CASE STUDY ANALYSIS OF A MARKETPLACE APPLICATION OF BIOTECHNOLOGY "ROUNDUP READY SOYBEANS"

— Final Report —

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FOREWORD

Background

Consumers' understanding of the nature of biotechnology is limited They may look to those knowledgeable about the subject, including expert stakeholders, for information about biotechnology applications. Consumers' support, however, is an important component in the development of a strong biotechnology industry in Canada. In order to improve the public's acceptance of new biotechnology products, it is useful to examine previous product introductions to develop an approach for future launches.

Creative Research International was commissioned by Industry Canada to conduct a case study analysis of the market introduction of a genetically engineered food product "Roundup Ready Soybeans" and to identify any issues arising from its appearance in the marketplace that could be applied to upcoming product initiatives.

"Roundup Ready Soybeans" are genetically engineered to be resistant to the broad-spectrum herbicide, "Roundup". Both the soybean gene technology and the herbicide are produced by Monsanto. Seed companies use this gene technology to produce Roundup Ready Soybean seeds. These genetically altered seeds and Roundup Herbicide together are positioned as a crop management tool for soybean growers.

A major concern for soybean growers is weeds which can impinge on crop yield — they can affect the size of the crop grown in a field since they tend to suck up available moisture and soil nutrients.

Herbicides are sprayed on crops to limit the weed population. Rather than using a variety of herbicides to eliminate each type of weed, one broad spectrum herbicide will act on most types of vegetation — the downside is that these herbicides may also kill the crop

He nterest in herbicide-resistant seeds which require fewer chemicals for weed control This should result in cost savings to the farmers and increased crop yields

Industry Canada indicates that crops that are resistant to herbicides "will permit more environmentally sound weed control"[1].

Roundup Ready Soybeans have been grown in the United States. According to the Food Biotechnology Centre[2], RRS has been approved by Health Canada and Agriculture and Agri-Food Canada (AAFC) for consumption by both humans and animals. The European Union has approved RRS for import; however Europe has been the site of protests over this product. There has been some reporting of the European protests in mainstream Canadian publications. RRS does not yet appear to be attracting any significant amount of media attention in Canada and consumer awareness of the product seems to be minimal.

This case study examines some of the issues associated with the introduction of Roundup Ready Soybeans and how they have been managed by various stakeholders.

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1 Consumer Quarterly, Office of Consumer Affairs, Industry Canada, Volume 1 Number 3, July 1996, p 3.

2 The Food Biotechnology Centre (Ottawa) website: http://www.biotech.ca/fbc/products/rounds.htm.

Objectives

- To investigate one environmental application of biotechnology that has implications concerning communications with consumers.

- To gather information from specific stakeholders about consumer concerns that be associated with the specific application.

- To identify communications issues which arose from the specific application and to analyse the methods in which they were handled.

- To recommend an approach for developing communication strategies for future applications of biotechnology to improve consumer understanding, support and satisfaction.

Method

In order to determine the impact of "Roundup Ready Soybeans" on the marketplace, qualitative in-depth interviews were conducted with several stakeholders (both proponents and critics) representing industry, government, academic and consumer groups who have an interest in the debate on agricultural biotechnology. In total, nine interviews were completed as follows:

Academia:	Professor of Genetics
	Professor of Plant Research
Agriculture:	Ontario Soybean Growers Marketing Board
	Canadian Organic Growers
Government:	Industry Canada
	Canadian Food Inspection Agency
General Public:	Consumers Association of Canada
Industry:	Monsanto
	Canadian Institute of Biotechnology

Some of those interviewed may be classified as "proponents" of agricultural biotechnology in the sense that they are strongly supportive of recent and future development of this technology. Others may be considered to be "critics" who voice serious doubts over the merits and serious concerns about the risks of agricultural biotechnology.

Results

The results are presented as follows:

- Implications;
- Highlights;
- Detailed Findings; and
- Appendix.

A Note Of Caution

Because of the qualitative nature of the study design, the reader is cautioned to view the findings as hypotheses rather than as definitive conclusions. Although consistencies and logic lend confidence to the analysis and interpretations, there is no way of determining the degree to which the opinions expressed are reflective of stakeholders were not available to be interviewed for this study.

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IMPLICATIONS

- The apparent lack of consumer enthusiasm for Roundup Ready Soybeans indicates that benefits of genetically engineered foods should be clear and meaningful to the general public. Consumers need to perceive a tangible benefit to themselves (some added value), not to industry or government.

- A concerted effort to "get the message out" clearly and effectively is necessary if genetically engineered products are to be accepted by consumers. Recognize that a wide assortment of information sources exist but the range, amount and varying levels of quality may increase confusion.

- Professionals such as medical practitioners (physicians, nutritionists), may be perceived as credible, trusted experts to disseminate information to the public.

- Safety assurances are critical for consumer acceptance. Consumers should be informed about how these products are regulated and the safety measures that are in place (for example, tests/trials conducted before full scale product implementation).

- Ethical issues should be addressed including the obligation incumbent on stakeholders involved with genetically engineered foodstuffs to keep the public informed about potential risks and to effectively minimize these risks wherever possible.

- The public may be looking to technology developers to design techniques to reduce such risks and implications from genetic engineering as:

    - harmful genetic mutations e.g. accidental cross-breeding;

- health and safety hazards e.g. allergens in genetically altered foods, decrease in antibiotic effectiveness, etc.;

- environmental risks e.g. need to use more powerful herbicides if resistance to existing chemicals develops; and

- economic implications e.g. small farmers can no longer be competitive.

- The issue of labeling genetically engineered products should be resolved to allay consumers' concerns about the foods they purchase.

- Government and industry should work with consumer groups to develop policies that best meet the requirements of all concerned.

HIGHLIGHTS

- Biotechnology, in general, and specifically genetic engineering of food products is a highly controversial subject. It is considered by some to be an important tool in increasing food production as well as increasing the overall quality of food. Others are concerned, though, that the unknown risks may be too great, since the genetic code of organisms is being altered.

- The general public tends to be extremely uninformed about biotechnology, as well as its benefits and risks. Only specific interest groups seem to be making an attempt to learn about genetic engineering of foods (e.g., those concerned with environmental issues or who have specific health concerns).

- The media does not appear to do a very good job of informing consumers about the pros and cons of biotechnology.

- Consumers do not generally know anything about Roundup Ready Soybeans.

- Some potential risks of genetically engineered soybeans appear to be:

    - the possibility that some consumers may develop an allergic reaction to this food;

    - possible reduced effectiveness of antibiotics ingested at the same time as the altered soybeans; and

    - unforeseen long term effects e.g., similar to thalidomide, silicone breast implants

x Some of these risks are not very likely to develop from Roundup Ready Soybeans but may be problematic for other genetically altered crops.

- Benefits from RRS may tend to favour large agronomic interests versus independent farmers.

- Canadian consumers have no way of knowing if foods they purchase contain any genetically engineered products since labeling of such foods is not now required in North America.

- There are many sources of information about genetically engineered foods including the Internet, newsletters, newspapers, magazines, government documents, conferences, etc. Some are considered to be more accurate than others.

- Some sources of information about food biotechnology include:

    - The Consumers' Association of Canada
    - The Food Biotechnology Centre
    - Ag-West Biotech Inc.
    - National Institute of Nutrition
    - The Dietitians' Food Biotechnology Network

- The public looks to doctors and nutritionists to inform them about such highly technical matters as genetically engineered food.

Respondents' Perceptions Of Biotechnology/Genetic Engineering

The definition of biotechnology is simply the use of living organisms to provide goods and services. Generally, those interviewed associate the term with genetic engineering.

When questioned about their own perception of biotechnology, those who are proponents describe it as a tool which has the potential to provide significant benefits (for example, the potential for agricultural biotechnology to address the growing demand for food as world population continues to increase). When genetic engineering in agriculture is compared to traditional breeding methods, biotechnology advocates feel it is an improvement on such methods because it allows for faster and more targeted changes in organisms.

Some who are critical of biotechnology take issue with such a comparison. They express their lack of comfort with a technology which enables gene transfers, for example, between animal and plant organisms, which would not be possible naturally. An accusation was made that industry is "subverting" mother nature.

The question of safety standards usually enters into any discussion of biotechnology. One of the most important considerations raised by respondents is that a good regulatory system is required to ensure that the genetically engineered products of biotechnology are safe for humans, animals and the environment. Generally, Canada's regulatory system is highly praised. Proponents of agricultural biotechnology regard this system as a rigorous one which assures that all relevant risks are properly assessed. The feeling among proponents of biotechnology appears to be that as long as products meet the safety criteria set by regulatory bodies, then these products are acceptable.

All of those interviewed want assurances that this technology is safe, that the safety and nutrition of food produced using genetic engineering is maintained and that the tests used are valid.

Those respondents with concerns about biotechnology are quick to raise questions about the adequacy of safety testing. There is a strong sentiment among those critical of genetic engineering that the potential for long term adverse effects have not been adequately evaluated. In addition there is a strong cynicism about the relationship between government organizations and industry — perceptions that these two sectors are putting economic interests ahead of public safety concerns and government is not adequately protecting public interests.

Critics also express concern that products are being designed with the knowledge that their usefulness will be short lived – a type of "planned obsolescence" – resulting in a never ending cycle of new and increasingly complex and expensive products being brought to market.

The question of "intellectual property" rights was raised. The issue appears to be that such rights will allow the technology developers to gain control of the agricultural industry, forcing farmers to increasingly become more dependent on the products (e.g., seeds) sold by these companies.

Perceptions About The General Public's Attitudes Towards Genetically Engineered Foods

Both skeptics and advocates of genetic engineering agree that awareness and knowledge about genetically engineered foods is low among the general public. Biotechnology is considered to be a difficult topic to present to a wide and varied public audience. Some feel the technology itself is too complex to be easily understood by the mass market. Since there is also a belief that consumers are not interested in the details of food production, the task of informing consumers is perceived by these respondents to be a difficult one. The public's concerns about food seem to centre around factors such as safety, nutritional composition, quality and value. How it is produced is believed to be low down on the average consumer's list of concerns.

It was pointed out, though, that the Canadian public is not a single entity, and of course levels of awareness and interest in issues pertaining to biotechnology will vary. Certainly some segments — those who suffer from food allergies or those with concerns about the ethical, religious or environmental repercussions of such technology — may be more interested in becoming better informed.

Many proponents feel that consumers' interest in the biotechnology debate has primarily to do with the question of food safety. If consumers have strong confidence in the Canadian system in place to ensure food safety, it is thought that consumers will accept the products of biotechnology.

It may be difficult to address the concerns of that part of the population who feel less trusting of the regulatory system or who are more cynical about the motives of the developers of biotechnology.

The Media and Biotechnology

Generally, the impression among both proponents and critics is that most consumers are from time to time exposed to small pieces of information on the subject of biotechnology but are not exposed to information which provides the "big picture".

The biotechnology advocates that were interviewed expressed concern about the potential for consumers to develop negative emotional responses to the concept of genetically engineered foods. They feel that mainstream media does not provide an accurate portrayal of biotechnology, tending instead to focus on "sensationalized" reports of consumer protests which suggest that the products of biotechnology are unsafe.

Meanwhile biotechnology opponents are also skeptical of mainstream media, accusing them of avoiding publishing articles on the subject of biotechnology because of the potential backlash from their biggest advertisers such as companies which are major developers of the technology (e.g., Monsanto) or users of the products (e.g., major food manufacturers).

Respondents' Perceptions About Roundup Ready Soybeans

From an agricultural perspective, RRS is seen by those interviewed as an early development in the field of biotechnology but does not demonstrate the full potential of this new science. While the product itself is not regarded as one which alone will revolutionize the agricultural industry, the success of products like RRS is thought to be critical to the long term acceptance of genetically engineered foods.

The advantage of using RRS is generally acknowledged to be an agronomic benefit, which provides economic gains to the developer of the technology, the seed companies and to the farmers. Over the longer term, some price benefit may reach others along the food production chain, such as food processors, food retailers and perhaps ultimately the consumer. As yet, an economic advantage to these groups is not a certainty.

Perceptions About Consumer Response To RRS

Given the belief among those interviewed that consumer awareness of genetically engineered foods is low, awareness of Roundup Ready Soybeans is expected to be negligible among the general population.

All of those interviewed believe that the majority of consumers are unlikely to have had much exposure to this product. The nature of the product itself does not lend itself to consumer interest. Firstly, soybeans are a not a produce item which consumers tend to buy. Soybeans primarily appear as an ingredient in some processed foods (many consumers maybe unaware of their presence in these foods). Secondly, the Roundup Ready Soybeans do not appear to offer a tangible consumer benefit such as improved nutrition, flavour or increased shelf life, which can be marketed as product attributes.

Some consumers may be aware of RRS from media reports about European protests of imports of RRS, or from information provided by magazines dealing with alternative health or organic growing.

Both advocates and critics of genetically altered foods feel that whatever information consumers are receiving about products such as RRS, it is one-sided. Neither group expresses much faith in mainstream media; however the two groups have opposing impressions of which point of view the mainstream media are promoting.

There is agreement that the public is generally not being presented with a balanced in-depth analysis of the subject. The concern is that consumers are getting conflicting points of view on the subject from different sources and are having difficulty resolving the concerns.

Product Benefits

The only difference between Roundup Ready Soybeans and non genetically engineered soybeans is the ability of the former to tolerate the herbicide Roundup. A crop of RR Soybeans can be sprayed with Roundup which is a broad spectrum herbicide. The soybeans survive, while virtually any weeds are killed off. The combination of the RRS crop and spraying with Roundup herbicide is seen to be an effective crop management tool in certain circumstances. For example a regular soybean crop planted in a field with a variety of weeds would have typically required the use of a number of different weed specific herbicides. The Roundup Ready option allows the farmer to use only one herbicide - Roundup. In this case, the farmer may not need to use this option again for a few years.

Essentially, Roundup Ready Soybeans are perceived by respondents to provide an agronomic benefit to the soybean grower since only one herbicide is required for weed control. Although the price of the genetically engineered seeds is higher than that for regular soybeans, and Monsanto is charging a "technology fee" for their use, the growers' overall production costs are believed to be lower due to savings from a reduction in total herbicide requirement.

Because RRS results in lower production costs, those interviewed who are associated with the farming community believe that RRS is needed in order for Canadian farmers to be competitive in the international marketplace. There is a perception that Canadian farmers must adopt new technologies such as the RR soybean in order to compete with others (e.g., U.S. growers) who are already using these genetically altered seeds. Ultimately the key motivation for the use of products such as RR soybean is the economic advantage it brings, implying that farmers who do not use this technology will be at a disadvantage.

From a consumer perspective, it was suggested that consumers might appreciate the environmental benefit that results from the associated reduction in herbicide use when Roundup Ready Soybeans are grown.

These soybeans seem to offer little tangible direct benefits to consumers. Consequently it is a product that food processors and food retailers will not be interested in talking to consumers about. If anything these groups may be concerned about the potential negative factors associated with RRS, such as the potential for resistance to genetically engineered foods from export customers or even adverse reactions among Canadian consumers.

Product Safety

All of the proponents of biotechnology that were interviewed feel strongly about the high quality of the Canadian system of product assessment. Their faith in this system leads this group to conclude that products such as RRS which have been approved for food and environmental safety pose negligible risk to humans, animals or the environment.

Nevertheless, it is difficult to guarantee 100% safety and while remote, even advocates would agree that some risks do exist.

The greatest concern associated with this particular application is the potential for resistance to Roundup to occur in other plants which could potentially result in Roundup resistant weeds. Virtually all of the individuals interviewed mention that this risk exists. Advocates generally feel the risk of "superweeds" developing as a result of using this particular application is minimal because soybeans are characteristically inbred and have no wild relatives. The "superweed" threat appears to be greater for other herbicide resistant crops such as canola.

Critics worry that products like RRS will lead to the creation of weeds which will tolerate the Roundup herbicide and this will ultimately lead to the development of more powerful herbicides. The implied conclusion is that applications of biotechnology such as RRS will leave farmers with increasingly difficult weed control problems and the need to rely on increasingly harmful chemicals to manage their fields.

The possibility of genetically engineered products causing an allergic reaction is mentioned. With RRS, proponents believe this is not a likely possibility because of the relatively small difference between conventional and genetically engineered soybeans. In addition the belief was expressed that scientists now have enough experience with and understanding of allergens that current testing methods will detect any possible problems.

Another possible negative effect associated with genetic engineered products is the reduction of the effectiveness of antibiotics taken at the same time as these foods are ingested. Again, because of the specific properties of the RRS application, this risk is considered by proponents to be remote. It should be noted that the issue of antibiotic resistant bacteria has received fairly broad media attention and the potential for consumer confusion about this issue exists.

The most difficult fear to address is the potential for unforeseen long term effects. Biotechnology proponents worry that this fear will be exploited by groups who oppose biotechnology as a means to generate consumer opposition to genetically engineered foods.

Critics feel that the amount of safety testing done on products like RRS is not sufficient. They have accused the government of being biased in favour of industrial interests.

There is concern that products like RRS will be grown on too large a scale, too quickly. A more sensible approach, according to some opponents, would be to grow such crops on a limited basis for a few years in order to allow time for a better assessment of the possible risks.

Economic Issues

The export of Roundup Ready Soybeans or foods processed with this soybean may be problematic in the future

The European Union has officially approved these soybeans for import.[3] However consumers and environmental groups have organized fairly well publicized protests in some European countries.[4] Even if protests do not alter the approval status of products, protesters can exert pressure on individual food processors who may opt to not buy RR Soybeans.

In fact some European food processors are asking for assurances that the soybeans they purchase are Roundup Ready-free. This will require that growers, wishing to maintain their customer base, be able to accommodate such requests. According to the Soybean Growers Marketing Board in Ontario, their system will be able to do so, provided any such request is contracted ahead of time. The feeling is that the resistance to products such as RRS will disappear over time.

Some individual member countries within the European Union may choose to establish their own laws with respect to genetically engineered foods and are considering mandatory labeling for such products.

The opinion was expressed that the resistance in Europe to genetically engineered foods is a function of countries looking for ways to create trade barriers. RRS is perceived to be a product of the U.S. and some of the resistance may be due to an anti-American sentiment.

[3]"Two New Modified Crops Hit Wall Of Controversy", The Financial Post. October 23, 1996, p.58.

[4]Schuler, Corinna, "Scientists Fear Humans Used As Guinea Pigs", The Globe And Mail. November 15, 1996 p.N5.

While such resistance may create problems for some, it may also create niche markets for farmers who are willing to grow Roundup Ready-free Soybeans. Part of the biotechnology debate concerns who is actually benefiting from the development of new products. Some critics of biotechnology are concerned that over the long term, this technology will make farmers more and more dependent on the products sold by multinational companies. The response from industry is that product development responds to customer (i.e. farmer) demands. This suggests potential for discontent among individual farmers who may resent becoming increasingly dependent on products like RRS.

Concern was voiced that the continued advancement of biotechnology may adversely affect small farm operations or organic farmers. Since those who do not embrace biotechnology for whatever reasons may find it increasingly difficult to compete, especially on price.

Information For Consumers

Proponents believe that the most important thing for consumers to understand about products of agricultural biotechnology is that once products are approved by the Canadian regulatory system, they are safe. Consumers should be informed that products which make it to the supermarket have gone through the regulatory process to ensure safety; any product not deemed to be safe will not be approved and will not appear on the grocer's shelf.

There is some disagreement among these stakeholders as to how much information consumers need or want to have. Some feel consumers should understand the food production system and have an appreciation of why products of biotechnology are being developed and what benefits they may offer.

Others believe that most consumers neither need nor want to know such details and that knowing a product is safe simply because it is available to buy in a supermarket is enough.

If genetic modification results in a nutritional change in the food or results in the added presence of an allergen, then such information should be provided to consumers.

Some suggested that the biggest hurdle to overcome is making consumers aware that there is an issue of concern. Once consumers are aware that there are some questions, most interviewed feel that many good sources of information exist, for those consumers willing to search it out.

The Labeling Debate

On the surface, labeling of products which are genetically engineered or contain genetically engineered foods might be seen as a way to allow consumers to make their own choices about these products.

Discussion of this issue reveals that it is more complicated than initially suspected.

Currently in Canada and the U.S. genetically engineered foods are not required to be identified as such. In the case of RRS, the genetic engineering did not result in any substantive difference or allergenicity and consequently no special labeling is required.

Those who oppose the mandatory labeling of genetically engineered foods voice two major concerns.

Biotech proponents claim that such labels run the risk of being misleading to consumers. There is the question of how products will be labeled in terms of wording or symbols. What will such information imply to the consumer? There is concern among those who are in favour of biotechnology that such labels may serve to alarm consumers and negatively affect the sales of genetically engineered foods.

The market failure of irradiated foods in the past is cited as an example of labeling which "misled" consumers into believing such foods were unsafe.

The opinion was put forth that food labeling should be reserved for "useful" information, such as food composition, nutritional values or presence of allergens which help consumers make healthy choices.

There is also a concern that the additional costs and logistics of labeling may be prohibitive.

Food processors would have to allow for additional information on their labels which requires redesign of existing labels or possibly the manufacture of separate brands for the same food product — one which is free of any genetically engineered ingredients and one which is not.

Labeling regulations would have to address whether, for example, even the presence of small amounts of genetically engineered ingredients requires labeling or whether foods prepared in restaurants using genetically engineered ingredients would also need to be identified.

One opponent of mandatory labeling estimated that 60% of processed food contain soybeans. If other crops like corn are considered, we eventually may end up with 99% of processed foods containing genetically engineered ingredients.

The labeling issue is a sensitive one because it raises the question of protecting consumers' right to know what they are buying and the freedom to choose whether or not to buy genetically engineered foods. From some estimations, consumers wishing to avoid genetically engineered foods — labeled or not — will have a difficult time finding alternatives.

Ultimately, the labeling issue comes down to two questions:

1. Will mandatory labeling for genetically engineered food happen in Canada?

2. How will consumers react to such labeling?

Mandatory labeling is not expected to happen in Canada - this opinion is held by both proponents and critics of biotechnology – the latter group are in favour of labeling, but believe those opposing it are too powerful. To the second question, most interviewed expect consumers to react negatively to a product labeled as genetically engineered; that is to say, consumers would avoid purchasing such products.

This expectation is the reason that biotechnology critics feel opposition to labeling is so strong.

On the other hand advocates of biotechnology feel that the labeling issue is being used as a tactic by those opposed to genetically engineered food to block consumer acceptance of such foods.

An alternative proposal to mandatory labeling is that of "negative labeling" which indicates that the food does not contain any genetically engineered ingredients. Voluntary labeling — either positive or negative is allowable by the government.

There is an international implication to the labeling issue. Some countries, potentially export markets for Canadian soybean growers or food processors, are considering implementation of mandatory labeling. If these countries do implement such legislation, a means of accommodating these markets will have to be put into place.

Who Should Be Providing Information To Consumers?

Concern was expressed that consumers should be careful about where they get information about genetically engineered products, because they risk getting unbalanced or misleading reports. One of the challenges will be to identify sources of information which would be considered as "neutral" by both critics and proponents.

The view that a number of different organizations have a role to play in providing information to consumers is fairly consistent. It is acknowledged that the different players will each be better suited to specific roles. For example the regulatory bodies such as Health Canada and Agriculture Canada may be the best source for information on the specifics of the regulatory system; however an intermediate organization might be needed to bridge communication between government and consumers. Manufacturers and retailers may be best suited to talking directly to consumers about benefits of specific products.

Virtually everyone along the food production and distribution chain is felt to have some responsibility. This includes the developers of technology, seed companies, growers, food manufacturers and food retailers.

Outside of the food chain, government, industry, consumer and environmental organizations as well as the media also have roles to play.

"Experts" to whom consumers can turn to for credible information, such as doctors, nutritionists, educators and academics are also considered important sources of information. Credibility with consumers is believed to be an important consideration.

There are mixed feelings about the credibility of government as a direct source of consumer information. Many respondents feel that government should act as a supporting body for others who are better suited to providing consumers with information. Support could take the form of coordination of activities, financial funding or provision of data to intermediates such as consumer or trade organizations which could act to interpret and disseminate information to consumers.

Credibility is an issue for industry as well. There is some concern that companies like Monsanto are not trusted by consumers to provide a balanced perspective. It was suggested that Monsanto should work through intermediate agencies which can act as more credible sources of information for consumers, which in fact the company does.

Mainstream media are also suspect as a source of balanced information for consumers. The perception exists that media reports choose to present emotional or sensationalized stories rather than science based coverage and tend to lack depth. Both advocates and skeptics of biotechnology, for different reasons, doubted that mainstream media would provide a balanced perspective on biotechnology issues.

Sources Of Product Information

It should be noted that while several organizations exist which provide information on biotechnology, many do not provide product specific information. Thus while the individuals interviewed represent organizations which have a role in providing information on biotechnology, many of these organizations do not provide information about Roundup Ready Soybeans and to do so would contradict their mandate.

The nature of the particular product in question, namely Roundup Ready Soybeans, influences who should take part in the provision of information. The parties interested in a product like RRS will be predominantly those in the farming community and perhaps, to a lesser extent, food manufacturers who will use the soybeans in their products. Retailers and consumers are unlikely to have a high level of interest in this particular application because of its perceived lack of consumer benefit. Over time, interest in RRS may increase as products containing these soybeans are available in supermarkets.

In terms of providing information on the subject of agricultural biotechnology in a more general sense, the number of parties which can play a role become more numerous than that for a single product like RRS.

From the interviews, it is apparent that a wide range of information sources on the subject of biotechnology already exist. Most of these sources provide access to information to interested parties, including individual consumers, but few appear to disseminate information on a proactive basis t .ie general public.

Virtually everyone interviewed is associated with one or more organizations which are involved, at least to some extent, in making information available to consumers. A wide range of communication formats are being used, although many of these formats are intended for audiences other than the general public.

Some of those mentioned include:

•Internet web sites

•newsletters and magazines

•workshops

•meetings and conferences

•information kits

•radio talk shows

•government decision documents

•personal responses to phone queries

The range of sources and formats makes consolidation of information into a meaningful perspective a challenge. For example even a single format such as the Internet provides more information than most individuals would ever want. The Internet is being used both to source and disseminate information by many of those interviewed. For those who have access, the Internet web sites provide information ranging from technical government documents to perspectives from environmental groups. While a wide spectrum of opinions on the pros and cons of biotechnology are available to anyone interested, it is questionable whether the average consumer wishes to invest either the time or effort to sort through the conflicting views.

Organizations like the Consumers Association of Canada and the Food Biotechnology Centre are praised for providing balanced coverage of the general issues. Many others organizations were identified as being good sources of information for consumers such as Ag-West Biotech Inc., National Institute of Nutrition and The Dietitians' Food Biotechnology Network.

Retailers are in a good position to provide information to consumers directly. Manufacturers can work with retailers to get information to the consumer at point of sale using traditional marketing vehicles, such as in-store displays or pamphlets which can be product specific. Manufacturers of name brand products could potentially use traditional advertising vehicles to promote new products which have a marketable benefit.

The "experts" that consumers turn to for reliable information such as doctors or nutritionists are and will continue to be targets of educational information provided by others such as government or industry bodies.

APPENDIX

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Information On Food Biotechnology Kit, Food Biotechnology Centre,

Consumers' Association Of Canada, Ottawa

Consumer Quarterly, Office of Consumer Affairs, Industry Canada, Volume 1

Number 3, July 1996

Respondents List

Christine Mitchler — Consumer Association of Canada

Gordon Surgeoner — Director of Plant Research, University of Guelph

Vahid Aidun — Industry Canada

Joe Cummins — Professor of Genetics (retired), University of Western Ontario

Rick Walter — Canadian Institute of Biotechnology

Susan Iler — Ontario Soybean Growers Marketing Board

Ray Mowling — Monsanto

Jeff Johnston — Past President of Canadian Organic Growers

Margaret Kenny — Canadian Food Inspection Agency (recently part of AAFC)

Discussion Guide
Roundup Ready Soybean.
Non-Monsanto Personnel

February 11, 1997

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(revised)

1. INTRODUCTION

- Reason for this call/research on behalf of Industry Canada, purpose to investigate a product called "Roundup Ready soybean"....

- Are you familiar with "Roundup Ready Soybean"? (IF NO OR INDIVIDUAL HAS VERY LIMITED KNOWLEDGE, ASK if there is someone else in the organization who could be interviewed).

x TAPE – APPROVAL TO USE

- Can you tell me a little about what your organization does? What is your role?

- What department do you work for? What is your position? What are the main activities of this department?

2. Attitudes Towards Biotechnology In General

- What do you think about biotechnology?

- Can you think of any applications of biotechnology that you are comfortable with? Are there some that make you uncomfortable?

- What about genetically engineered food — what are your feelings about this type of biotechnology?

- Would you say that you are relatively well informed?

- What do you think the public thinks about genetically engineered food?

- Do you think consumers are well informed?

3. Perception of Roundup Ready Soybean

- What do you think about Roundup Ready soybeans? Want to get some background information about RRS (what benefits, etc.)?

- What benefits does this product offer?

- Who realizes these benefits? (CLARIFY RE: MANUFACTURER/ MONSANTO, FARMERS, FOOD PROCESSORS, CONSUMERS)

- (IF NOT MENTIONED, ASK:) Do you think there are any benefits in terms of:

    - cost savings,
    - increased crop output,
    - reduced crop vulnerability,
    - reduction in chemical inputs such as herbicides or pesticides,
    - potential as an export crop for Canadian farmers.

- What are the possible risks associated with Roundup Ready soybeans? How great are these risks?

- (IF NOT MENTIONED, ASK:) Do you think there is any potential risk in terms of:

    - allergic reactions in humans,

- effectiveness of antibiotics, (taken at the same time as foods containing the soybeans)
- reduced nutritional value,
- risk of cross-breeding with weeds to create "superweeds",
- a loss in bio-diversity.

4. Safety/Testing

- Are you aware of any safety testing conducted on Roundup Ready soybeans? (PROBE RE: RESULTS)

- Do you think the tests were sufficient? (IF NO) What other tests should have been done?

- What, if anything, would convince you that these soybeans are safe to be grown and consumed?

5. Consumer Response

- How do you think consumers feel about Roundup Ready soybeans?

- What, if anything, do you think consumers should be concerned about with respect to Roundup Ready soybeans?

- What information would you like to be available to consumers about these soybeans?

- Who do you think should be providing the information? Why? (PROBE RE: CREDIBILITY)

- Do you think processed foods which contain these soybeans should be labeled to the effect that they contain genetically engineered soybeans?

- How do you think most consumers will react to such information on a food label?

- Do you think that processed foods that contain the genetically engineered soybeans will be accepted by the Canadian consumer?

6. Response From Farming Community/Food Processors

- As far as you know, how have Canadian farmers reacted to Roundup Ready soybeans?

- What concerns do farmers have?

- Do you think that Canadian farmers will benefit from being able to grow these soybeans?

- Do the soybeans represent a good crop export possibility for Canadian farmers? (IF NOT MENTIONED ASK:) Are there any barriers to exporting these to markets in Europe or Japan?

- Has there been any reaction from Canadian food processors who might use these soybeans in their products?

- What concerns do food processors have? (IF NOT MENTIONED ASK:) Are there any barriers to exporting processed foods containing the soybeans to markets in Europe or Japan?

- Does Industry Canada provide information to food processors (what, etc.)? What about food retailers?

7. Information Sources

- How did you first hear about Roundup Ready soybeans? (PROBE RE: SOURCES, FORMAT I.E. PRINT, INTERNET, OTHER.)

- What information have you obtained about this soybean? (PROBE FOR EACH SOURCE.) (ASK HOW GOOD EACH SOURCE WAS)

- (PROBE:) Where else did you get any information about it?

- Did you receive any information from Monsanto about Roundup Ready soybeans? Are you aware of any information being made available by Monsanto?

- Do you think Monsanto is doing a good job or a bad job of providing information. (PROBE RE: IS MONSANTO ADDRESSING POTENTIAL CONCERNS ABOUT THIS PRODUCT.)

- What information (is being) provided about Roundup Ready soybeans by Industry Canada?

- What information is the average consumer getting, if any, about these soybeans?

- How do you think consumers reconcile the different views they might be receiving about the soybeans?

What role, if any, does your organization have in terms of providing information about RRS to others (PROBE: TO WHO? — CONSUMERS, OTHER GROUPS). (IF NO ROLE — PROBE RE: LACK OF PERCEIVED BENEFITS)

- What role do you think you should play in the future regarding products like RRS?

8. Close

- Is there anyone else you think I should interview?

- Ask for agreement to include name in published list.

- I may need to contact you again, just to clarify one or two points. This would only take a few minutes. Would that be all right?

- Thank respondent.

x

Discussion Guide

Roundup Ready Soybean.

Monsanto Personnel

February 11, 1997

120596d(jal)

(revised)

1. INTRODUCTION

- Reason for this call/research on behalf of Industry Canada, purpose to investigate Monsanto's product "Roundup Ready soybean".

TAPE — APPROVAL TO USE.

2. Risks/Benefits of Roundup Ready Soybean

- Status of RRS in Canada — next step? (in terms of government approval – import, grow)

- What benefits does this soybean provide?

- Who realizes these benefits? (CLARIFY RE: MONSANTO, FARMERS, FOOD PROCESSORS, CONSUMERS.)

- What are the possible risks associated with it?

- How great are these risks?

- (IF NOT MENTIONED, ASK:) What is potential for risk in terms of:

    - allergic reactions in humans,

    - effectiveness of antibiotics, (taken at the same time as foods containing the soybeans),

    - reduced nutritional value,

    - risk of cross-breeding with weeds to create "superweeds",

    - a loss in bio-diversity.

3. Safety/Testing

- What safety tests were conducted on Roundup Ready soybeans? (PROBE RE: RISK ASSESSMENT, ENVIRONMENTAL IMPACT ASSESSMENT.)

- How has Monsanto communicated information about product safety?

- Have there been any safety concerns raised by media, consumer groups or farmers?

4. Consumer Response

- What information do you think the average consumer is getting about Roundup Ready soybeans? Where is consumer getting the information?

- How do you think consumers feel about Roundup Ready soybeans?

- Have the public raised any other concerns about the product?

- Do you think processed foods which contain these soybeans should be labeled to the effect that they contain genetically engineered soybeans?

- How do you think most consumers would react to such information on a food label?

5. Response from Farming Community/Food Processors

- How have Canadian farmers reacted to Roundup Ready soybeans?

- What concerns do farmers have? How has Monsanto addressed these?

- Do you think that Canadian farmers will benefit from being able to grow these soybeans?

- Do the soybeans represent a good crop export possibility for Canadian farmers?

- Will farmers face any difficulties exporting the crop? (PROBE RE: EUROPE OR JAPAN)

- Has there been any reaction from Canadian food processors who might use these soybeans in their products?

- What concerns do food processors have? How has Monsanto addressed these?

- Will food processors face any difficulties expo[illegible]ng processed foods? (PROBE RE: EUROPE OR JAPAN).

6. Communication Support for Roundup Ready Soybean

- How was the introduction of Roundup Ready Soybean into Canada supported in terms of communication? (PROBE RE: WHAT INFORMATION PROVIDED, FORMAT USED, TO WHOM).

- What information, if any, has the company provided to the media or to consumers?

- How do you think consumers feel about genetically engineered foods?

- What has the company done in terms of giving assurance about this product's safety?

- What has been the reaction to Roundup Ready soybeans from the media?

- What has been the reaction from environmental or consumer groups?

- What has been the reaction to this product from the general public?

- What has the company done to address any concerns raised by the public? What about others -- farmers, etc.?

- What happens if an interested party contacts the company for information?

- What role do you think Monsanto should play in terms of informing consumers about biotech applications such as RRS?

7. The Future

- From the Roundup Ready soybean experience, what lessons were learned about the communication efforts needed to support such a product's introduction?

- What do you think Monsanto might have done differently to alleviate concerns about Roundup Ready soybeans?

- Do you expect that processed foods containing the genetically engineered soybeans will be accepted by Canadian consumers?

- Would you say this product has been a "success" for Monsanto?

- Is there anything that might stand in the way of this product's success?

8. Close

- Is there anyone else you think I should interview?

- Permission to use respondents name in report list (ASK FOR POSITION/ TITLE).

- I may need to contact you again, just to clarify one or two points. This would only take a few minutes. Would that be all right?

- Thank respondent.