Consumer Attitudes Toward Use of Probiotic Cultures

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ABSTRACT: Some probiotic cultures appear to modulate the immune system, improve lactose intolerance, resolve some bacterial and viral diarrheal diseases, reduce symptoms associated with inflammatory bowel disease, lower blood cholesterol, and protect against some cancers. Focus groups were used to determine consumer familiarity with probiotic bacteria and response to benefits, information source, potential health claims, and dietary sources. Some consumers were skeptical that probiotic cultures could be effective. Information is more credible if it is consistent with existing beliefs and endorsed by recognized health experts. Consumers aware of "friendly bacteria" in yogurt were more likely to accept the potential benefits of probiotic cultures than consumers unaware of beneficial bacteria. Some consumers were so sensitive to the risks of pathogenic bacteria that the concept of beneficial bacteria was not credible.

Keywords: probiotics, cultures, yogurt, consumer attitudes

Introduction

PROBIOTIC CULTURES ARE LIVE MICROBIAL FOOD INGREDIENTS THAT have beneficial effects on human health (Salminen and others 1988). Bacterial cultures have long been used in dairy products to develop a distinctive flavor and increase shelf life. In some regions of the world, human longevity is attributed to consumption of cultured dairy products (Bibel 1988). Interest in these cultures has increased in recent years as research has verified the effect of specific strains of *Lactobacillus* and *Bifidobacterium* on human health (Sanders 1999; Sanders 2000).

The benefits of consuming probiotic cultures have been demonstrated in several areas (Sanders 1999; Sanders and Klaenhammer 2001; Hamburger and others 1997). Some cultures have been shown to reduce lactose intolerance. Animal models and human studies have found that probiotic bacteria are able to enhance nonspecific and specific immune responses by activating macrophages, increasing levels of cytokines, increasing natural killer cell activity, and increasing levels of immunoglobulins. Probiotic bacteria have been shown to decrease the incidence, duration, and severity of some bacterial and viral diarrheal disease and reduce symptoms associated with some inflammatory bowel disease. Probiotic bacteria may be able to counteract mutagenic and genotoxic effects in the colon and other organ sites. Additionally, probiotic bacteria or their byproducts appear to decrease cancer cell proliferation. Preliminary research in the area of food allergies indicates that probiotics may suppress milk-induced immune inflammatory response (Pessi and others 1998; Isolauri 1996). Some probiotic bacteria, or their end products, may inhibit *H. pylori* infection associated with chronic gastritis, peptic ulcers, and the risk of gastric cancer (Coconnier and others 1998; Kabir and others 1997; Midolo and others 1995). Vaginal health has been correlated with oral consumption of certain probiotic-containing products (Hallen and others 1992; Hilton and others 1992; Hilton and others 1995). Consumption of fermented milk products by hypercholesterolemic individuals has resulted in a significant lowering of total cholesterol and low-density lipoprotein cholesterol (Taylor and Williams 1998). Daily consumption of food products derived from probiotic culture could also contribute to blood pressure control (Takano 1998; Hata and others 1996). Probiotics appear to influence a variety of other conditions, including reducing ill effects from radioactive isotopes (Henriksson and others 1995; Korschunov and others 1996; Salminen and others1988) and reducing the effects of endotoxemia associated with alcoholic liver disease (Nanji and others 1994).

Although the number of studies identifying these beneficial effects is impressive, additional verification is needed. Results were not always consistent, studies used different probiotic strains, and the length of dietary intervention and exposure levels varied. Identification of strains that are most effective in promoting these health-enhancing properties is ongoing. The amount and frequency of consumption necessary to obtain beneficial effects is under investigation.

Although structure/function statements about gastrointestinal tract health, immune function, or improved digestion are permitted on probiotic dietary supplement labels as long as they are truthful and not misleading, they are seldom found on food products (Sanders 1998). The United States Food and Drug Administration (FDA) regulations permit promotion of health enhancing properties on food labels or in advertising material (McNamara 1998). Consumers indicated an interest in receiving information about the health benefits of food. In a nationwide survey, 78% of consumers said they were interested in receiving information about food that boosts the immune system, 77% were interested in information about food that reduces the risk of disease, and 53% were interested in information about active cultures in yogurt (Health Focus 2001). This project was undertaken to assess relative consumer interest in health enhancing properties of probiotics, identify factors which increase credibility of health related messages, and identify the consumer's preferred sources of information.

Methods

GROUP DISCUSSIONS (FOCUS GROUPS) WERE USED TO MEASURE consumer attitudes since this method permits free expression of ideas within a structured question format. Questions addressed participants' use of nutritional labeling, awareness of health claims on labels, familiarity with *Lactobacillus* or *Bifidobac-*

terium, interest in potential benefits of food which contains these bacteria, response to potential label statements, credibility of product endorsements, and appropriate price for probiotic products. The discussion of benefits was limited to lowering blood cholesterol and thereby guarding against heart disease, decreasing the risk of certain cancers, enhancing the immune system and thereby increasing resistance to illness, and reducing lactose intolerance.

Focus group findings are not quantitative, but rather reflect the range of attitudes likely to be encountered in the marketplace (Krueger 1994). To explore the range of consumer attitudes, efforts were made to recruit men and women of Caucasian, Latino, Asian, and African heritage. Participants were advised that they would share their ideas on a food-related topic and receive a $30 honorarium for participating in a discussion that would last no more than 2 h.

Results

With the assistance of Univ. of California Cooperative Extension Advisors, consumers from Southern, Central, and Northern California were identified to participate in a 2 h discussion. Consumers were recruited through announcements in newspapers, business offices located near the Cooperative Extension office, and service organizations. Nine discussion groups ranging in size from 8 to 17 people, average size 11, took place in the summer of 1998 with a total of 100 people (28 men and 72 women) of Caucasian, Latino, Asian, and African heritage. The age of participants ranged from the twenties to over 60, with most in the 40 to 50 age group.

Most consumers said they examined the nutritional label when they purchased a food for the first time. Some only examined nutritional labels when they were looking for a certain type of food or if they were especially focused on nutrition. Others acknowledged that they are not interested in nutrition label information.

When asked if they had noticed health or nutrition claims on foods, many consumers reported seeing statements describing constituents a food did not have, such as "Fat Free," "Cholesterol Free," or "No MSG." The most commonly recalled positive claim was related to dietary fiber. Regarding health claims, some had seen endorsements from the American Heart Association. Quaker Oats and Cheerios were referred to as "heart healthy." One person made a general statement that the cultures in yogurt are healthful.

Response to probiotic cultures

When specifically asked, familiarity with *Lactobacillus*, *Bifidobacterium*, or the general concept of cultures in yogurt varied from knowledgeable and believing, to unaware, to repulsed. Many who consume yogurt had heard of the bacteria and believed yogurt helps prevent yeast infections and replenishes gut flora, especially after taking antibiotics. Some consumers also mentioned that yogurt helps digest protein while others believed it helps with lactose intolerance. Acidophilus milk or acidophilus supplements, as well as yogurt, were identified as offering these benefits. Some were vaguely aware of digestion benefits while others were not at all familiar with these bacteria or the potential benefits of consumption. Among those unaware, some ate yogurt because they liked it while others did not like yogurt and never consumed it.

In each focus group, there were some consumers who said they had heard of *Salmonella* and other harmful bacteria, saw advertisements about antibacterial soap, and were repelled by the thought of eating bacteria. These individuals viewed both the words "culture" and "bacteria" with concern and distaste. Those who had a course in bacteriology recalled unpleasant odors and plates with mounds of growth. Even those who lacked these classroom experiences were conscious of the need for good sanitary practices and could not envision bacteria as "friendly."

Consumers were overwhelmed when they heard that specific probiotic bacteria might lower blood cholesterol, decrease incidence of some cancers, and enhance the immune system so people would be more resistant to illness. Although each benefit was considered valuable, people noted that the potential to influence cancer or heart disease was not unique to probiotic cultures. Several commented that many foods protect against heart disease and cancer, thus probiotic cultures could only be added to a long list of other items. People also felt these benefits were primarily important to those at highest risk for these diseases because of family history, life style, or age. Several consumers had family or friends who suffered from cancer. They saw cancer as a complex set of catastrophic diseases that arose unexpectedly. Conducting further research to verify the effectiveness of probiotic cultures in protecting against cancer was a priority for them.

Strengthening the immune system was seen as important to all people at any age. Participants believed this benefit would help the body resist a multitude of illnesses and diseases. They saw this as a powerful benefit for their children or grandchildren as well as for themselves. Typical comments included, "If you have a good immune system, it will protect you against the others [diseases]," "Improving your immune system improves the quality of life today," and "In our culture, immune system problems are becoming an even greater issue. They contribute to many (conditions) we don't even realize." Some asked if a strengthened immune system would protect against HIV and AIDS.

Some participants were pessimistic and thought probiotic cultures were unnecessary. Typical comments included, "If you have a good general diet and you exercise, you should be getting all the normal vitamins. I don't see that all this is necessary," and, "If you have a healthy diet with fresh foods, chances are you are already getting natural bacteria."

Communicating benefits

Multiple channels were suggested to convey benefits to the public. People looked to their favorite television or radio programs for information. The national news, Discovery Channel, Dr. Dean Edell (a physician with a syndicated call-in show) and Oprah were frequently mentioned. People also looked for information in magazines, especially Reader's Digest, health magazines, and assorted magazines in the doctors' waiting rooms. Some received health-related newsletters, such as Tufts Univ. Health and Nutrition Letter. Younger consumers said that they looked for information on the Internet. Hispanic consumers commented on the need to have information in Spanish. Word of mouth was cited as a common and useful means to receive information; many people said they placed great faith in information from people who used and benefited from a particular product. A typical comment was, "Use all these methods and a consistent message. Tell me 1 thing 10 times, then I get it."

People felt information describing potential benefits should appear on the food label, and believed credibility was enhanced if the statement was reviewed and approved by FDA. Further endorsement by recognized health authorities such as the American Cancer Society, the National Academy of Science, or the U.S. Surgeon General increased the perception of credibility. Many

also commented that additional information such as the number of studies completed, the number of persons studied, the name of universities conducting the research, and the degree of benefit would convey the strength of the science behind the stated health claims.

Those consumers who purchased from health food stores were less interested in FDA approval and more focused on comments from providers of alternative medicine. Because of long-term interactions at health food stores, they thought that information provided by store clerks and electronic and published resources available in these settings was reliable, but they were skeptical of information provided by "big business." They believed that information other than the required Nutrition Facts was most likely promotional and not grounded in sound research. While some felt FDA approval increased reliability of a health claim, others commented that it takes too long for FDA to review studies, and many previously approved products have been recalled. These consumers also did not trust the American Medical Association's safety evaluations. They believe that the Association and individual doctors are biased due to financial profits they receive from pharmaceutical sales. Many of these individuals placed greater confidence in holistic doctors and chiropractors than in mainstream medical doctors.

Participants were asked to respond to statements that conveyed the potential beneficial effects of probiotics on the immune system and cancer, and in preventing heart disease. In general, consumers preferred statements that used simple terms. The structure/function claim, "Improves gastrointestinal tract health" was rejected because people did not like the term "gastrointestinal." They did not want to think of the gastrointestinal tract when shopping for food. Similarly, "Guards against foodborne illness" was not appealing because it was viewed as too technical and people did not want to think about foodborne illness or diarrhea when buying food. In contrast, positive terms that referred more generally to the natural systems were acceptable. "Strengthens the body's immune system" was universally endorsed.

Consumers were sensitive to statements that may promise too much regarding the ability of probiotics to help prevent cancer and heart disease. "Reduces incidence of cancer" was considered both too broad and too absolute. "Helps reduce incidence of certain types of cancer," or "May reduce incidence of cancer" were much more acceptable because they did not promise absolute reduction. People expected to be able to read additional material that stated what types of cancer were affected. Similarly, claims such as, "May reduce blood cholesterol" were acceptable because they do not overstate the benefits of consuming probiotic cultures.

Marketplace application

Consumers would like the option of obtaining probiotic cultures in foods or supplements. Those who preferred a supplement valued the control of taking the product at a specific dose and frequency. Others pointed out that supplements would add to food costs, would require people to remember to consume them, and may be difficult for those uncomfortable swallowing pills.

Those who preferred a food source considered food more convenient than dietary supplements. They also asserted that food vehicles for probiotics should diversify beyond yogurt. Even those who liked yogurt were not sure they wanted to eat it daily, and those who did not like yogurt were not prepared to eat it at all. People suggested adding probiotic cultures to as many foods as possible. Dairy products were frequently mentioned because of the historic use of probiotics in this food group. As long as there are no ill effects from high consumption, people suggested putting probiotic cultures in milk, cheese, and ice cream.

In each focus group, consumers noted that labels must state the quantity and frequency of recommended consumption. Some who consumed yogurt for health benefits said they never knew how active the bacteria were, or if they were getting enough. Providing probiotics in both supplement and food product forms allowed the consumers to adjust their consumption to obtain probiotic benefits without radically changing their food habits. People also wanted to know if there are any foods that should not be consumed at the same time as probiotic cultures. They were also interested if there were foods that should be consumed with the cultures to enhance their viability. Finally, they wanted to know if there were possible ill effects from over-consumption, and if so, what amount was too much.

Study participants recognized that adding something new to existing products would entail a price increase, but they would prefer not to pay a premium for probiotic-enriched foods. Others countered that this was not realistic. These consumers noted that they were already paying a premium for vitamins and other health aids. Some consumers saw the use of health enhancing probiotic cultures as an opportunity for the dairy industry to reward loyal customers who have been choosing dairy products all their lives. People believed if probiotic cultures were truly as beneficial as stated, they should be available in all products without additional cost.

When asked for a final message, consumers noted that taste is a primary consideration. Comments included, "Be sure it doesn't taste bad," and, "Lots of times when they make things healthy, it tastes unappealing." Several women noted that putting probiotic cultures in commonly consumed foods would allow them to subtly provide these benefits to their husbands and children. Several had noted that some men refuse to take care of themselves, and that children don't always follow good dietary habits. People urged that consuming probiotic cultures be described as a preventive practice. Even if healthful foods cost more today, consuming them would save on health costs in the future.

Discussion

PROJECTIONS OF THIS STUDY'S RESULTS TO NATIONWIDE STATISTICS are not an appropriate use of focus group research. Nevertheless, attitudes expressed by the 100 participants in this study reflect trends observed in other studies. Consumers check nutritional labels when first purchasing items and expect the information to be truthful (Bender and Derby 1992; Rodolfo and others 1998; Buzby and Ready 1996). They also rely on mass media for information, are more likely to trust information provided by recognized health groups, and are more likely to believe a message if there is scientific consensus on the issue (Hoban and Kendall 1992; Bruhn and others 1992). Label information should use lay terminology and describe how consumers should use a product to most greatly benefit from it (National Institute of Nutrition 1999).

Products containing probiotics are common in Japan and Europe (Sanders 1999). A review of the yogurt market in Europe shows that probiotic yogurts constitute 13% of the market in the United Kingdom and Germany, and 20% of the market in Denmark (Fonden and others 1999). A survey of food manufacturers, retailers, and ingredient producers conducted by Leatherhead Research in the United Kingdom projects about a 60% growth in

functional foods in these countries and a 78% growth in the U.S. in the next 15 y (Fonden and others 1999). If these projections are accurate, foods on U.S. supermarket shelves containing probiotic cultures will increase.

Conclusion

CONSUMER ATTITUDES TOWARD THE USE OF PROBIOTIC CULTURES are positive; however some people must be convinced that specific bacteria can be beneficial. FDA approval as well as endorsement by recognized health groups would increase believability of a health claim. For increased credibility, promotion of probiotic culture benefits must not overstate the protective effects of probiotic cultures. Enhancing the immune system is a powerful benefit applicable to people of all ages. With appropriate promotion, use of probiotic bacteria as an ingredient in a wide range of dairy products would add value to this food category and be well received by consumers.

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