were found to be willing to pay approximately 10 percent more for the favored approach (catch date on the label) and about eight percent for information on catch site or on holding temperature history. Eleven percent indicated that they were consuming less seafood than two years ago, citing prices and concerns about safety as reasons. Eighty percent viewed seafoods as either somewhat or very safe.

Although the few recent studies of specific areas of concern were limited geographically, and different questions were asked, the diversity among consumers of perceptions of risk is apparent. I will first review microbial foodborne illness issues, then agrichemicals, biotechnology and radiation.

### **Microbial Concerns**

The early 1993, highly-publicized outbreaks of illnesses and deaths from *E. coli* O157:H7 in the Northwest resulted in increased awareness of health hazards from foods, especially in that region. Expose-type programs by television journalists also got the attention of some consumers. From the FMI 1995 survey, there is evidence of a shift in the last three years toward more concern about spoilage/foodborne illness.

Foods that were considered to be at high risk for food poisoning in early 1993 FDA telephone interviews with 1,620 people (Fein et al.) were chicken (by 33 percent), red meat (by 24 percent), fin fish (by 16 percent), and eggs, shellfish and prepared salads (each by 11 percent). The identified source of food safety problems was led by processing plants (37 percent), followed by restaurants (22 percent), warehouses (13 percent), homes (10 percent), supermarkets (10 percent) and farms (3 percent) (Food Quality). These rankings were very different from where the food perceived as causing foodborne illness was prepared, as reported by those who had had such illness. In this group, 65 percent of illnesses were attributed to foods prepared in restaurants. Microorganisms were considered to be a serious food safety problem by 44 percent who had a perceived foodborne illness, as compared to 34 percent who had not.

### **Agrichemical Concerns**

Agrichemicals have been the focus of crises. Not only are these viewed by some as health hazards, but also as environmental problems and potential risks to farmworkers' or animal health. As found in the FMI 1995 consumer study, the level of concern has been fairly constant. van Ravenswaay concluded from her review of the literature, that approximately one-fourth of the public perceives a great chance of harm from pesticide residues in food, but about the same percentage perceives very little or no chance of harm.

The annual *Fresh Trends* study reported little change in consumers attitudes. Hispanic (Mexican) consumers who participated in focus groups in California had less confidence in the safety of U.S. grown produce than the general population (Diaz-Knauf et al.). However, English-speaking respondents were more confident of safety than non-English speaking (83 percent and 67 percent); both were significantly less confident than a cross-

section of California consumers studied earlier (92 percent). All groups were more concerned about imported produce. More than half (55 percent) of the Hispanic participants reported, in 1990, that they did not consume certain produce because of food safety concerns. Overall, the Hispanic consumers lacked information on the safeguards which are in place for produce safety.

### **Biotechnology Update**

Biotechnology, as a specific technique to produce growth regulators as well as new varieties of plants and, potentially, animals, has been difficult to explain to the lay public. Since several reviews have been published, only the most recent findings are included here. Since awareness of an issue must precede a concern, it is important to note that only 35 percent of shoppers in one 1995 study (Food Marketing Institute) had ever heard, read or seen at least some information about biotechnology. As expected, the percentage was highest for those with more education and higher incomes.

A study conducted in five states in 1992 using focus group techniques (Zimmerman et al.), found that participants had only a little (45 percent) or some (37 percent) knowledge of biotechnology; in general, this group was well educated and had higher incomes. Attitudes toward use of biotechnology were generally positive, but selective: plant applications were more approved than animal. The consumers (93 percent) strongly agreed with the statement, "Average citizens need more information about the use of biotechnology." As to the source of this information, there was least trust in statements made by chemical companies, food manufacturers, grocers or biotech companies; more than 50 percent chose "a little" or "none" in level of trust in each.

The consumer acceptance of the use of recombinant bovine growth hormone (rBGH) to increase milk production in dairy cows has been studied extensively. Awareness has been found to be highly dependent on the extent to which its use had become controversial in the state or region. Reactions are also complex, in part, because milk has a cultural image of being a natural, nutritious, pure food for all ages. The major concern voiced is for future human health. Fears of adverse impacts on the economy of small dairy farms and on animal health (humaneness) are also a part.

In a 1990 telephone interview study (Grobe and Douthitt) of 1,056 in Wisconsin, a state with high awareness, 89 percent of consumers were aware of the rBGH controversy. Statements about expected economic benefits to consumers did not result in differing risk perceptions. Those consumers with higher risk perceptions were willing to pay more for untreated milk, purchased larger quantities of milk, and were predominantly female.

## **Irradiation of Foods**

The acceptability of radiation processing of food remains a confusing issue. Although consumer studies indicate an increasing acceptance, groups of organized citizens, who are active in their opposition, have created a reluctance on the part of industry in Europe, as well as the United States, to move ahead (Lagunas-Solar, Bruhn). Concerns regarding the use of radiation include worker safety and environmental protection to at least as great an extent as the safety of the food itself.

In a 1994 study in Georgia (Resurreccion et al), 72 percent of consumer respondents were aware of the process of irradiation, but had a low level of knowledge with 37-71 percent selecting "Don't know" as the response. This sample of consumers was more concerned about other risks to food safety. This may be because irradiation is used very little in today's food supply. Consumer response appeared to be linked to microbial safety benefits; 54 percent thought irradiation was not necessary for fruits and vegetables, as compared to 27 percent for poultry and pork, 28 percent for seafoods and 31 percent for beef.

There are general issues related to consumer attitudes and actions. I want to enlarge on three of these: the role of the media, the factor of trust and the use of information/education.

### **Role of the Media**

Since consumer awareness is required before there is a consumer concern, the media has had a major role in calling public attention to food safety issues. The publisher's goal is that the item be newsworthy. That may be because of its rarity, incongruity with what is generally accepted or human interest aspects. Based on English food scares, Scottish writers (Miller and Reilly) add to this "disagreement, conflict, conspiracy and cover-up," especially if this involves authorities such as scientists or government departments. What becomes newsworthy as an issue relates not only to the news, but also to the political and social environment at the time.

Twenty-four percent of Nebraska homemakers studied by a mailed questionnaire in 1991 had not used a food in the past year because of adverse comments about the food in the news (Albrecht). The products most frequently mentioned were apples, poultry, tuna and fruits/vegetables (including grapes).

### **Role of Public Trust**

The importance of public trust in consumer determination of risk was emphasized by van Ravenswaay. She concluded that the public lacks trust

in the users and regulators of agrichemicals, because of the evidence of error, such as accidental food contamination episodes or risk assessment revisions and the evidence of dishonesty and ineffectiveness. Her recommendation is: "Both food producers and consumers might benefit from actions taken to improve consumer confidence. What such actions may be, what they may cost, or how great a benefit they may have are questions that should be explored." An informative case study of a conflict is that which led to the 1979 ban on the use of diethylstilbestrol as a cattle growth enhancer (Marcus). It also chronicles the loss of public faith in scientists and regulators.

Scientists know that new information will change many current recommendations. However, the non-scientist views such change as indicative of unreliability. For example, most shoppers surveyed in January 1995 as part of the Food Marketing Institute/*Prevention* magazine annual survey, were concerned about conflicting information on nutrition. The findings: "Most shoppers believe that the experts will change their minds within the next five years about which foods are healthy and which foods are not."

Trust in the producers and processors of foods is increasingly important in public confidence as food preparation moves outside the household. The resources of the food industry include large-scale advertising, public relations and lobbying. Only if information will build confidence, will it be provided. A recent prediction, as to the outcome of "the food information war" between consumer advocates and food industry advocates, is that both sides will continue to seize on issues, especially the effects of international trade agreements and food component-carcinogenity concerns (Anderson).

Research must provide the factual base for risk estimates and for the direction of regulatory action. The public, educators, industry and regulators alike may be frustrated with the time and cost of acquiring the research-based facts. In their zeal to build a base, researchers must not overstate the benefits, or the resulting loss of trust will be reflected in loss of long-term commitments.

### **Role of Information/Education**

Does experience with the extension system influence perceptions of the risks of pesticides? Clients who had contact with extension through a food preservation program and Master Gardener volunteers were compared with commercial growers of vegetables in an Oregon study (Love). Although the majority in each group was confident that fresh fruits and vegetables available to consumers are safe to eat, 26 percent of clients, 24 percent of volunteers and two percent of growers were not very or not at all confident.

Clients had the greatest perception of eating foods produced using pesticides “as a high risk” (55 percent), as compared to trained volunteers (34 percent) and growers (2 percent). As in other studies, females were significantly more concerned. Thus the fact that the growers were 95 percent male may account for the difference in that group’s concern. Those in all groups who perceived a higher risk were more willing to pay a higher price for certified residue-free produce, and produce grown without synthetic pesticides, and also were more concerned about pesticide residues when buying imported produce.

Insights from focus groups, which explored attitudes toward biotechnology, led Zimmerman et al, to conclude that a two-sided educational approach, which presents not only opposing viewpoints and information, but is both cognitive and affective-based, is needed. Grobe and Douthitt also concluded that, “Beliefs rather than information appear to be at the heart of rBGH’s nonacceptance.”

Public awareness messages to communicate the theme, “Here are the risks, benefits and options; you share in the decision-making power,” with a focus on pesticides and food safety were tested with focus groups of women in the four regions of the U.S. by Chipman et al. After viewing four media communications, the participants had greater concern for risks, but also an increased confidence in their personal control over exposure to pesticide residues. The message style, which included risk/benefit/option, was liked, but the lack of specific information was criticized. (One source of data is the annual publication by the FDA Pesticide Program of the results of its monitoring studies.)

Since one policy decision is the extent to use an educational approach, the findings in a 1993 FDA study related to foodborne illness are pertinent (Altekruse et al). Overall, there was evidence that specific knowledge of causes of foodborne illness had a positive relationship to application. However, groups with significant discrepancies between knowledge and practice were males, people younger than 30 years, those with more than 12 years of education, and infrequent food preparers. The authors suggested that adequate cooking of meat appeared to be a food preference or risk-taking behavior issue. An Oregon study of food discard practices (VanGarde and Woodburn) found that those respondents who were rated as least cautious on a cautiousness scale were also found to discard the least food as “unsafe.” (Correlation to cost of discards was .96.)

One of 15 recommendations made by a recent task force for the Council for Agricultural Science and Technology (CAST) considering problems of foodborne pathogens was, “Given that risk communication is critical

because zero risk is impossible, we recommend that the public be well educated regarding safe food handling, and the relative and changing risk status of individuals." A similar recommendation was made by a task force of the National Live Stock and Meat Board. However, there is limited discussion in both of the bases, techniques and accountability for the consumer aspects.

### **Food Ambivalence**

A broader, social science approach considers that food choices have always carried both anxieties as well as pleasures. Strategies to cope with these conflicts have changed over time. Beardsworth suggests that the current problem of food ambivalence is different because the "stable and taken-for-granted" cultural practices of food intake, which gave confidence, no longer are strong. Weakening of this framework has resulted from globalization, consumerism, removal of food preparation from the household and scientific knowledge, with its accompanying doubt and uncertainty. The future state of foodways may be one of increasing abundance and conflict, or may become a more ordered but pluralistic food-related culture. Science and the food industry can contribute to either outcome.

### **Conclusions**

From our knowledge of current consumer perceptions of risk in our food supply, several policy issues arise. These include:

1. What should be the balance between industry management, government regulation and consumer information/education in increasing the safety of the food supply, making decisions on applications of new technologies, and in increasing the confidence of the public in the food supply?
2. Should the federal government mandate more information and care labeling of foods? What of state and local government policies?
3. If ambiguity is always present in consumers' attitudes toward the food supply, how can confidence be built?
4. What research is needed, and how shall it be funded?

### **REFERENCES**

- Albrecht, Julie A. "Food Safety Knowledge and Practices of Consumers in the U.S.A." *J. Consumer Studies and Home Econ.* 19 (1995): 119-134.
- Altekruse, Sean F., Debra A. Street, Sara B. Fein, and Alan S. Levy. "Consumer Knowledge of Foodborne Microbial Hazards and Food-Handling Practices." *J. Food Protection*. Accepted for publication, 1995.
- Anderson, Clifton. "The Food Information War: Consumer Rights and Industry Prerogatives." *Eating Agendas: Food and Nutrition as Social Problems*, eds. Donna Maurer and Jeffery Sobal. Aldine de Gruyter, Inc., New York, NY, 1995.

- Beardsworth, Alan. "The Management of Food Ambivalence: Erosion or Reconstruction?" *Eating Agendas: Food and Nutrition as Social Problems*, eds. Donna Maurer and Jeffery Sobal. Aldine de Gruyter, Inc., New York, NY, 1995.
- Bruhn, Christine M. "Strategies for Communicating the Facts on Irradiation to Consumers." *J. Food Protection* 58 (1995): 213-216.
- Chipman, Helen, Patricia Kendall, Garry Auld, Michael Slater, and Thomas Keefe. "Consumer Reaction to a Risk/Benefit/Option Message About Agricultural Chemicals in the Food Supply." *J. Consumer Affairs* 29 (1995): 144-163.
- Council for Agricultural Science and Technology. *Foodborne Pathogens: Risks and Consequences*. CAST, Ames, IA, 1994
- Diaz-Knauf, Katherine Martha Lopez, Carmen Ivankovich, Fernando Aguilar, Christine Bruhn, and Howard Schutz. "Hispanic Consumer Acculturation and Food Safety Concerns." *J. Consumer Studies and Home Econ.* 17 (1993): 233-243.
- Fein, Sara B., C-T. Jordan Lin, and Alan S. Levy. "Foodborne Illness Perceptions, Experience, and Preventive Behaviors in the United States." *J. Food Protection*. Accepted for publication, 1995.
- Food and Drug Administration Pesticide Program. *Pesticide Monitoring 1994*. Food and Drug Administration, Washington, D.C., 1995.
- Food Marketing Institute. *Trends in the United States-Consumer Attitudes and the Supermarket 1995*. Food Marketing Institute, Washington, D.C., 1995.
- Food Marketing Institute/Prevention Magazine. *Shopping for Health, 1995. New Food Labels, Same Eating Habits?* Food Marketing Institute, Washington, D.C., 1995.
- Grobe, Deana and Robin Douthitt. "Consumer Acceptance of Recombinant Bovine Growth Hormone: Interplay between Beliefs and Perceived Risks." *J. Consumer Affairs*, 29 (1995): 128-143.
- Lagunas-Solar, Manuel C. "Radiation Processing of Foods: An Overview of Scientific Principles and Current Status." *J. Food Protection* 58 (1995): 186-192.
- Love, Margaret L. "Pesticides and Produce: Risk Perceptions of Extension Clients." M.S. thesis. Oregon State University, Corvallis, OR, 1993.
- Marcus, Alan I. *Cancer from Beef: DES, Federal Food Regulation, and Consumer Confidence*. The Johns Hopkins University Press, Baltimore, MD, 1994.
- Miller, David and Jacquie Reilly. "Making an Issue of Food Safety: The Media, Pressure Groups, and the Public Sphere." *Eating Agendas: Food and Nutrition as Social Problems*, eds. Donna Maurer, and Jeffery Sobal. Aldine de Gruyter, Inc., New York, NY, 1995.
- National Live Stock and Meat Board. *Solving the E. coli 0157:H7 Problem*. National Live Stock and Meat Board, Chicago, IL, 1994.
- The Packer. *Fresh Trends*. Vance Publishing, Lincolnshire, IL, 1995.
- Resurreccion, A.V.A., F.C.F. Galvez, S.M. Fletcher, and S.K Misra. "Consumer Attitudes Toward Irradiated Food: Results of a New Study." *J. Food Protection* 58 (1995): 193-196.
- VanGarde, Shirley J., and Margy J. Woodburn. "Food Discard Practices of Householders." *J. Am. Dietet. Assoc.* 87 (1987): 322-329.
- van Ravenswaay, Eileen O. *Public Perceptions of Agrichemicals*. Council for Agricultural Science & Technology, Ames, IA, 1995.
- Wessells, Cathy Roheim, and Joan Gray Anderson. "Consumer Willingness to Pay for Seafood Safety Assurances." *J. Consumer Affairs* 29 (1995): 85-107.
- "What You Don't Know..." *Food Quality* 1:5 (1995): 7-8.
- Zimmerman, Linda, Patricia Kendall, Martha Stone, and Thomas Hoban. "Consumer Knowledge and Concern about Biotechnology and Food Safety." *Food Technol.* 48:11 (1994): 71-77.