

CONSUMERS AND RETAIL FOOD EMPLOYEES' ATTITUDES, KNOWLEDGE,
AND SKILLS WITH RESPECT TO SOYFOODS

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ABSTRACT

This study sought to develop an informed understanding about consumers and retail food employees' perceived attitudes, knowledge and skills needed regarding soyfood purchase decisions. This exploratory research utilized a quantitative technique (self-administered questionnaire) and a qualitative technique (interview) to obtain data from participating grocery shoppers and retail food employees at two Saskatoon Co-op stores, in Saskatoon, Saskatchewan, Canada. Descriptive and inferential statistics, frequency distributions, t-test, and Pearson chi-square test were used to assess quantitative data. A significance level of 5% was adopted. Interviews and open-ended questions and comments from the questionnaires were categorized into major themes, coded, and synthesized into descriptive reports.

Findings of the questionnaire indicated that the demographics of the declared soy users at the sampled food stores were no different from grocery shoppers or declared soy non-users, i.e., predominantly female, Caucasian, older than 45 years old, household yearly income higher than CAD\$50,000, and possessing at least a trade, college or university certificate, or diploma. There also was no significant difference with respect to the consumption of vegetables and fruits, nuts and beans, and dairy products between declared soy users and declared soy non-users. The majority of shoppers indicated that soy is healthy. When asked about soy health benefits, most shoppers indicated that soy helped reduce the risks of heart disease; however, they were neutral with respect to the soy's ability to help reduce the risk of cancer and bone loss, to cause allergies, and to alter estrogen levels in the body. The percentage of soy users who agreed with the following statements "Soy is low in cholesterol", "Soy helps

reduce the risks of heart disease”, “Soy is healthy”, “Soy helps reduce risk of cancer”, “Soy consumption is completely safe”, and “Soy can fulfill part of my protein needs” was significantly higher when compared to soy non-users. Findings suggest that grocery shoppers at both food stores purchased soy products mainly because these foods were nutritious and good sources of protein. Any health claim usually associated to soy with respect to the prevention of chronic diseases was not indicated as a major factor that would influence the purchase of soy foods. Lack of knowledge and cooking skills were identified by most participating grocery shoppers as major barriers to consuming soy products. Price reduction and taste improvement were identified as factors that would increase consumption of soy products.

The majority of grocery shoppers and food store employees indicated interest in learning more about soy products. Learning strategies suggested by employees were training sessions, cooking classes, taste tests, and information pamphlets.

This research identified important factors contributing to soy foods consumption that can be used as a starting point to develop a specific framework in which to further examine consumer knowledge and consumption behaviours relating to other aspects of soy and other legumes.

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DEDICATION

I dedicate this thesis to my mother, Suely Saraiva Ferrari, for her encouragement throughout my life. Inspired by her strong human values, I have strived toward becoming a better being, finding the energy and commitment to achieve my inner goals.

I also dedicate this thesis to Dr. Carol J. Henry. Besides being my supervisor, Carol has become a dear friend. I have found in her an amazing human being, full of compassion, selflessness, and humanitarian values. She has taught me not only to become a better professional but also to believe in myself. I will never forget her words when I most needed: ‘- Paula, you can do it!’. It turned out she was right and here is the proof.

TABLE OF CONTENTS

PERMISSION TO USE	i
ABSTRACT	ii
ACKNOWLEDMENTS	iv
DEDICATION	vi
TABLE OF CONTENTS	vii
LIST OF TABLES	xii
LIST OF ABBREVIATIONS	xiv
1. INTRODUCTION	1
1.1 Introduction	1
1.2 Statement of the Problem	2
1.3 Purpose of the Study	2
1.4 Research Questions	2
1.5 Definition of Terms	3
1.6 Significance of the Study	4
2. LITERATURE REVIEW	6
2.1 Search Strategy	6
2.2 Introduction	7
2.3 Functional Foods: An Overview	7
2.4 The Role of Soy in Preventing and Treating Chronic Diseases	12
2.4.1 Soy Nutritional Profile	13
2.4.2 Soy Health Effects	15
2.4.2.1 Soy Isoflavones	16

2.4.2.2	Soy and Cardiovascular Disease Prevention	18
2.4.2.3	Soy and Bone Health	20
2.4.2.4	Soy and Cancer Prevention	23
2.4.2.5	Soy and Menopausal Symptoms	25
2.4.3	Soy Isoflavones Safety	27
2.4.4	Soy Protein Allergy	28
2.5	Consumers' Perceptions about Soy Products	29
2.6	Socio-demographic Factors and Dietary Behaviours	33
2.7	Essential Skills	34
2.8	Retail Food Store Staff Education and Training	40
2.9	Consumers' Nutrition Education	45
2.10	Conceptual Framework	48
3.	RESEARCH PROCEDURES	51
3.1	Research Design	51
3.2	Setting of the Study	51
3.3	Study Population	52
3.3.1	Shoppers of Saskatoon Co-op Supermarkets	52
3.3.2	Employees of Saskatoon Co-op Supermarkets	52
3.4	Sample Size	53
3.4.1	Shoppers of Saskatoon Co-op Supermarkets	53
3.4.2	Employees of Saskatoon Co-op Supermarkets	53
3.5	Data Collection	53
3.5.1	Self-Administered Questionnaire	54

3.5.1.1	Development and Pre-testing of Questionnaire	54
3.5.1.2	Training of Research Assistants	56
3.5.1.3	The Self-administered Survey Questionnaire	57
3.5.2	Interview Guide	58
3.5.2.1	Selection and Recruitment of Participants	59
3.5.2.2	Conducting the Interviews	59
3.5.2.3	Recording Procedures	60
3.6	Data Analysis	60
3.6.1	Quantitative Analysis of the Self-administered Survey Questionnaire	60
3.6.2	Qualitative Analysis of the Interviews and Questionnaire Comments	61
3.7	Data Reporting Procedures	61
3.8	Confidentiality and Ethical Approval	62
3.9	Triangulation	62
4.	RESULTS	64
4.1	Quantitative Results of the Survey Analysis	64
4.1.1	Response Rate	64
4.1.1.1	Response Rates for the Survey Questionnaire	64
4.1.1.2	Response Rates for the Interview Survey	66
4.1.2	Demographic Description and Characteristics of Respondents	66
4.1.2.1	Supermarket Shoppers	66
4.1.2.2	Employees	75

4.1.3	Soy Consumption of Supermarket Shoppers	75
4.1.4	Perceived Barriers to Soy Consumption by Shoppers	77
4.1.5	Factors that Would Increase Soy Consumption by Shopper	79
4.1.6	Perceived Benefits of Soy Consumption by Shoppers	80
4.1.7	Knowledge on Soy-related Issues	82
4.2	Results of the Qualitative Survey	84
4.2.1	Themes and Sub-themes	84
5.	DISCUSSION	103
5.2.1	Research Question One: What are the perceptions of consumers and retail food store employees with respect to soy products?	103
5.2.2	Research Question Two: Why do consumers purchase soy products and what factors influence their purchase decisions?	105
5.2.3	Research Question Three: What are the characteristics (demographics, dietary intake, and health status) of consumers who purchase soy products?	107
5.2.4	Research Question Four: What specific knowledge and skills are needed by consumers to make informed purchase decisions regarding soy products?	109
5.2.5	Research Question Five: What specific knowledge and skills are perceived as necessary by retail food store employees to assist consumers in making informed purchase decisions about soy products?	111
6.	CONCLUSION	115

6.1 Conclusion	115
6.2 Limitations of the Study	116
6.3 Recommendations for Further Research	118
6.4 Implications of Findings for Professionals	119
REFERENCES	120
APPENDICES	133
Appendix 1 Ethical Approval	134
Appendix 2 Information Letter: Consumer	135
Appendix 3 Survey Questionnaire	136
Appendix 4 Information Letter: Employee	142
Appendix 5 Interview Consent Form: Employee	143
Appendix 6 Interview Guide	146
Appendix 7 Transcript Release Forms	153

LIST OF TABLES

Table 2.1	The nine Essential Skills according to Human Resources and Skills Development Canada
Table 4.1	Response rates for shoppers
Table 4.2	Response rates for female and male shoppers
Table 4.3	Demographics and subjective health of shoppers
Table 4.4	Daily intake of selected foods by shoppers
Table 4.5	The demographics and subjective health of all shoppers and those who were declared soy users and soy non-users
Table 4.6	Daily intake of selected foods by all shoppers and those who were declared soy users and soy non-users
Table 4.7	Daily intake of selected foods by female and male declared soy users
Table 4.8	Subjective health of female and male declared soy users
Table 4.9	Age groups of female and male declared soy users
Table 4.10	Level of education of female and male declared soy users
Table 4.11	Household yearly income of female and male declared soy users
Table 4.12	Shoppers' consumption of soy products
Table 4.13	Perceived barriers to soy consumption by shoppers
Table 4.14	Perceived barriers to soy consumption by shoppers who were declared soy users and soy non-users
Table 4.15	Factors that would increase soy consumption by shoppers
Table 4.16	Factors that would increase soy consumption by shoppers who were declared soy users and soy non-users

Table 4.17	Perceived benefits of soy consumption by shoppers
Table 4.18	Perceived benefits of soy consumption by shoppers who were declared soy users and soy non-users
Table 4.19	Sources of information most cited that would positively influence soy knowledge of shoppers
Table 4.20	Themes and Sub-themes

LIST OF ABBREVIATIONS

ES =	Essential Skills
GM =	Genetically-modified
HRSDC =	Human Resources and Skills Development Canada
IFs =	Isoflavones
LDL =	low-density lipoprotein
HRT =	hormone replacement therapy
TRA =	Theory of Reasoned Action

CHAPTER 1 – INTRODUCTION

This chapter provides an introduction to the study, identifying the research problem, purpose of the study, research questions, and the significance of this study. In addition, some significant terms are defined.

1.1. Introduction

Today's health systems are facing a shift from paternalistic to partnership models, where individuals are becoming more responsible for managing their own health. Consumers, as actors within this paradigm shift, have begun to view their diets from radically different vantage points. Food is no longer viewed as merely a means to satisfy hunger, as providing the essential building blocks of nutrition (e.g. water, protein, carbohydrate, fat, vitamins, minerals), or for repairing body tissue, but has become the primary vehicle for delivering optimal health and wellness (Hasler, 2000). Consumers are beginning to view food as the first line of defense in the prevention of various chronic conditions of aging, including cancer, cardiovascular diseases and osteoporosis (Hasler, 2000). This self-care phenomenon has become a primary motivating factor for food purchasing decisions among consumers (Sloan, 1999). Increased health care costs and recent legislation (Erdman, 2000; Department of Health and Human Services & Food and Drug Administration, 1999) have also contributed to the growing use of food as a vehicle for health and wellness. In 2002, health care cost accounted for 9.2% of GNP in Canada and 14% of GNP in the U.S. (New Brunswick Advisory Council on the Status of Women, 2002).

The intricacies of the marketplace and the rapid pace at which society is evolving make the consumer's role in selecting food for health and nutritional well-being more challenging than ever before. Improving consumer competency will require

awareness and commitment by researchers, educators, retail food workers, and managers. The educational background of retail sales workers and managers varies widely. Before effective educational efforts can be attempted, educators should understand how consumers make decisions about food choices and the role played by consumer attitudes, knowledge, and skills in influencing those choices.

1.2. Statement of the Problem

Although soyfoods are becoming increasingly popular, little is known about consumers' rationale for their purchases, knowledge about products purchased, or the skills needed to make soyfood purchase decisions. Very little is also known about the skills needed by retail food workers who may be called upon consumers about healthy food purchase decisions.

1.3. Purpose of the Study

The purpose of this study was to develop an informed understanding of consumers and retail food employees' attitudes, knowledge, and relevant skills with respect to soyfood use. Specifically, the study sought to understand how purchase decisions are made and what skills are needed by consumers and retail food employees in making and supporting soyfood purchase decisions. The study also sought to identify the relationship between socio-demographic characteristics and soyfood purchase decisions.

1.4. Research Questions

1. What are the perceptions of consumers and retail food store employees with respect to soy products?
2. Why do consumers purchase soy products and what factors influence their purchase decisions?

3. What are the characteristics (demographics, dietary intake, and health status) of consumers who purchase soy products?
4. What specific knowledge and skills are needed by consumers to make informed purchase decisions regarding soy products?
5. What specific knowledge and skills are perceived as necessary by retail food store employees to assist consumers in making informed purchase decisions about soy products?

1.5. Definition of Terms

Consumer Attitude	A person's enduring favourable or unfavourable evaluations of some object or idea. Attitudes are formed over a period of time through individual experiences and groups contacts, and are highly resistant to change (Beckman & Rigby, 2001).
Consumer Behaviour	Consists of the activities of individuals in obtaining, using, and disposing of goods and services, including the decision processes that precede and follow these actions (Beckman & Rigby, 2001).
Consumer Perception	The process by which an individual selects, organizes, and interprets stimuli (any unit of input to any of the senses) into a meaningful and coherent picture of the world (Schiffman & Kanuk, 1994), and/r the conscious and unconscious effects of sensory stimulation on behaviour (Norman, 2002).

Decision-making A systematic process of coping with matters of concern to consumers and can be divided into the following steps: problem recognition, information search, alternative evaluation, purchase decision, and postpurchase evaluation (Beckman & Rigby, 2001).

1.6. Significance of the Study

Changes in society, new technologies, and the rapid growth of more ready-to-eat meals have resulted in a loss of skills and knowledge about food purchasing and preparation by individuals, and families (Jaffe & Gertler, 2006; Cooper, 2000; Heffernan, 2000). Social trends suggest a move from cooking in the home with basic ingredients to greater reliance on the labour of others with ready-prepared foods (Ritzer, 2000; Lupton, 1996). This loss of skills may limit individuals and families from using the most nutritious and affordable foods available. Therefore, nutrition education about food purchasing and preparation skills is becoming increasingly important for both food sector workers and consumers.

Health concerns and increased health care costs have fuelled consumer interest in self-help measures including the use of selected food products to address various health concerns. The food industry has targeted this ever-growing consumer market segment with an array of functional food products (Sheehy & Morrissey, 1998). Hilliam (1996) contends that the successful sale of these functional foods relies on factors such as the level of concern for general health, a belief that it is possible to influence one's health, and the knowledge of the foods and ingredients that are claimed to be beneficial. Consequently, it is important to establish reliable mechanisms for obtaining and communicating information needed by consumers to help them make

informed food purchase decisions. Hilliam (1996) argues that the task of educating consumers is very important if functional foods are to realize not only their potential, but their nutritional importance in meeting consumers' dietary needs (Kantor, Variyam, Allshouse, Putman, & Lin, 2001).

From a product development and marketing perspective, it is fundamental to understand how consumers explain their interest about certain foods, how that interest is linked with their values, and what are the broader life values that underline their interest (Urala & Lähteenmäki, 2003). There is a need to understand consumers' attitudes and purchase decisions relating to soy product choices, including what drives consumers to choose or not choose these products (Urala & Lähteenmäki, 2004). In the food system, nutrition education programs can be developed to combat the erosion of food skills by identifying those required by food store employees who advise consumers about food purchasing, preparation, and safety decisions, as well as the ones required by consumers to choose and prepare foods.

The major contribution of this study is related to insights into the attitudes, knowledge, and skills of consumers and retail food staff with respect to soyfoods, and their potential health and nutritional benefits. Findings may provide opportunities for health professionals, health associations, government agencies, and the food industry to bridge this knowledge gap and contribute to the appropriate positioning of soyfoods in the context of the total diet.

CHAPTER 2 – LITERATURE REVIEW

This chapter describes the results of a literature review on (a) functional food, (b) the role of soy in treating and preventing nutrition related chronic diseases, (c) consumer attitudes, knowledge, and skill needs with respect to soy products, (d) Essential Skills, (e) socio-demographic factors and dietary behaviours impacting soy purchase decisions, (f) knowledge and skill needs and retail food store staff's nutrition education, (g) knowledge and skill needs and consumers' nutrition education, and (h) the conceptual framework that guided the part of this study related to consumers' attitudes towards soy products. The first section discusses the literature search strategy.

2.1. Search Strategy

A broad search of the literature was carried out in an attempt to identify existing relevant research relating to soyfoods, soy health benefits, consumer attitude, knowledge and behaviour related to soyfood consumption, consumer training, consumer nutrition education, retail food employees training, and skill needs. The inquiry focused on materials published from 1995-2005, a period of significant growth of the functional food industry and also of rapid growth in consumer health awareness related to the use of soy products. The inquiry was restricted to materials published in the English language.

Citations were drawn from a search of the following databases: ABI/INFORM Global, CAB Abstracts, CBCA Business, Emerald, Google™ Scholar, Ingenta, Journals@Ovid Full Text, ProQuest Dissertations and Thesis, PubMed, and ScienceDirect®.

A “snowball” technique was used for following up references cited in retrieved reports to locate additional pertinent sources. Efforts were also made to

retrieve unpublished reports, theses, and dissertations. The search terms included combinations of the following: functional food, soy, consumers, nutrition education, essential skills, consumer attitudes, consumer behaviour, supermarkets, grocery, training, and employees.

2.2. Introduction

As indicated in chapter one (Introduction), over the past decade consumers have begun to view their diets as a primary vehicle to deliver optimal health and wellness (Hasler, 2000). This phenomenon has helped fuel the popularity of food products such as soy. Bogue and Sorenson (2001) observe that consumer concerns have switched from fears of food insecurity to those related to the choice of foods consumed and their influence on human health.

2.3. Functional Foods: An Overview

As indicated previously, the genesis of functional food has occurred for a variety of reasons. Key factors that appear to be driving consumer interests include, the growing self-care movement, changes in food regulations, and growing scientific evidence highlighting the critical link between diet and health (Hasler, 2000).

Consumers have become increasingly aware of the possible role that diet can play in disease risk management. In the past, foods were primarily recognized for their contribution of essential nutrients (protein, fat, carbohydrate, minerals, and vitamins) for normal metabolic activity and bodily function. Roberfroid (1999) writes that concepts in nutrition are changing from an emphasis on satisfying hunger and absence of adverse effects to an emphasis on the promising uses of functional foods to promote a state of well-being and health and to help reduce risks of disease. Advances in bioscience provide more and more support to the hypothesis that there is a strong

relationship between food, health, and chronic diseases such as cardiovascular disease, diabetes, cancer, and osteoporosis (Roberfroid, 1999; Health Canada, 1997). Although there are still many who know little about nutrition itself, consumer awareness of the importance of diet and its relationship to health is growing appreciably (Roberfroid, 1999).

A report released by the U.S. Institute of Food Technologists reports that customer expectations and the use of food and food-ingredients in self-medication and disease prevention will be the most significant influence on the food industry in the future (Bhaskaran & Hardley, 2002). The American Dietetic Association (2004) agrees, noting that the development of functional food products will continue to grow throughout the 21st century as consumer demand for healthful products grows. The American Dietetic Association (2004) identified several factors as key to reshaping food supply trends. These include an aging population, increased health care costs, consumers' desire to enhance personal health, changes in consumer awareness and expectations, advancing scientific evidence that diet can alter disease prevalence and progression, advances in food science and technology, and changes in the food regulatory environment.

Regulatory bodies are becoming increasingly cognizant and supportive of the public benefits of functional foods. In countries such as Japan, the legislative framework is well developed. Japan has been credited for launching the first functional food product in 1991 within the food category called FOSHU (Food for Specific Health Use) amid growing health care costs. Now, more than 200 functional foods have been identified under existing FOSHU regulations (Jones, 2002). To receive FOSHU status, scientifically proven evidence of the health or physiological effect of a product had to

have been demonstrated. As well, a FOSHU product had to be in the form of an ordinary food and not a supplement. To date, Japan is the only country with specific legislation governing functional foods (Urala & Lhteemki, 2005). In the U.S., functional foods are not a legally recognized food category; however, three major legislative changes during the 1990s have dramatically increased the amount of information disseminated to consumers via product labels. These changes are: (1) the Nutrition Labeling and Education Act of 1990 (NLEA), (2) the Dietary Supplement health and Education Act of 1994 (DSHEA) and (3) the FDA Modernization Act of 1997 (FDAMA). As a result of these changes, the line between foods, drugs, and dietary supplements has become blurred (Hasler, 2000). The Food and Drug Administration (FDA), which is the U.S. agency responsible for food and drug regulations, permits health claims to be made for about 15 food categories (Department of Health and Human Services, Food and Drug Administration, 2005). Like the U.S., functional foods are not a legally recognized food category in Canada (Health Canada, 2001b). However, there are five allowable generic diet based claims that can be made linking a food/nutrient to a reduction in the risk of disease development. These are: sodium and hypertension, calcium and osteoporosis, saturated/trans fats and coronary heart disease, fruits/vegetables and cancer, and sugar/alcohol and tooth decay (Newton, 2005). In addition, five other links between food/nutrients and reduction in the risk of developing a disease are being considered by Canadian authorities. These are: folate and neural tube defects; fibre-containing grain products, fruits, vegetables and cancers; fruits, vegetables, and grain products that contain fibre, particularly soluble fibre, and the risk of coronary heart disease; and soluble fibre and the risk of coronary heart disease (Newton, 2005).

The soy-food industry in North America is well-recognized. Food products featuring soy have doubled in recent years (Neff, 2000). Since 1995, the sales of soy-based products in the U.S. has grown about 20% per year, with the market for soy-based alternatives growing more than 45% annually since 1997 (Ohr, 2000). Based on this trend, it is possible that similar growth has continued since 2000.

The use of food for medicinal or other health purposes is not new. Wartime experiences of deprivation and food rationing emphasized the importance of population-based strategies to prevent nutritional deficiency disorders.

Since the 1990s, however, the focus has shifted from concerns about dietary deficiencies to promoting health and nutritional well-being. The knowledge explosion about the physiological functions and health benefits of certain nutrients has also helped fuel the growing functional food market.

There are many possible definitions for the term functional food and there is no global consensus on its meaning (Health Canada, 2005; American Dietetic Association, 2004; Bech-Larsen & Grunert, 2003; Urala, Arvola, & Lähteenmäki, 2003; Coletta, 1999). This is due in part to the difficulties in defining the term *functional foods* given the variety of health benefits that are perceived to be provided by many conventional foods. For example, while antioxidants occur naturally in foods such as blueberries, they do provide health benefits without additional processing or modification. Therefore, one might even argue that every food is functional; nonetheless, such reasoning renders the term meaningless (Pariza, 1999). The driving force behind the functional food concept is to market products that impart desired physiologic effects beyond those ordinarily associated with typical nutrients (Pariza, 1999). As a general definition, a food can be said to be functional if it contains a food component that

affects one or a limited number of function(s) in the body in a targeted way so that it has positive effects. The effect to which this refers should be relevant to well-being and health or reduction of disease risk (Roberfroid, 1999).

According to Health Canada (2005), a functional food is “similar in appearance to, or may be, a conventional food, is consumed as part of a usual diet, and is demonstrated to have physiological benefits and/or reduce the risk of chronic disease beyond basic nutritional functions”. Functional foods have also been defined as products that have been modified or enriched with naturally occurring substances with specific physiological preventative and/or health-enhancing effects (Poulsen, 1999). As well, the product must also be part of normal daily consumption of food and beverages. Similarly, Goldberg (1994) defined functional foods as “any food that has a positive impact on an individual’s health or performance, along with nutritive value”.

The scientific classification and categorization of foods and food components is much older than the science of nutrition. With the advent of the food and nutritional sciences, scientists increasingly focused on the essential nutrients as the major constituents of health significance (Dwyer & Peterson, 2000). Today, however, there are hundreds of other food components that are known to have beneficial biologic effects. Foods recognized to provide protection against chronic diseases and promote general health are being called functional foods (McConnon, Cade, & Pearman, 2001).

Some examples of functional foods include fortified margarines with plant sterols, whole oat products, soy protein, fish oil fatty acids, probiotics and prebiotics, processed tomato products, grape juice and eggs with fatty acids (American Dietetic Association, 2004; Jones, 2002). According to Roberfroid (1999), components that make food “functional” could be essential macronutrients, including those with specific

physiologic effects (such as resistant starch or omega-3 fatty acids), or essential micronutrients, when present in a single food at amounts over and above the daily recommendations. In addition, food components that are not classified as essential may also be classified as functional (such as some of the oligosaccharides). Others with no known nutritive value (such as live organisms or phytochemicals) may also be classified as functional (Roberfroid, 1999).

From the consumer's point of view, the establishment of the functional food industry is dependent upon a number of interrelated factors, including concern about general health (McConnon et al., 2001). This new trend in functional foods opens up profitable opportunities but also poses many challenges for the food industry. These include appropriate definition for functional foods, investigation of active substances, safety issues, and development of new technologies for the production of foods generally referred to "functional foods".

2.4. The Role of Soy in Preventing and Treating Chronic Diseases

Today, consumers are able to choose from a wide range of functional foods from vegetables and fruits to processed legumes and seed products. Among these foods, consumption of products derived from soybeans is becoming a significant trend in the food market.

Soybean (*Glycine max* Merr.) is a legume that has played an important role in the traditional diets of many regions throughout the world and especially in Asia, India, and South America (Messina, 1999). In East Asia, soyfoods have always been consumed as part of a grain-based diet (Shurtleff & Aoyagi, 2004). In Japan, soybeans are consumed in various forms, including dried or green soybeans, tofu (soybean curd), natto (fermented soybeans), miso (fermented soybean paste), okara (tofu lees), soybean

sprouts, soy beverage, yuba (soy milk skin), kinako (soy flour), and soy sauce (Yamamoto, Sobue, Kobayashi, Sasaki, & Tsugane, 2003).

Although soybean is a good source of many nutrients, Messina (1999) writes that soybeans tend to have a poor image and have been generally called the “poor man’s meat”, a metaphor which is consistent with the inverse relation between bean intake and income in developing countries. Nevertheless, the consumption of soyfoods has become increasingly popular among different cultures due to claims about the diverse health benefits associated with their consumption (Kok, Kreijkamp-Kaspers, Grobbee, & Schouw, 2004; Messina & Hughes, 2003; Nagata, Shimizu, Takami, Hayashi, Takeda, & Yasuda, 2003; Watanabe, Uesugi, & Kikuchi, 2002; Edens, 1999; Messina, 1999; Pszczola, 1998; Head, Record, & King, 1996).

2.4.1. Soy Nutritional Profile

From a nutritional perspective, soy products provide higher protein content (14.3%) content than other legumes such as pinto bean (7.0%), chickpea (7.3%), black bean (7.6%), kidney bean (7.7%), and lentil (9.0%) (Messina, 1999). As well, soy has methionine-rich protein, which makes it an important diet component for people who depend exclusively on protein from plant sources (Anderson, Smith, & Washnock, 1999). Currently, soy protein is recognized as a complete protein, with a protein digestibility-corrected amino acid score of 1, equivalent to egg albumin (Anderson et al., 1999). It is also promoted as an inexpensive source of plant protein with the potential for worldwide use as substitute for animal-protein (Anderson et al., 1999). In studies with children in the critical growth period of two to four years, commercial soy protein isolates were shown to contain 80% to 100% of the protein nutritional value of milk protein (Endres, 2001). In 2000 the U.S. Department of Agriculture issued a

regulation allowing soy protein (and other high-quality proteins) to completely replace animal protein in the National School Lunch Program (Messina, Gardner, & Barnes, 2002). As a rich source of protein, soy is used as a substitute for meat, dairy, and eggs, not only in the diet of consumers with dietary restrictions (vegetarians, the lactose intolerant, and those with allergies to dairy) but also in the diets of consumers who are interested in lowering their intakes of animal products for diverse health and ethical concerns.

Soybeans are quite high in fat content (approximately 47%) and the consumption of full-fat soyfoods contributes significantly to linoleic acid and alpha-linolenic acid intakes (Anderson et al., 1999; Messina, 1999). When ingested, alpha-linolenic acid is converted into n-3 polyunsaturated fatty acids, especially eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA), which possess many health benefits (Messina, 1999).

Soybeans are low in sodium but are a good source of calcium, copper, iron, magnesium, phosphorus, potassium, and zinc (Anderson et al., 1999). The bioavailability of minerals in soybeans varies according to the processing methods (Anderson et al., 1999).

Soybeans are also an excellent source of dietary fibre and have a very low glycemic index when compared to other beans. This makes them particularly important in the diet of individuals with diabetes and those with an elevated risk of developing diabetes (Anderson et al., 1999; Messina, 1999). According to Anderson et al. (1999), up to 30% of the fibre in soybeans is soluble; soyfoods rich in fibre include soy nuts, green soybeans, soy flour, textured soy protein, and tempeh.

One major concern about the consumption of legumes such as dry beans is the flatulence effect. Oligosaccharides, such as raffinose, stachyose, and verbascose found in dry beans, have been reported to be responsible for gas production (carbon dioxide, hydrogen, and sometimes methane) when metabolized by bacteria in the large intestine. Most consumers tend to avoid beans in the diet. Compared to other beans, soybeans have reduced amounts of raffinose or stachyose, which helps them to become a more acceptable product in the diet of people concerned with flatulence (Messina, 1999). Although oligosaccharides have the negative reputation of gas-producers, research is showing that they actually stimulate the growth of bifidobacteria, which are organisms with health-promoting activity in the colon area (Anderson et al., 1999). In fact, Japanese researchers have suggested that soybean oligosaccharides be used as substitute for common table sugar (Messina, 1999).

2.4.2. Soy Health Effects

Besides their nutritional composition, soybeans contain several components that traditionally have been considered to be non-nutrients such as phytates, trypsin inhibitors, oligosaccharides, and isoflavones. Phytates are the storage form of phosphorus bound to inositol in the fiber of raw whole grains, legumes, seeds, and nuts. Phytates, which are abundant in soybeans, are thought to contribute to poor mineral bioavailability of soybeans because they bind with minerals, especially iron and zinc, and interfere with their absorption in the body (Messina, 1999). However, the marked negative effect of phytates on iron and zinc absorptions can be counteracted by a dephytinization process (Jovaní, Barberá, & Farré, 2001). With regards to the other non-nutrients found in soy, research today shows that these components may have health-promoting effects (Kok et al., 2003; Nagata et al., 2003; Watanabe et al., 2002)

by helping lower cholesterol levels, reducing bone loss, preventing cancer, and relieving menopausal symptoms (Messina, Ho, & Alekel, 2004; Arliss, & Biermann, 2002; Messina & Loprinzi, 2001; Edens, 1999; Pszczola, 1998; Head et al., 1996).

2.4.2.1. Soy Isoflavones

Isoflavones (IFs), of which there are nearly 230 individual types (Munro, Harwood, Hlywka, Stephen, Doull, Flamm, & Adlercreutz, 2003), belong to a group of non-nutrients called flavonoids (Messina et al., 2004). They are extensively investigated and as Messina et al. (2004) noted, there are nearly 600 scientific papers published each year about this topic. Isoflavones are found in the plant kingdom but have a very limited distribution; in fact, soybean is the only commonly consumed food to contain nutritionally relevant amounts of these compounds (Messina et al., 2004).

There are 12 isoflavone chemical entities that can be present in soyfoods, three aglycones, and nine glucosides (Gilani & Anderson, 2002). The primary aglycones are genistein, daidzein, and glycitein (Messina et al., 2004; Munro, 2002; Edens, 1999).

Isoflavones are also known as phytoestrogens (plant estrogens) because they are plant-compounds which appear to have estrogen-like activity (Umphress, Murphy, Franke, Custer, & Biltz, 2005). Their chemical structure is similar to 17 β -estradiol, the most potent naturally occurring estrogen, and they are capable of binding to estrogen receptors (Umphress et al., 2005; Brynin, 2002). Although structurally similar to 17 β -estradiol, IFs bind estrogen receptors with 100 to 1,000 times less affinity (Yeung & Yu, 2003). According to Brynin (2002), the binding of a phytoestrogen to the receptor may result in either partial activation of the receptor (agonistic effect) or the displacement of an estrogen molecule, thus reducing receptor activation (antagonistic effect). Research suggests that IFs may act similarly to tamoxifen, which is similar in

structure to isoflavones and has anti-estrogenic effects on breast tissue and pro-estrogenic effects on bone health (Arjmandi, Birnbaum, Goyal, Getlinger, Juma, Alekel, Hasler, Drum, & Kukreja, 1998).

The biochemical pathway of IFs and biologic activity differ depending on their chemical form (Munro et al., 2002). The chemical form of the IFs influences the extent of absorption, with aglycones more rapidly absorbed and more bioavailable than highly polar conjugated species (Gilani & Anderson, 2002; Munro et al., 2002). In addition, the availability of isoflavones in soyfoods varies considerably depending on the physical form and consistency of the food (Gilani & Anderson, 2002). Once ingested, IFs from non-fermented soyfoods are released from the food matrix by various secretions and by the action of bacteria present throughout the gastrointestinal tract. Isoflavones enter the small intestine as glucosides from the stomach. Part of these isoflavone glucosides may be glucuronidated, entering the portal circulation. Two processes may happen to the remaining glucosides: (1) they can be hydrolyzed to aglycones by bacteria in the distal small intestine, resulting in the removal of the sugar moiety to produce their respective aglycones, daidzein and genistein or (2) they can pass directly into the large intestine, without being hydrolyzed (Gilani & Anderson, 2002; Munro et al., 2002). Absorbed IFs that are not glucuronidated or sulfated in the intestine wall pass to the liver via the portal vein. The majority are conjugated and excreted by urine and bile. The portion excreted by bile is deconjugated by fecal bacteria to release the aglycones, which may again be either metabolized or absorbed (Gilani & Anderson, 2002).

Generally speaking, one serving of soyfoods provides about 25 mg to 40 mg of isoflavones (Arliss & Biermann, 2002). According to Anderson et al. (1999), mature

soybeans, roasted soybeans, soy flour, and textured soy protein are excellent sources of IFs (5.1 – 5.5 mg total IFs/g soy protein). Green soybeans (3.3. mg/g) and tempeh (3.1 mg/g) are intermediate sources of IFs. Tofu, isolated soy protein, and some types of soy beverage provide nearly 2 mg IFs/g soy protein. The amount of IFs in soybeans varies considerably depending on the variety of the crop, geographic location, soil type, and environmental conditions of growth (Munro et al., 2002). Usually, the processing of soybeans for the preparation of soy products increases the concentrations of aglycones (Munro et al., 2002). Nevertheless, during processing of a few soy products such as oil and sauce, the majority of isoflavones are removed (Arliss & Biermann, 2002).

2.4.2.2. Soy and Cardiovascular Disease Prevention

Cardiovascular/Heart disease continues to be the leading cause of death in the Canadian population, with 121.7 deaths per 100,000 Canadians in 1999 (Health Canada, 2002). According to the Heart and Stroke Foundation of Canada (2003), cardiovascular diseases are defined as “all diseases of the circulatory system including acute myocardial infarction, ischemic heart disease, valvular heart disease, peripheral vascular disease, arrhythmias, high blood pressure and stroke”. Health Canada (2002) states that heart disease is the most costly disease in Canada, placing the greatest financial burden on the nation’s health care system. In 1998, \$18 billion dollars were spent to treat Canadians affected by this illness (Heart & Stroke Foundation of Canada, 2003). There are a number of risk factors for heart disease including diets rich in saturated fats, physical inactivity, smoking, being overweight, stress, and a family history of heart disease. From a nutritional perspective, high daily intake of natural vitamins, antioxidants, and fibre has been associated with a reduced risk of

cardiovascular diseases (Heart & Stroke Foundation of Canada, 2003). Soybeans and soyfoods are good sources of antioxidants, fibre, and isoflavones. Indeed, in 1999 the Food and Drug Administration approved health claims for the cholesterol-lowering properties of soy protein; a year later, the American Heart Association recommended that patients with elevated cholesterol include soy protein products in their diets (Messina et al., 2002). Today, soyfood labels in the U.S. may state that: "Diets low in saturated fat and cholesterol that include 25 grams of soy protein a day may reduce the risk of heart disease" (Arliss & Biermann, 2002).

Glore, Treeck, Knehaus, and Guild's (1994) review of clinical studies in humans found that soluble fibre from dry beans significantly reduced total serum cholesterol in 88% and LDL-cholesterol concentrations in 84%. Although the hypocholesterolemic effects of dry beans have been attributed to their soluble fibre content, researchers such as Yeung and Yu (2003), and Anderson et al. (1999) have found that the lipid lowering effects of soybeans are due not only to the presence of fibre.

Isoflavones and protein content seem to play an important role in decreasing cholesterol level as well (Anderson et al., 1999). However, the mechanism through which this occurs remains unclear. For example, after conducting a meta-analysis of 29 studies on soy proteins, Anderson et al. (1995) reported that the consumption of soy protein rather than animal protein significantly decreased serum concentrations of total cholesterol, LDL-cholesterol, and triacylglycerols. Studies included in the meta-analysis were those that (a) employed isolated soy protein or textured soy protein, (b) were controlled, (c) had either a crossover or a parallel design, and (d) provided initial (base line) values so that changes for each study group could be calculated (Anderson et

al., 1995). Nonetheless, the meta-analysis was criticized for the fact that trials involved largely isoflavone-free soy protein products.

Several researchers (Yeung & Yu, 2003; Watanabe et al., 2002; Anderson, Johnstone, & Cook-Newell, 1995) have proposed the hypothesis that the hypocholesterolemic effect of soy protein may be due to the isoflavone contents in soybeans. In a review developed by Raines and Ross (1995), it was suggested that isoflavones may have potent antioxidant effects on blood vessels, protecting against atherogenesis in humans. In another study, a meta-analysis, 17 randomized controlled trials using isoflavone interventions in the forms of tablets, isolated soy protein, or soy diets were conducted (Yeung & Yu, 2003). The authors hypothesized that isoflavones may be able to readily bind estrogen receptors-beta (ER-beta), which are important receptors in both central nervous and cardiovascular systems. However, these relationships remain unclear.

Anthony (2002) contends that although the mechanisms of action of soy on cardiovascular health have not been clearly defined, it seems reasonable to recommend including soy in the “heart healthy” diet for cardiovascular disease prevention.

2.4.2.3. Soy and Bone Health

Osteoporosis affects about 1.4 million of Canadians and represents an enormous reduction in quality of life for those affected by this disease. According to the Osteoporosis Society of Canada (2005), osteoporosis is defined as “a disease characterized by low bone mass and deterioration of bone tissue, leading to increased bone fragility and risk of fracture, particularly of the hip, spine, and wrist”.

Osteoporosis is often known as “the silent thief” because bone loss occurs without any particular symptom. Osteoporosis can result in disfigurement, lowered self-esteem,

reduction or loss of mobility, and decreased independence (Osteoporosis Society of Canada, 2005). Health Canada (2001a) states that one out of four Canadian women and one out of eight Canadian men over 50 years of age is likely to have osteoporosis. According to the Osteoporosis Society of Canada (2005), each year osteoporosis represents a CAD\$1.3 billion financial burden on the Canadian health care system. Risk factors for developing osteoporosis include the following: slender and small bones; low physical activity; post menopause; cigarette smoking; family history of osteoporosis; previous fracture; low calcium diet; ovaries removed, or menopause before age 45; vitamin D deficiency; too much caffeine or alcohol intake; and excessive use of some medications (e.g. cortisone, prednisone, and anticonvulsants) (Health Canada, 2001a).

Bone loss occurs most rapidly during the years immediately prior to and after menopause due to changes in estrogen concentration. Estrogen plays an important role in the protection of bone structure through the synthesis of $1,25(\text{OH})_2$ vitamin D, control of bone-resorbing cytokine production, and decrease of bone sensitivity to parathyroid hormone (Riggs, Khosla, & Melton, 1999). Arjmandi and Smith (2002) noted that the most logical approach for optimal treatment of osteoporosis is “to combine an antiresorptive agent to reverse the increased bone remodeling and an agent to stimulate osteoblastic proliferation so that bone formation accrues more rapidly”.

Although relatively little data is available, evidence suggests that soy protein and/or soy isoflavones may have skeletal effects. A review of 15 clinical trials showed that in seven of them soy protein and/or soy isoflavones significantly decreased bone loss in subjects (Messina et al., 2004).

The mechanisms by which isoflavones reduce bone loss remain unclear; however, research has been raising some hypotheses. First, there is the speculation that the skeletal effects noted by the use of soyfoods may be due exclusively to the isoflavone content. As explained earlier in this literature review, IFs possess estrogen-like activity; therefore, they stimulate osteoblastic activity through activation of estrogen receptors (Arjmandi & Smith, 2002). Second, observers such as Arjmandi and Smith (2002) suggest that soy or its isoflavones promote insulin-like growth factor-I (IGF-I) production. IGF-I is the primary protein involved in responses of cells to growth hormone (GH), that is, IGF-I is produced in response to GH and then induces subsequent cellular activities, particularly on bone growth (Arjmandi & Smith, 2002). Third, it has been suggested that soy protein consumption positively affects intestinal calcium absorption (Arjmandi et al., 1998). Finally, it has been suggested that isoflavones specifically genistein, may modulate the production of nitric oxide, a substance that is believed to be an important modulator in bone formation (Weaver & Cheong, 2005).

While the evidence that soyfoods and isoflavones reduce bone loss is encouraging, the existing controversy over whether isolated isoflavones or soy protein plus isoflavones are needed to exert skeletal effects must be resolved (Anderson & Alekel, 2002). Although the use of isoflavones as drugs in medical therapy is on the horizon, Messina et al. (2004) suggest that isoflavones cannot be viewed as an alternative to established anti-osteoporotic medications until more definitive data are available with regards the mechanisms of action, effectiveness, and safety in humans.

2.4.2.4. Soy and Cancer Prevention

Cancer is the name given for a disease that occurs by the abnormal and uncontrolled division of cells in the body; these cells may invade nearby tissues, spread through the bloodstream and lymphatic system, reaching other parts of the body.

It is estimated that in 2005, 149,000 new cases of cancer and 69,500 deaths from cancer will occur in Canada (Canadian Cancer Society & National Cancer Institute of Canada, 2005). On the basis of current incidence rates, 38% of Canadian women and 44% of men will develop cancer during their lifetimes and one out of four Canadians will die from cancer. According to the Canadian Cancer Society and National Cancer Institute of Canada (2005), three types of cancer account for at least 50% of new cases: prostate, lung, and colorectal cancers in males, and breast, lung and colorectal cancers in females.

Epidemiological, experimental, case-control, and prospective studies have been developed since the early 1980s to evaluate the hypothesis that soy isoflavones may play a role in cancer prevention. It has been observed in epidemiological studies that the incidence and mortality of breast, prostate, and colorectal cancers are higher in western countries compared with Asian countries (Peeters, Keinan-Boker, van der Schouw, & Grobbee, 2003; Adlercreutz, 2002). Countries like Japan, China, Korea, and Indonesia have diets characterized by a high consumption of soyfoods, low ingestion of fat, limited consumption of red meat, and high intake of fish. Because of the high consumption of soy products in eastern countries and the low incidence of hormone-dependant neoplasm observed in these regions, it has been suggested that soy isoflavones may be one of the dietary factors which inhibit the growth of cancer cells. In fact, this hypothesis is based on numerous studies which indicate that isoflavones

exhibits a large number of biologic effects, both *in vitro* and *in vivo*, that can be associated with cancer prevention (Peeters et al., 2003; Sarkar & Li, 2003; Hendrich, 2002; Watanabe et al., 2002). Cancer prevention is usually associated with inhibition and reversion of cellular hyperproliferation. Isoflavones, particularly genistein, have been shown to inhibit the growth of both estrogen-receptor negative and positive breast cancer cells, in a time and dose dependent manner (Sarkar & Li, 2003). Many pathways by which isoflavones may prevent cancer have been suggested. According to Sarkar and Li (2003), this effect is believed to be mediated through the regulation of cell growth, cell cycle, apoptosis, oxidative stress, angiogenesis, invasion, and metastatic pathways.

Peeters et al. (2003) and Hargreaves, Potten, Harding, Shaw, Morton, Roberts, Howell, and Bundred (1999) suggest that cancer prevention by a diet rich in soy isoflavones may occur when the consumption of soy products starts early in life, before adolescence. This idea was also supported by Adlercreutz (2002) and Wu (2002), who believed that soy may have a protective effect against breast cancer if consumed throughout life, particularly before and during adolescence. Messina and Loprinzi (2001) explain that this protective effect of early isoflavone exposure may be due to the stimulation of cell proliferation in the mammary gland resulting in the enhancement of mammary gland maturation, fewer terminal end buds and more lobules, and lower rates of cell proliferation in the terminal end buds. However, understanding dose-response relationship between intake of soy and cancer risk continues to be a challenge in epidemiologic studies (Wu, 2002).

Conversely, a few studies have shown that isoflavones may increase human breast tumor growth and reduce the effects of tamoxifen against these tumors (Cassileth

& Vickers, 2003). Hargreaves et al. (1999) suggested that the sudden intake of high concentration of isoflavones may predispose women to breast cell proliferation, posing risk in the aging breast or in women with malignant breast lesions. However, after reviewing many studies using breast cancer cells in culture, Adlercreutz (2003) concluded that phytoestrogens can indeed stimulate the growth of breast cancer cells but this usually happens at low concentrations; an inhibitory effect occur when isoflavones are consumed at high doses. Nevertheless, authors (Adlercreutz, 2003; Peeters et al., 2003; Messina & Loprinzi, 2001; Hargreaves et al., 1999) concluded that information about isoflavones and breast cancer risk is still scarce, although many prospective studies have shown non-significant results.

There is particular concern with respect to soy consumption in breast cancer patients taking tamoxifen. Tamoxifen is a medication that has been used for over 20 years to treat advanced breast cancer by working against the effects of estrogen (hormone) on breast cell proliferation. Isoflavones interfere with estrogen metabolism, thus there is a possibility that they might also interfere with the efficacy of this medication (Messina & Loprinzi, 2001). Results obtained from *in vitro* and *in vivo* experiments are conflicting and no conclusion can be drawn from these investigations (Messina & Loprinzi, 2001)

In sum, conflicting scientific evidence exists on the relationship between isoflavone consumption and breast cancer prevention and/or proliferation.

2.4.2.5. Soy and Menopausal Symptoms

Menopause is not a disease but a normal biological event related to aging, marked by the definitive end of menstrual cycles. Women may experience menopause anytime between their thirties and sixties; however, the majority of women experience a

natural menopause between the ages 42 and 56 (Social Issues Research Centre, 2002). The onset can happen naturally with age or be induced surgically if the woman has had surgery or medical treatments that affect the ovaries. Dalais (2002) noted that the transition from pre-menopause to post-menopause may not be smooth for the majority of women. Symptoms such as hot flashes, mood swings, and sleep disturbances are common and may be very stressful. Hot flashes are considered one of the hallmark signs of perimenopause and it reaches its highest rate during the first two years of postmenopause, declining afterwards (Flint, 2003). Symptoms include flushing, perspiration, and a sensation ranging from warmth to intense heat on the upper body and face, sometimes followed by chills. Hot flashes that occur with perspiration during sleep are called night sweats. The exact cause of hot flashes is unknown, although changes in estrogen concentration associated with menopause may play a role.

In the past decade, there have been several clinical trials examining the effects of phytoestrogens on menopausal symptoms. Huntley and Ernst (2004) suggest that because conventional hormone replacement therapy (HRT) has been shown to increase the risk of breast cancer and cardiovascular diseases, many women have begun to seek alternative treatments, with less perceived associated health risks. Within this scenario, soy has been considered as a possible alternative to HRT because it is a unique source of estrogen-like compounds (Kok et al., 2004; Messina, 2002, Watanabe et al., 2002).

In fact, a prospective study developed by Jeri (2002) showed that isoflavone supplementation significantly reduced hot-flushes in postmenopausal women.

Albertazzi, Pansini, Bottazzi, Bonaccorsi, de Aloysio, and Morton (1999) measured the effects of a diet supplemented with 60 g of soy powder daily for 3 months in a double-masked, parallel, placebo-controlled trial using 104 postmenopausal Italian women

subjects. The results showed that women taking soy had a 26% to 33% reduction in the mean score of hot flushes compared with baseline ($p < 0.001$).

Despite the perceived benefits, other studies such as the ones developed by Albertazzi (2002) and Dalais (2002) show that phytoestrogens may have only a mild effect in alleviating menopausal symptoms. Larger trials are needed to determine the mode of action and dosage.

2.4.3. Soy Isoflavones Safety

Several studies (Munro et al., 2003) in the literature describe soy isoflavones (IFs) from epidemiologic, biochemical, mechanistic, pharmacologic, and toxicologic perspectives. However, confusion regarding soy isoflavones and health research is common considering the complexity of this area. In fact, Erdman, Badger, Lampe, Setchell, and Messina (2004) argue that even scientists specializing in soy nutrition find it difficult to synthesize the findings from the hundreds of papers published yearly on soyfoods, soy IFs, and genistein. Erdman et al. (2004) point out that part of the confusion arises because of a lack of standardized nomenclature for referring to soy products and components in the scientific literature added to a lack of details regarding the products and compounds provided by researchers. Research articles often use terms such as soy, soy protein, or even soy supplements, without specifying what is meant or had been used in the study (Erdman et al., 2004).

A review shows that there are no conclusive results with regards the effect of soy IFs on chronic disease risk reduction (Newbold, Jefferson, Padilla-Banks, & Bullock, 2002). Therefore, there is a need to investigate better the estrogenic and anti-estrogenic mechanisms of soy isoflavones before using them therapeutically to treat chronic diseases and menopause symptoms.

Although a few researchers (Munro et al., 2003) have concluded that the consumption of soy IFs has no adverse effects in pregnant women, Newbold et al. (2002) notes that it is important to highlight that developing fetus and neonate are uniquely sensitive to perturbation with estrogenic chemicals. Developmental exposure to phytoestrogens and phytoestrogen-containing foods can alter multiple end points in both sexes in multiple organ systems ranging from the reproductive system to the immune system (Delclos, 2002). Therefore, there are increasing concerns about the adverse effects of estrogen exposure in infants and young children, since the long-term effects are unknown (Newbold et al., 2002).

A major concern arising from the ingestion of isoflavones in adults is the possibility of infertility. This concern was initiated by a study conducted in a flock of sheep which demonstrated that the development of infertility in these animals was a result of ingestion of high-isoflavone clover pasture (Rotstein & Gilani, 2002). However, no reported incidents of human infertility associated with isoflavones are available in the current literature.

Overall, the adverse effects that have been suggested to isoflavones consumption are largely based on results from animal studies and are not supported by the long history of safe use in all human subpopulations (Rotstein & Gilani, 2002). Further research is recommended in order to establish safe levels of consumption of isoflavones.

2.4.4 Soy Protein Allergy

Soy has been identified as one of the eight protein foods that most frequently causes allergy in humans; the other foods include milk, eggs, fish, crustaceans, wheat, peanuts, and tree nuts (Cordle, 2004). The major allergens in soy are β -conglycinin and

glycinin (Mill & Breiteneder, 2005). Several studies have focused on reducing the allergenicity of soybeans by changing the structure of the immunodominant allergen P34 using food processing, agronomic, or genetic manipulation techniques (Wilson, Blaschek, & de Mejia, 2005). Although a small number of fatal allergic reactions to soy have been reported, soy protein was significantly less reactive than cow's milk protein in a variety of clinical studies (Cordle, 2004).

2.5 Consumers' Perceptions about Soy Products

As indicated previously, soyfood products have become very popular in North America and have received special attention from the media in recent years. The U.S. International Food Information Council (2000) surveyed 1,260 U.S. food-related news stories from May to June of 1999 and found that 22% of all discussions were about functional foods. Information from the IFIC's Web site (International Food Information Council, 2005) suggests that the organization seeks to bridge the gap between science and communications by collecting and disseminating scientific information on food safety, nutrition and health. A survey by the same organization showed that 93% of U.S. consumers agreed that certain foods have health benefits beyond basic nutrition and 85% of survey participants expressed interest in learning more about functional foods. Through its investigations, the International Food Information Council found out that about 50% of U.S. consumers identified functional foods such as soy and berries as having "health-related" effects. In Canada, the National Institute of Nutrition (2000) reported that about 88% of Canadian consumers have shown some interest in discovering more about functional foods. In fact, functional foods, especially soy products, have become one of the hottest trends in Canadian grocery stores (Felix, 2002). Currently, a variety of soy-based products are

available on the market such as beverages, cheese, yogurt, ice creams, flour, sausages, pasta, cookies, and cereals. From an industry point of view, SoyFoods Canada reports that about 40% of Canadians have consumed tofu, soy milk, soy ice cream, or soy-based meatless patties/sausages.

Despite the overwhelming interest and increasing consumption of functional foods, very little is known about how consumers perceive functional products or what the perceptions of consumers about functional foods are (Saher, Arvola, Lindeman, & Lahteenmaki, 2003). Only 22% of U.S. consumers reported that they were aware of the term functional food (Wansink, 2001). This study consisted of a twelve-page questionnaire sent to a random national sample of 1,002 U.S. residents (obtained from U.S. Census data). Of the total number of surveys, 770 responses (59 % female, average age: 44 years old) were returned and included in the study. Questions covered soy-related food preferences, soy-related knowledge, soy-related consumption, and functional food-related knowledge. This study also reported that 39% of respondents did not know of any health effects connected with soy consumption and 4% thought that soy had no health benefits at all.

In another study of 1,004 U.S. adults (over 18 years old), the International Food Information Council (2002) found that knowledge and beliefs were the major motivations for food purchasing and consumption, or for not having tried functional foods. Wansink (2001) pointed out that consumers who have no knowledge of unfamiliar but nutritionally dense functional foods are unlikely to purchase these foods. Furthermore, Wansink's survey (2001), previously described in this chapter, indicated that although the respondents knew about the attributes of soy as a functional food, they did not link that knowledge to any self-relevant health consequences. Therefore, the

development of meaningful connections between soy attributes and personal health consequences may increase usage of foods such as soy products.

Coletta (1999) contends that consumers face a large amount of information regarding the relationship between diet and health consequences (e.g. prevention of chronic diseases), and that the data are often difficult to interpret. As Bhaskaran and Hardley (2002) stated, it seems that the unremitting influx of conflicting scientific evidence, regulations, and marketing information regarding diet-health relationships have made consumers highly skeptical of information on diet-health relationships. In addition, a lack of scientific consensus in many areas of nutrition has lead to confusions among consumers about the type and amount of soyfood to be consumed.

Reilly (1994) points out that it is not a surprise that functional foods have been described as “a communications challenge”. Mixed and controversial messages from media and science have led health practitioners and consumers to be skeptical and uncertain about the health claims made about new and emerging food products (Jones, 2002). Hogbin and Hess (1999) suggest that a fundamental difficulty often mentioned by consumers is the sheer volume of messages concerning healthy eating to which they are exposed and that many of these messages are conflicting. Because consumer trust and acceptance of functional foods is the driving force for this particular industry, Coletta (1999) suggests that emphasis ought to be placed on education and communication in order to enhance public confidence in functional food products.

Consumer acceptance of different products is likely to vary cross-nationally and intra-individually. After conducting a conjoint study with 500 randomly selected households from Denmark, Finland, and the U.S. about their perception of functional foods, Bech-Larsen and Grunert (2003) noted that differences in acceptance of

functional foods may be related not only to differences in nutritional knowledge, but to difference between cultures in the perceived seriousness of various diseases. Frewer, Scholderer and Lambert (2003) notes that because perceptions and attitudes are strongly founded in cultural values they are difficult to change by informative means such as health claims. Notwithstanding, good quality information can assist consumers in making appropriate food choices. In particular, in new products that have not been tasted before, the information can have an impact on the willingness of the consumer to try the product (Urala et al., 2003). Urala et al., (2003) note that if information can be readily linked or added to existing belief structures, then adopting the new belief is easy. Urala et al. (2003) surveyed 958 Finnish respondents at 76 different workplace cafeterias across Finland and found that health-related claims were perceived as advantageous. As well, the consumers surveyed indicated that they had more trust in information sourced from authorities and television than from food manufactures and retailers.

Frewer et al. (2003) pointed out that another factor that may contribute to the acceptability of functional foods is the food technology used to produce them. With regards to organoleptic characteristics, even a functional food with desirable and proven health benefits may not be attractive to consumers if its sensory properties do not meet consumer expectations. On the other hand, if the product demands the use of costly technology to improve its organoleptic characteristics, the end price of the product will be too expensive to warrant purchase (Frewer et al., 2003).

Taste was found to be one of the most important choice factors when choosing functional foods in a study of 1,158 Finnish respondents. Wansink and Cheong (2002) support this finding noting that when dietary patterns are changed

because of taste-related reasons they tend to have longer-term consequences, than when changed for nutritional reasons only. Similarly, Coletta (1999) writes that generally most people will introduce new foods into their diets if the taste of the product is equal or preferable to foods currently eaten.

2.6 Socio-demographic Factors and Dietary Behaviours

The type, extent, and progression of changes in dietary behaviours may be dependent on various socio-demographic factors such as gender, level of education, and income. According to Nestle and Wing (1998), consumers make dietary decisions based on economic, physiologic, psychologic, sociologic, and even spiritual considerations. In many communities, “eating is a social and family event, an act of pleasure, which goes far beyond the ingestion of the necessary nutrients to sustain life” (Blaylock, Smallwood, Kassel, Variyam, & Aldrich, 1999).

With respect to functional foods, the U.S. National Institute of Nutrition (2000) reports that U.S. men and younger consumers appear less likely to believe in the benefits of functional foods, and are less likely to make changes in their diets. Similarly, a focus group involving 35 Australian primary household grocery shoppers showed that younger consumers were less likely to switch to functional foods as a major disease preventative initiative (Bhaskaran & Hardley, 2002). Among Canadian consumers, a survey conducted by Canada’s National Institute of Nutrition (2000) found that middle-aged Canadian consumers (age 35-54) are more likely than other groups to be interested in learning about functional foods; among those consumers who declared to be interested in learning about functional foods, 59% were women. The survey used a mix of qualitative (using focus group technique) and quantitative methods (using telephone interview technique) to obtain information from sample groups in

Calgary, Halifax, Montreal, Toronto, and Vancouver. In another study (Urala et al., 2003) a self-administered questionnaire survey was used to collect data on 958 Finnish respondents at 76 different workplace cafeterias across Finland. In this study, women perceived health-related claims of functional foods to be more useful to them than men (Urala et al., 2003). A qualitative telephone survey involving a random selection of 1,004 U.S. adults (over 18 years old) developed by the International Food Information Council (2002) indicated that consumers aged 55 to 64 years were more aware of the health claims related to foods. The study also showed that awareness of the health benefits of certain foods increases with formal education, and was highest for those with graduate school education. In addition, the study showed that awareness of the health benefits of certain foods also increased with income, particularly for those earning U.S. \$75,000/year or more, compared to those earning less than U.S. \$35,000/year.

Education and ethnic background may affect the consumption level of dietary supplements and food choice. A self-administered questionnaire survey conducted in an urban community with 51 U.S. women (25-45 years old) who consumed a dietary supplement at least four times per week showed that consumption of a dietary supplement was associated with being better educated and Caucasian (Miller & Russel, 2003). Therefore, investigating the relationships between socio-demographic factors and consumers' food choices is essential to understand how soy products purchase decisions are made.

2.7 Essential Skills

In the early 1990's, literacy researchers observed that certain skills were important to people in virtually all occupations and facets of life (Human Resources and

Skill Development Canada, 2004). In 2004 the Government of Canada released a new Workplace Skills Strategy to help workers enhance their skills while keeping pace with evolving workplace requirements (Blunt, Kinney, & Vandale, 2005). Reports from the Government of Canada (Blunt et al., 2005) suggest that the Workplace Skills Strategy provides a framework for understanding and developing policies and programs to address human capital development in Canadian workplaces. The objectives of the Workplace Skills Strategy are: (a) ensure that the Canadian workforce is highly-skilled, adaptable, and resilient; (b) build a labour market that is flexible, efficient, and productive; and (c) promote participation by helping those who face labour market barriers to find and maintain employment (Blunt et al., 2005).

Programs and activities from Human Resources and Skill Development Canada (HRDC) that feed into this Workplace Skills Strategy include: Apprenticeship, Essential Skills, Literacy, and Foreign Credential Recognition (Blunt et al., 2005).

According to HRDC (2004), Essential Skills are enabling skills that: (a) help people perform the tasks required by their occupation and other activities of daily life; (b) provide people with a foundation to learn other skills; and (c) enhance people's ability to adapt to change. Human Resources and Skills Development Canada (2004) states that people who have the Essential Skills at the levels required for their desired occupations will have enhanced employability. Other factors that also enhance employability such as honesty, persistence, and a positive attitude to change have been suggested as important to workforce development (Human Resources and Skills Development Canada, 2004). The word *essential* was carefully chosen in order to avoid the negative connotations associated with the word *basic* (Blunt et al. 2005).

Through extensive research, the Government of Canada has identified nine Essential Skills: reading text, document use, numeracy, writing, and oral communication, working with others, computer use, continuous learning, and thinking skills (Human Resources and Skills Development Canada, 2004).

Human Resources and Skills Development Canada (2004) noted that these nine skills were selected because they were identifiable, definable, common, and were susceptible to influence through relatively short training interventions. Blunt et al. (2005) suggest that these skills were drawn from, and applicable to, Canadian workplaces; they provide a uniform structure for assessing and upgrading workplace skills; they are among the most transferable skills an individual has; both from job to job as well as from work to home; and they enable people to evolve with their jobs, adapt to technological change, and advance professionally.

Nevertheless, while there are currently only nine Essential Skills selected, more may be added as research continues. In fact, Human Resources and Skills Development Canada (Blunt et al., 2005) states that Essential Skills do not establish all skills required for life. Essential Skills compose a framework that is not prescriptive or absolute. They ought to be applied as needs demand and serve as an important guide for those who need help and support (Blunt et al., 2005). In addition, the Essential Skills' framework is not intended as a tool for screening, although depending on how it is operationalized this is a negative potential (Human Resources and Skills Development Canada, 2004).

Table 2.1 provides a detailed description of each of these skills.

Table 2.1 The nine Essential Skills according to Human Resources and Skills Development Canada 2004

Essential Skill	Definition
Reading Text	It refers to reading material that is in the form of sentences or paragraphs. It generally involves reading notes, letters, memos, manuals, specifications, regulations, books, reports, or journals. Typical applications are: scan for information; skim for overall meaning; read a full text to understand, learn, critique, or evaluate; and integrate and synthesize information from multiple sources or from complex and lengthy texts.
Document Use	It refers to tasks that involve a variety of information displays in which words, numbers, icons, and other visual characteristics (eg., line, colour, shape) are given meaning by their spatial arrangement. For example, graphs, lists, tables, blueprints, schematics, drawings, signs and labels are documents used in the world of work. Document use includes: print and non-print media (for example, computer screen or microfiche documents, equipment gauges, clocks and flags) reading/interpreting and writing/completing/producing of documents-these two uses of documents often occur simultaneously as part of the same task, e.g., completing a form, checking off items on a list of tasks, plotting information on a graph, and entering information on an activity schedule. Typical applications are: read signs, labels, and lists; interpret information on graphs or charts; enter information on forms; and read or create schematic drawings.
Numeracy	It refers to the workers' use of numbers and their ability to think in quantitative terms. Typical applications are: numerical estimation, numerical calculation (money math, scheduling, budgeting, and data analysis math).
Writing	It refers to writing texts and writing in documents. Typical applications are: organize, record or document; inform or persuade, request information or justify a request, present an analysis or a comparison, fill in forms, type on a computer.
Oral Communication	It pertains primarily to the use of speech to give and exchange thoughts and information by workers in an occupational group. Typical applications are: greet people or take messages, seek or obtain information, resolve conflicts, facilitate, or lead a group.
Working with Others	It examines the extent to which employees work with others to carry out their tasks. Do they have to work co-operatively with others? Do they have to have the self-discipline to meet work targets while working alone?
Thinking Skills	It refers to the process of evaluating ideas or information to reach a rational decision. It differentiates between five different types of cognitive functions. However, these functions are interconnected. Typical applications are problem solving, decision making, critical thinking, job task planning and organizing, significant use of memory, and finding information.
Computer Use	It indicates the variety and complexity of computer use within the occupational group. Typical applications are: operate a computerized cash register, use word processing software to produce letters or memos, send e-mails with attachments to multiple users, create and modify spreadsheets for data entry, develop research on the internet.
Continuous Learning	It examines the requirement for workers in an occupational group to participate in an ongoing process of acquiring skills and knowledge. In addition, it tests the hypothesis that more and more jobs require continuous upgrading, and that all workers must continue learning in order to keep or to grow with their jobs. If this is true, then the following will become essential skills: knowing how to learn; understanding one's own learning style; and knowing how to gain access to a variety of materials, resources and learning opportunities.

The Essential Skills Initiative has four basic objectives: (a) expand the essential skill knowledge base and research capacity; (b) promote and solidify strategic partnerships with key workplace stakeholders to increase essential skills awareness, understanding and utilization; (c) develop products and support mechanisms that will promote and facilitate essential skills integration in the workplace; and (d) promote and disseminate essential skills knowledge, tools, and best practices (Blunt et al., 2005).

The overall objectives are to improve Essential Skills of Canadians entering the workforce and facilitate transition into the workforce. According to Human Resources and Skills Development Canada (2004), the workplace can serve as the nexus for action and success in the development of human capital. Human capital is a clear predictor of long-run labour productivity and economic growth as well as being linked to better social outcomes. In this study, the term *Essential Skills* is capitalized when referring to the nine most important skills as defined by Human Resources and Skills Development Canada.

The present study stems from a larger multidisciplinary project entitled “Thought for Food: Essential Skills and Food System Performance”, which was funded by the Social Sciences and Humanities Research Council of Canada (SSHRC # 854-2003-0004). The grant period was from March 2004 to March 2006. Thought for Food aimed to extend research on literacy and health in new directions and to probe questions triggered by changes in society, new technologies, corporate food systems, and shifts in consumer values.

This interdisciplinary project was a collaborative effort by several investigators: Adrian Blunt (College of Education), Michael E. Gertler (Department of Sociology, College of Arts and Science), Susan Whiting (College of Pharmacy and

Nutrition), Carol Henry (College of Pharmacy and Nutrition), all from the University of Saskatchewan and JoAnn Jaffe (Department of Sociology and Social Studies), University of Regina. The investigators worked in partnership with community organizations and enterprises including CHEP Good Food Inc., the Saskatoon Co-operative Association, and the Saskatoon Food Coalition. The project looked at three major questions:

1. What are the Essential Skills required by retail food outlet employees to maintain healthy, food secure communities within a competitive retail market?
2. What are the Essential Skills required by food purchasers and preparers and community actors to maintain healthy and food secure families?
3. How useful is the Essential Skills approach for community organization, adult education programming, and staff development?

One of the goals of this study was explore the current knowledge and understanding of consumers and retail food store employees regarding the preparation and sale of soyfood products, in preparation for an in-depth investigation of the essential skills each group may require in their respective roles.

The majority of the Essential Skills are pertinent to soyfood purchasing, preparation, and food safety. From the consumers' perspective, making healthy food choices requires a complex group of reading, listening, analytical, and decision-making skills. Changes in consumer values have contributed to the transformation of the food systems. Today, consumers focus on health, food processing issues, and convenience, which lead to different perceptions of value in food products. In order to respond to increasing consumer demand for information, food sector employees need continuous development of skills since more and different skills are required today than were

required two decades ago. By better understanding consumers and providers' knowledge and attitudes toward specific food groups (e.g. soyfoods), consumer groups and food retailers are able to tailor appropriate educational programs including those focusing on Essential Skills.

2.8 Retail Food Store Staff Education and Training

Educating retail food store staff about nutrition is becoming important as a means to ensure community health and the sustainability of the food industry. Many companies now seem to agree that human capital is clearly a company's most important asset, and training and learning are keys to making the most of that asset (Haapaniemi, 2001). The literature suggests several education strategies, namely, seminars/courses (written material, audio tapes, and video tapes), computer-based training, blended learning (combining online and classroom), self-learning, luncheons, cooking classes, taste tests, and store tours (O'Connor, 2004; Major, 2002; Blackburn, 1998; Weinstein, 1997).

A number of food retail organizations have begun to focus on educating retail staff about functional foods such as soy products. Natural foods co-operatives across the U.S. are providing education to employees so that they will be knowledgeable about the products the stores carry (Blackburn, 1998). According to Blackburn (1998), knowing not just where to find, for instance, the tempeh but being able to describe what it is and some ways to use it are important staff knowledge. Blackburn (1998) notes, however, that only a few stores have a program in place to provide natural foods training for all employees. Community Mercantile, a U.S. co-operative natural foods store, is an example of a retail food store concerned about the training of its staff related to nutrition. One section of the training process is devoted to product-specific

information about soy, wheat-free, and Atkins products (O'Connor, 2004). According to O'Connor (2004), soyfoods are covered in depth, including comparative taste tests of at least seven brands of soy beverages and at least five soy-based protein bars. In addition, the instructors talk about how to introduce products to customers who are new to soy and how to make product recommendations (O'Connor, 2004). Other activities included in the training are a store tour, video session, and a review of some basics of label reading.

Another store, the Sacramento Natural Food Co-op Store (U.S.), developed a treasure map used by employees to find and learn about the products in the store. In addition, the store offers a two-hour mandatory "enrichment meeting" four times a year to maintain the knowledge of its employees. At the end of the meeting, employees get quizzed to test their knowledge (Blackburn, 1998). In Seattle (U.S.), Puget Consumers Co-op has developed the workshop *Whole Foods Kitchen* consisting of three-hour training for all staff as an introduction to natural foods (Blackburn, 1998).

In Tempe (U.S.), Arizona Gentle Strength Co-op developed education training on natural foods called *The Bastyr Program*, which uses self-directed modules integrating written text, audio tapes, and video tapes. The program has two levels: (a) Level 1: teaches the basics to new employees as an orientation to natural foods and (b) Level 2: teaches anatomy, physiology, and nutrition concepts. Some stores do not like to use *The Bastyr Program*, however, because they find that the self-study format is time-consuming and there is no one to answer questions the employees might have (Blackburn, 1998).

Co-op stores in the Minneapolis and St. Paul area of the U.S. created the *TCNFC Natural Training Course* (Twin Cities Natural Foods Co-ops). This program

uses any brochures or product information that is made available so employees become familiar with the resources in their store. The program consists of two 3-hour sessions with a mid-class quiz and a final exam. These quizzes and the course information can be adapted from store to store in order to focus on what is important to them (Blackburn, 1998).

Many supermarkets in the U.S. have also been investing in computer-based learning using customized training programs. Supermarket chains believe this system allows employees to learn interactively, remain engaged, skip subject areas they are competent in, and to train on their own at their own pace (Major, 2002).

In Canada, Liquor Control Board of Ontario (LCBO) stores have undergone a complete makeover in the last 15 years. As part of their modernization strategy, the stores invested in staff training that would improve customer service skills and focus on product knowledge (Anonymous, 2003).

Educating consumers about products offered is also a goal of the Saskatoon Co-operative Association (hereafter referred to as the Saskatoon Co-op). The Saskatoon Co-op is a member of Federated Co-operatives Limited (FCL), which is a wholesale, manufacturing, and administrative organization owned by some 300 retail co-ops. Its primary purpose is to provide its co-operative members with a variety of goods and services ranging from petroleum, food, and general merchandise to crop supplies and feed. In Western Canada, the co-operative retailing system employs more than 3,000 people within FCL and an estimated 15,000 people at affiliated retail co-operatives, for a total workforce of more than 18,000 people (Federated Co-operatives Limited, 2005). Co-ops in the FCL networks have developed a special training program for their employees named *Careers with a Difference* to promote employee

access to challenging management opportunities and training initiatives for their professional growth and career advancement (Federated Co-operatives Limited, 2005). Saskatoon Co-op agrees with Human Resources and Skills Development Canada (2005) that employers who continually invest in their employees are better equipped to respond to the demands of the evolving global knowledge-based economy. Saskatoon Co-op desires to retrain good quality employees, to utilize current training programs to help reduce staff turnover, and help with staff protocol (Saskatoon Co-operative Association, 2004). Staff training is mostly delivered in-house, is departmentalized, and mandatory for all positions at Saskatoon Co-op (Saskatoon Co-operative Association, 2004). There is on-the-job training as well as training seminars and programs (Saskatoon Co-operative Association, 2004). Orientation and position training are considered two of the most important aspects of a Saskatoon Co-op employee's development; therefore, providing the appropriate training at an early stage of employment ensures that the department is operating at an efficient and effective level (Saskatoon Co-operative Association, 2004).

Examples of training seminars offered to the employees of the grocery, produce and meat, and bakery departments of the supermarkets are: Understanding Saskatoon Co-op, Service Beyond Expectations, and Value Added Selling (Saskatoon Co-operative Association, 2004). Understanding Saskatoon Co-op has the objective to familiarize new employees with Saskatoon Co-op supermarkets (Saskatoon Co-operative Association, 2004). Service Beyond Expectations is a customer service program designed exclusively for Saskatoon Co-op and provides an extra edge in customer service to keep sales high and customers satisfied (Saskatoon Co-operative Association, 2004). Value Added Selling has the primary objective to increase

employees' skills by examining and practicing the steps involved in selling (Saskatoon Co-operative Association, 2004). Besides the compulsory training, additional training is also available to those individuals who are seeking advancement (Personal communication; Blunt et al., 2005).

Current key training issues for Saskatoon Co-op are related to food safety including prevention of cross-contamination in food preparation and health issues in in-store preparation, and responding to consumers who are becoming more safety aware due to issues such as mad cow disease (bovine spongiform encephalopathy) and avian influenza (Blunt et al., 2005). However, the growing interest of consumers in food purchasing such as soy products has led managers at Saskatoon Co-op to identify employee training needs. Consumers are demanding more information from employees, thus they need to be more prepared to answer those questions. According to Haapaniemi (2001), training of food retail staff is needed due to the rapid rate of change in the food industry that renders employees' expertise out of date; if the staff is not up to date, the company falls behind.

Saskatoon Co-op's business revolves around people, including the members and other customers shopping in the stores, and the staff working in them. Therefore, skill levels and attitudes are critical to its success and help differentiate the enterprise from its competitors (Blunt et al., 2005). Blackburn (1998) pointed out that training of food retail employees is mutually beneficial because it benefits the store by increasing its customer service status and the staff by learning so they can help the customer. Therefore, identification of the skills needed by employees to help consumers make appropriate purchase decisions can be viewed as an important step towards meeting the ever growing information needs of Saskatoon Co-op members and other shoppers.

2.9 Consumers' Nutrition Education

Canadian consumers are receiving an increasing volume of information relating to healthy eating and the impact of diet on the prevention of chronic diseases. This information is coming from a variety of sources with different agendas. Therefore, without a critical understanding of nutrition and the role of foods in improving and maintaining health, it is likely that consumers will be confused and unable to discern between reasonable and unreasonable information.

Various strategies were found in the literature directed at increasing consumer knowledge and understanding about nutrition and foods. For instance, Santerre and Machtmes (2002) developed face-to-face training involving food biotechnology with 576 U.S. consumers to see how the training would affect consumers' knowledge and attitude toward these products. The training sessions consisted of presentations including information on the technical aspects of biotechnology, history, regulatory policies, food labelling, environmental safety, and controversies surrounding food biotechnology (Santerre & Machtmes, 2002). The results showed that when subjects were provided science-based information concerning food biotechnology, they were more knowledgeable and accepting of the technology, the end products of this technology, and its regulatory oversight (Santerre & Machtmes, 2002). Therefore, the authors believe that efforts to inform consumers should be extended if adoption of this technology is to progress smoothly.

In the area of functional foods, only one study to date was found in the literature search concerning consumers' education and training (Pelletier, Kundrat, & Hasler, 2002). Pelletier et al. (2002) developed an educational program with the intent of increasing U.S. consumers' intake of nine functional foods (tea, broccoli, fatty fish,

garlic, purple grapes/grape juice, oats, soy, tomatoes/tomato products, and yogurt). The strategy consisted of educational kits to consumers containing an introductory video, overheads outlining specific food-health links, copy-ready consumer handouts, 1999 American Dietetic Association's position on functional foods, Functional Food Guide Pyramid, Institute of Food Technologists' Scientific Status Summary on Functional Foods, and Functional Food consumption frequency questionnaire. These kits were delivered to registered dietitians who volunteered to help with the study and educate their clients. The evaluation of this educational intervention showed that most participants indicated interest in increasing functional food intake after receiving training.

In recent years, there have been meaningful attempts to explore various issues around eating and preparation of food as well as the various strategies to restrain consumers' cooking deskilling. According to Jaffe and Gertler (2006), "many consumers have lost the knowledge necessary to make discerning decisions about the multiple dimensions of quality, including the contributions a well chosen diet can make to health". Carather, Dixon, Lang, and Carr-Hill (1999) believe the role of cooking and its relationship to health is unclear, although this topic has been debated by many researchers. For Lang and Caraher (2001), cooking skills are: (a) necessary for the understanding of what constitutes a healthy diet, (b) an important part of an empowerment process for individuals who wish to exercise control over their diet and food intake, and (c) a vehicle by which citizens can engage with the social norms of a society in which food is central both for existence and identity.

Cooking skills have traditionally been learned through apprenticeship, with children learning first-hand while their mothers cook (Jaffe & Gertler, 2006). Jaffe and

Gertler (2006) believe that “cooking requires a fine-tuning of all the senses—a good cook knows how things ought to taste, smell, look, feel, and sometimes even sound through different stages of the cooking process”. In addition, “cooking involves body knowledge, such as the movement required to whip an egg, knead biscuit dough, or skillfully cut a chicken” (Jaffe & Gertler, 2006). As Jaffe and Gertler (2006) pointed out, the preparation of food involves practical skills (e.g., the know-how to make a cake from scratch), the possession of knowledge that would facilitate more discerning food selection choices and would permit the usage of foods as medicinal products, as carriers of culture and heritage, and as focus for social intercourse and celebration (Jaffe & Gertler, 2006).

With respect to the development of cooking skills in consumers and its impact on health, Carather et al. (1999) state that “there is evidence that cooking classes or training programs in the short term achieve behaviour change based on arguments ranging from the importance of cooking skills to healthy eating to the role of cooking skills as an essential life skill and fun in their own right”. Carather et al. (1999) believe that consumers need long-term, reliable sources of education which would help translate the intention of cooking into action. According to Carather et al. (1999), there is little point in purveying nutrition advice and tips on healthy eating if people lack the skills to implement them.

2.10 Conceptual Framework

The Theory of Reasoned Action (TRA) (Ajzen & Fishbein, 1980) has been incorporated in this inquiry as a guide to investigating part of the research related to consumers’ attitudes with respect to soyfoods purchase decisions. The Theory of Reasoned Action (TRA) was developed to help explain behaviours over which an

individual has personal control (Ajzen & Fishbein, 1980). The model assumes that one's behavioural intention is the immediate determinant of behaviour. First articulated by Fishbein and Ajzen in the 1970s, the TRA attempts to explain how (and whether) specific behaviour, attitudes, and norms influence purchasing decisions.

Specifically, the theory assumes that consumers are rational and make systematic use of information available to them, considering the implications of their actions before they decide to engage or not engage in certain behaviors, such as the purchasing of soy products. According to the theory, a person's intention to perform behaviour is a function of his/her attitude toward the behaviour and the environmental influence or subjective norms (e.g. perceived opinion of others regarding the behaviour in question). The theory of reasoned action predicts intention to perform a behaviour by consumers' attitude towards that behaviour. Attitudes are determined by a belief that a given outcome will or will not occur and an evaluation of that outcome. As well, a consumer's intention to perform certain behaviour may be influenced by the normative social beliefs held by the consumer. For example, a consumer might have a very favourable attitude toward having a drink before dinner when dining out. However, the intention to actually order the drink may be influenced by the consumer's beliefs about appropriateness (i.e. perceived social norm) of ordering a drink in certain situations (with friends) and his/her motivation to comply with those normative beliefs (Hawkins, Best, & Coney, 2003). Considering this theory, information about consumers' attitudes and beliefs about specific behaviours can be useful in nutrition education, or employee training efforts.

The TRA is concerned with rational and systematic behaviour (Chang, 1998; Fishbein & Ajzen, 1975), i.e. behaviours over which the individual has control

(Thompson, Haziris, & Alekos, 1994). This assumption has been widely criticized by various researchers. Sheppard, Hartwick, and Warshaw (1988) contend that researchers are often in situations in which the target behaviour is not completely under the consumer's control. However, as Sheppard et al. (1988) observed, actions that are at least in part determined by factors beyond individuals' volitional control fall outside the boundary conditions established by the model. For example, a consumer may be prevented from purchasing a soy product if the consumer perceives the cooking process to be too complex or if the consumer does not possess the necessary skills to perform the behaviour (i.e. preparing the product or cooking). These considerations are incorporated into the Theory of Planned Behaviour (Ajzen, 1991, 1985). In comparison with the Theory of Reasoned Action, the Theory of Planned Behaviour adds "perceived behavioural control" as a determinant of behavioural intention. The Theory of Planned Behaviour is, therefore, an extension of the Theory of Reasoned Action. Perceived behavioural control (PCB) can be conceptualized as the consumer's subjective belief about how challenging it will be for that consumer to generate the behaviour in question (e.g. a cooking soy product). The concept of PCB has been considered in a variety of research settings (Patch, Tapsell, & Williams, 2005; Pawlak, Connell, Brown, Meyer, & Yadrick, 2005; Chang, 1998). For instance, Shim, Eastlick, Lotz, and Warington (2001) have proposed and tested an online pre-purchase intentions model, which included the concept of PBC.

The TRA has been widely applied to various consumer choice situations (Becker & Gibson, 1998; Crawley & Koballa, 1994). Over the last two decades, several applications have been made to the area of food choices. This include studies aimed at predicting healthy eating (Lambert, Conklin, & Johnson, 2002); consumption

of specific food products, such as sugar (Freeman & Sheihmam, 1997); and other food choices (Petrovici et al., 2004). However, an initial review of the literature revealed no study reporting that TRA was used to address consumers' attitude, beliefs, knowledge, and intentions regarding soyfood purchase decisions.

When predicting behaviour, the TRA uses five constructs leading up to the actual behaviour (e.g. soy purchase). These are behavioural beliefs, normative beliefs, attitudes toward the behaviour, subjective norm, and behavioural intentions. The first four constructs assist in predicting the fifth construct which is behavioural intentions.

The TRA does not include variables such as demographic characteristics or consumer traits in its model; consequently, it may be necessary for the researcher to continue to explore areas of understanding that will help to explain consumer characteristics relevant to the use of soy products. Nevertheless, TRA takes into account non-economic factors neglected by conventional economic models. Unlike many previous models, the Theory of Reasoned Action and the Theory of Planned Behaviour have predictive as well as explanatory power and provide valuable insights for understanding soyfood purchase decisions (Petrovici et al., 2004).

CHAPTER 3 – RESEARCH PROCEDURES

This section describes the design and methodology used to assess consumers' and retail food store employees' attitude, knowledge, skills, and purchase decisions with regards to soy products. The research design, study population, data collection methodology, and analytic approach are described.

3.1 Research Design

The inquiry used both quantitative and qualitative research designs. The combined use of these approaches is becoming increasingly common in health and social sciences (Sale, Lohfeld, & Brazil, 2002). Qualitative techniques have been shown to generate rich, detailed, and valid data that contribute to in-depth understanding of the context in which the phenomenon under study takes place, whereas quantitative approaches can generate reliable population-based and generalizable data (Casebeer & Verhoef, 1997). The combination of qualitative and quantitative methods is highly recommended because, besides allowing a more holistic interpretation of the research problem, it helps ensure higher reliability of data and understanding the contextual aspects of the research (Sale et al., 2002). Qualitative and quantitative research designs contribute to the pursuit of knowledge in different but complementary ways (Casebeer & Verhoef, 1997).

3.2 Setting of the Study

The setting of the study was two Saskatoon Co-operative supermarkets, hereafter referred to as store A and store B. These supermarkets are located in the metropolitan area of Saskatoon, Saskatchewan, Canada. The two stores were chosen in order to gain a broader understanding of consumers' attitudes, beliefs, and knowledge about soy products. According to a senior manager of one of the Saskatoon stores

(personal communication), comparing these two locations may generate interesting data because the profile of patrons seems to differ. According to the senior manager's point of view, one store seems to have older patrons when compared to the other. As well, patrons from one store seem to be more affluent and have higher level of education when compared to the other store. In addition, both stores have a high volume of patrons and carry a broad range of soy products.

3.3 Study Population

The study was carried out on two separate populations; shoppers who purchase soy or not at each of the two Saskatoon Co-op supermarkets; and employees of both supermarkets.

3.3.1 Shoppers of Saskatoon Co-op Supermarkets

Shoppers who entered the survey areas of the supermarkets were asked about their willingness to complete the survey. This included consumers of all ethnicities, both females and males, over the age of 19 years. Equal number of questionnaires was handed out to female and male shoppers who entered the survey area in order to represent both genders. A self-administered questionnaire survey (described later) was used to collect data. Data was collected over a one week period.

3.3.2 Employees of Saskatoon Co-op Supermarkets

The second sample set consisted of employees of the Saskatoon Co-op stores (A and B, respectively) who consumed soy products or not. Employees (management and floor staff) were chosen on the basis of their work responsibilities (responsible for areas such as dairy, produce, and customer service). A total of eight individuals participated in the interview process, four from store A and four from store B; one manager and three floor staff from each store, respectively. Interview technique

(described in 3.4.2) was used to obtain data on their attitudes towards soy purchase decisions, as well as their perception of the Essential Skills needed to help consumers make soy purchase decisions.

3.4 Sample Size

3.4.1 Shoppers of Saskatoon Co-op Supermarkets

For the self-administered questionnaire survey, the researcher aimed at having a minimum of 100 participants from each store (n=200). Those individuals who voluntarily agreed to participate in the study time period constituted the sample.

3.4.2 Employees of Saskatoon Co-op Supermarkets

For the interview survey, employees were purposefully selected by the researcher in consultation with the senior managers of the Saskatoon Co-op supermarkets. Purposeful sampling is described by Maxwell (1996) as a strategy in which particular settings, persons, or events are selected deliberately in order to provide important information that can't be obtained as well from either convenience or probability sampling. In this study, the subjects were selected based upon their fields and exposure to consumers. In addition, it was anticipated by the investigator that by interviewing various food store department experts, each participant would contribute insight in different areas. A total of four (n=4) employees in each store, three from staff and one from management was selected for the study.

3.5 Data Collection

As indicated earlier, data was collected from two major sources: (1) a self-administered questionnaire survey of supermarket shoppers, and (2) interviews with selected employees at the two Saskatoon Co-op stores. The process encompassed

several phases. These were: (1) designing and pre-testing the questionnaire and interview guide, (2) training research assistants for participation in the study, (3) piloting the questionnaire procedures, (4) administering the questionnaire, (5) fine tuning the interview guide, (6) conducting interviews, and (7) processing the data.

3.5.1 Self-Administered Questionnaire

The purpose of the questionnaire was to gather information about four content areas: demographic characteristics, consumption practices, soyfoods related knowledge, and attitude towards soy products selection. The questionnaire was entitled *Soy for Healthy Living* (Appendix 3). Information from the questionnaire was included in the interview guide (Appendix 6).

3.5.1.1 Development and Pre-Testing of Questionnaire

The questionnaire contained closed- and open-ended questions and was designed to be completed in 10 to 20 minutes. Section A of the questionnaire provided questions about consumers' daily consumption of food groups (grains, legumes, nuts, vegetables, fruits, and dairy). Section B of the questionnaire related to the subjective health status and the use (frequency and type) of soy products and dietary supplements containing soy ingredients. Section C focused on questions about attitudes of consumers regarding soy products. Section D related to the benefits derived from soy use. Section E provided questions about the knowledge and interest of consumers in soy products. Section F was intended to gather information on demographics of participants. A 7-point Likert scale (1= "strongly agree", 2= "agree", 3= "somewhat agree", 4= "neutral", 5= "somewhat disagree", 6= "disagree", 7= "strongly disagree") was used to rate knowledge- and attitude-related questions (Likert, 1932). The

“neutral” point was included as an impartial point, with no expression of agreement or disagreement (Nowlis, Khan, & Dhar, 2000).

The questionnaire was reviewed for face and content validity by thesis committee members. It was then administered to 20 nutrition undergraduate students, four nutrition graduate students and five nutrition professionals to determine the length of time needed to complete the questionnaire, if the flow of questions was logical, and if the questions were clear and easily understood. Once the suggestions for improvement were taken into consideration, a pilot study was conducted in each store to test the survey procedures (A, n= 29; B, n= 28). During the pilot studies, it was noticed that consumers were not receptive to the word *survey* in the introductory conversation; therefore, the word *survey* was avoided further in the study and replaced by *study* or *research*. In addition, the pilot study showed that seniors were less willing to participate in the study as well as males at all ages. In both stores, survey packages were handed out in one hour. According to the pilot experience, it was noticed that the best area to approach shoppers was the produce site (fresh fruits, vegetables, and herbs), where shoppers usually take more time on their own and are more open to conversation. Shoppers were given the option of completing the survey on site or at home; however, all but one participant preferred to take the survey package home. In this regard, Alreck and Settle (2004) observed that consumers may be more willing and open to respond a questionnaire honestly and candidly if they can be in complete privacy to record their answers and be entirely assured of anonymity. All the information obtained from the pilot study was used to tailor the survey procedures and training program of the research assistants.

Internal consistency of knowledge- and attitude-related questions of the questionnaire was measured by Cronbach-alpha, which is a numerical coefficient of reliability (Cronbach, 1951). The alpha coefficients obtained from Section C (attitude) and E (knowledge) were 0.68 and 0.85, respectively. Results showed a moderate to high internal consistency.

3.5.1.2 Training of Research Assistants

Trained research assistants participated in the data collection process. Both undergraduate and graduate students received training on the data collection processes prior to the beginning of the study. The first phase of the training process was carried out in March, 2005 with undergraduate students enrolled in the Research Methods course (NUTR 305) at the College of Pharmacy and Nutrition, University of Saskatchewan. The course instructor Dr. Brian Bandy assisted in supervising the training. Training included an explanation about the background of the study and research methods. After the presentation, students were asked to indicate whether they were interested in assisting with data collection. Those who agreed to participate in the data collection process for the study were invited to the second phase of the training process which took place on the first week of May, 2005. Phase two of the training consisted of a two-hour workshop which outlined a step-by-step process on how the survey was to be conducted at the supermarkets, identifying questions that needed to be asked, and the proper manner in which to approach shoppers. In addition, a script was previously prepared for the research assistants and a mock role-playing activity was performed during the training session. Seven nutrition undergraduate and graduate students participated in the training sessions and later in the distribution of the questionnaires.

In appreciation of their help in the study, each student received a certificate of participation/training for completing the training process as well as a Saskatoon Co-op gift certificate of CAD\$10.00. In addition, these data collection assistants were promised that they would receive a summary of data from the research findings at the completion of the study.

3.5.1.3 The Self-Administered Survey Questionnaire

From May/16 to May/22, 2005, shoppers entering the survey areas at the two supermarkets were invited to participate in the study, including both soy consumers and non-soy consumers. The sampling period was blocks of two hours during the day and evening, with sampling continued on subsequent days at different time periods over a week period to attempt to get a more representative sample, and to ensure that participant selection occurred during busy and less busy shopping periods. The periods of time used in this investigation were:

- May 16: 10:00am – 11:30am and 3:00pm – 4:00pm
- May 17: 11:30am – 12:30pm and 4:00pm – 5:00pm
- May 18: 12:30am – 11:30pm and 5:00pm – 6:00pm
- May 19: 10:30am – 11:30am and 6:00pm – 7:00pm
- May 20: 11:30am – 12:30pm and 7:00pm – 8:00pm
- May 21: 12:30pm – 1:30pm and 6:00pm – 7:00pm
- May 22: 10:30am – 11:30am and 5:00pm – 6:00pm

Prospective participants agreeing to the survey were given a package containing a cover letter, the questionnaire, and a postage paid return envelope. The cover letter (Appendix 2) explained the study, asked the shopper to participate and

assured them of the anonymity of the survey. Two sets of questionnaires were given out. In the first set of 300 packages a CAD\$5.00 gift certificate purchased through the Saskatoon Co-op stores was include in each package. The gift certificate was included as a token of appreciation for returning the completed questionnaire. The second set of 257 packages was handed out without the CAD\$5.00 gift appreciation. All shoppers who agreed to participate in the survey were thanked at the time when the questionnaires were distributed. Those who received the packages with the gift certificate were told about the gift certificates only after they had agreed to participate in the study. An equal number of questionnaires were handed out at each of the two stores. As well, an equal number of questionnaires were handed out to females and males.

The sampling strategy was designed to cover different population groups served by both locations. Research assistants kept track of the number of contacts and refusals.

3.5.2 Interview Guide

The interview guide (Appendix 6) was developed using closed and open-ended questions to explore more deeply the consumption, knowledge, and attitudes of employees with regards to soy products. Open-ended questions allowed informants to respond more freely. The interview was designed to be completed in 15 to 30 minutes.

The sections on the interview guide were similar to the questionnaire; however, the interview guide included questions about the employees' knowledge with respect to the term *functional foods* and skills and training needs.

Permission to record the interview on audiotape was obtained from all participants, and interviews were transcribed. Data were analyzed using qualitative analysis methods of coding, categorizing, and developing themes and sub-themes.

The interview guide was reviewed for coherency and content validity by thesis committee members. Any suggestions for change were recorded and reviewed with the researcher's supervisor before the final draft was prepared. A mock interview was also conducted with graduate students at the University of Saskatchewan to get feedback on clarity of the questions and to give the researcher some practice interviewing.

3.5.2.1 Selection and Recruitment of Participants

Interviews were conducted with selected employees from both Saskatoon Co-op stores. Employees were purposefully selected in consultation with the senior managers of the respective supermarkets.

3.5.2.2 Conducting the Interviews

On May/31 and June/1, 2005, face-to-face interviews were conducted at the supermarkets at times convenient to each participant. Three to four days prior to the interview, participants received a package containing a cover letter (with consent form) and the interview guide. The cover letter explained in more detail the background to the study and logistics (Appendix 5). Participants were asked to sign and return a consent form which described the purpose and objectives of the study, possible benefits and risks, data collection procedure, confidentiality assurance, acknowledgment of their right to withdrawn from the study anytime without retribution, and persons they could contact for information and questions (Appendix 5). Interview sessions ranged from 15 to 30 minutes and were moderated by the researcher.

3.5.2.3 Recording Procedures

Interviews were audio-taped onto an audio cassette while the interview was being conducted. Initial testing was done to test for clarity and background noise. A few notes were made by hand by a research assistant. Participants gave written permission for the recording of the interviews.

3.6 Data Analysis

This study used quantitative and qualitative methods of analysis.

3.6.1 Quantitative Analysis of the Self-administered Survey Questionnaire

Data analysis was accomplished using the Statistical Package for Social Science (SPSS) computer program, version 13.0. Descriptive analysis was used to present quantitative descriptions in a manageable form. Frequency distribution was used to describe the variables. An independent t-test was used to determine whether the means of the two Saskatoon Co-op supermarkets were statistically different from each other with regards to attitudes, knowledge, demographics (except gender), and dietary/health characteristics. Statistical assessment was performed through Pearson chi-square test to compare response rates and gender (demographics) between the two stores and the two groups (soy users and soy non-users). A significance level of 5% was adopted, thus, p values < 0.05 were considered statistically significant. Data were entered twice to reduce input error. Data from the survey questionnaire was regrouped into smaller number of categories (“agree”, “neutral”, and “disagree”). This was done in order to increase the power of the statistical analysis of the study because the survey had a small number of participants. Percentages of “agree” included “strongly agree”, “agree”, and “somewhat agree” ratings of the questionnaire scale. As well, percentages of “disagree” included “somewhat disagree”, “disagree”, and “strongly disagree”.

3.6.2 Qualitative Analysis of the Interviews and Questionnaire Comments

Interviews were professionally transcribed using Microcassette Desktop Voice Processor (Dictaphone). A package containing a thank-you letter, the transcriptions, and a Transcript Release Form (Appendix 7) was sent to each participant. Participants were asked to review the transcription and sign if they found the transcript to be accurate and acceptable. After all interviews were transcribed and approved by participants, the researcher read each interview several times thoroughly, making notes in the margins, summarizing the data, and identifying key concepts. By doing so, the researcher was able to determine general themes and sub-themes. Using a word processor, the researcher made a file for each of the broad themes under which the sub-themes were then contained.

Responses to open-ended questions and general comments from the questionnaires were analyzed in the same way as the interviews. They were categorized into major themes, coded, and synthesized into descriptive reports of each site with a summary analysis for emerging and recurring themes and patterns in the responses about consumers attitude and purchase decisions relating to soy products. Selected verbatim quotes that capture participants' sentiments, views, and opinions were also extracted for inclusion in the thesis.

3.7 Data Reporting Procedures

For the data generated by the open-ended questions from the interviews and questionnaires, themes were identified that represented the key viewpoints of the employees and shoppers, with supporting quotations. In order to assist in coherency and flow of quotations, filler words such as *Okay*, *well*, and *um* were omitted. Words inserted by the researcher to improve understanding of the quotation were bracketed

and ellipsis points indicated that several extraneous words were omitted. In order to protect participants' anonymity, the following designations were used to identify employees: A, B, C, D, E, F, G, and H.

3.8 Confidentiality and Ethical Approval

The study was approved by the University of Saskatchewan Advisory Committee on Behavioural Ethics in Human Experimentation in May 2005. In addition, permission was sought from the management of both Saskatoon stores where the study was carried out. Participation in the study was voluntary, and the anonymity of those who chose to participate was assured. Participants were informed that they could withdraw at any time. Interview transcripts were sent to each participant to assure accuracy of the data and to get permission to quote from the interview. Consent was obtained from all participants before the beginning of the study (see Appendix 5). The return of the completed questionnaire was taken as evidence of consent for survey participants.

3.9 Triangulation

The term *triangulation* has been applied to research strategies intended to serve two distinct purposes, confirmation and completeness (Breitmayer, Ayeres, & Knafl, 1993). Triangulation of qualitative data refers to an approach to data collection in which evidence is deliberately sought from a wide range of different, independent sources and often by different means (May & Pope, 1995). In this study, all qualitative data items were corroborated from at least one other source and by another method of data collection (quantitative). Triangulation of data happened in a variety of ways, including comparison with the literature, findings from the survey, and the interview

responses. In addition, interview transcripts were returned to participants for feedback. Respondents were invited to make changes where necessary. None suggested changes.

CHAPTER 4 - RESULTS

This section presents the findings from the questionnaire survey of supermarket shoppers and the interview of the employees. The section begins with a discussion of the response rate from the survey, followed by a description of the demographic characteristics of the respondents (shoppers and employees). Next the frequency of soy consumption by the respondents (supermarket shoppers and employees) is described. This is followed by a description of the themes identified from the interviews of employees and the open-ended comments from the survey of shoppers. The major themes from the interviews were: perceived barriers to soy consumption, factors that would increase soy consumption, perceived benefits of soy consumption, education on soy-related issues, and skills identified by respondents as important to making soy purchase decisions. To protect anonymity and confidentiality, employee participants were referred to by the designations A-H. Comments from the survey of supermarket shoppers are presented without any identifying designation.

4.1 Quantitative Results of the Survey Analysis

4.1.1 Response Rates

4.1.1.1 Response Rates for the Survey Questionnaire

The response rates among those who agreed to participate in the study is reported in Table 4.1.

Table 4.1 Response rates for shoppers (n=557)

	Questionnaires Delivered	Questionnaires Returned	Response Rate ^a
Store A	279	140	50.1%
gift certificates	150	92	61.3%
no gift certificates	129	48	37.2%
Store B	278	164	58.9%
gift certificates	150	103	62.8%
no gift certificates	128	61	37.2%

^a Chi-square test significantly different between gift certificate treatments ($p < 0.05$)

Eight hundred and ten shoppers were invited to complete the survey questionnaire; 557 agreed verbally to do so. Three hundred and four returned the completed questionnaires in a timely enough manner to be included in the study. Three weeks were given to respondents to return the questionnaires. Thus, the response rate among those who agreed to participate was 54.6% or 37.5% of those who were invited to participate.

Two hundred and seventy-nine questionnaires were distributed at the supermarket A, 140 of the 279 (50.1%) questionnaires handed out were returned. Of these, 140, 92 (65.7%) were from the packages containing gift certificates, and 48 (34.3%) were from the packages containing no gift certificates. From the supermarket B, 164 out of 278 (60.0%) questionnaires handed out were returned. From the returned questionnaires, 103 out of 164 (62.8%) were from the packages containing gift certificates, and 61 out of 164 (37.2%) were from the packages containing no gift certificates. There was no significant difference between the response rates of the two supermarkets ($p > 0.05$). The overall return rate of packages containing gift certificates was 65% whereas the return rate for packages containing no gift certificate was 42%. The response rate for packages containing gift certificates was significantly higher

when compared to the response rate for packages containing no gift certificates ($p < 0.05$).

Table 4.2 displays the response rates between stores among females and males who returned the questionnaire.

Table 4.2 Response rates for female and male shoppers (n=301)[†]

Gender	Store A n	Store B N	Response Rate ^a
Females	91	107	65.1%
Males	47	56	33.9%

^a Chi-square test significantly different between females and males ($p < 0.05$)

[†] Missing values are not presented.

The response rate of females (65.1%) was significantly higher than the response rate of males (33.9%) ($p < 0.05$).

Refusal Rate: Two hundred fifty-three individuals (810 – 557) refused to take part in the survey; this represents a refusal rate of 31.2%. Reasons given for refusal included lack of time and lack of interest in the topic area.

4.1.1.2 Response Rate for the Interview Survey

All eight individuals contacted agreed to participate in the interview process.

4.1.2 Demographic Description and Characteristics of Respondents

4.1.2.1 Supermarket Shoppers

Table 4.3 presents the demographics and subjective health of all questionnaire respondents. Frequencies for gender, age, ethnicity, education level, household yearly income, and subjective health are reported.

Table 4.3 Demographics and subjective health of shoppers (n=304)

Characteristic	Respondents					
	Store A		Store B		All Shoppers	
	n	%	n	%	n	%
Gender ^a						
Female	91	65.0	107	65.2	198	65.1
Male	47	33.6	56	34.1	103	33.9
Unknown	2	1.4	1	0.6	3	1.0
Age (years) ^b						
19-24	16	11.4	7	4.3	23	7.6
25-44	51	36.4	44	26.8	95	31.3
45-54	36	25.7	43	26.2	79	26.0
55-64	20	14.3	31	18.9	51	16.8
>65	16	11.4	38	23.2	54	17.8
Unknown	1	0.7	1	0.6	2	0.7
Ethnicity						
Aboriginal	3	2.1	2	1.2	5	1.6
Chinese	3	2.1	0	0.0	3	1.0
Filipino	1	0.7	0	0.0	1	0.3
White (Caucasian)	131	93.6	159	97.0	290	95.4
Other	1	0.7	2	1.2	3	1.0
Unknown	1	0.7	1	0.6	2	0.7
Education level						
Less than a high school graduation certificate	10	7.1	21	12.8	31	10.2
High school graduate	20	14.3	31	18.9	51	16.8
Some postsecondary education	27	19.3	25	15.2	52	17.1
With a trade, college or university certificate or diploma (below bachelor's degree)	30	21.4	52	31.7	82	27.0
With a university degree at bachelor's level or higher	52	37.1	32	19.5	84	27.6
Unknown	1	0.7	3	1.8	4	1.3
Household yearly income ^b (in Canadian dollar)						
Under \$25,000	7	5.0	26	15.9	33	10.9
\$25,000 to \$49,999	23	16.4	51	31.1	74	24.3
\$50,000 to \$74,999	39	27.9	48	29.3	87	28.6
\$75,000 to \$99,999	21	15.0	19	11.6	40	13.2
\$100,000 and over	35	25.0	6	3.7	41	13.5
Unknown	15	10.7	14	8.5	29	9.5
Subjective health ^b						
Excellent	8	5.7	8	4.9	16	5.3
Very Good	53	37.9	48	29.3	101	33.2
Good	65	46.4	81	49.4	146	48.0
Fair	13	9.3	25	15.2	38	12.5
Poor	0	0.0	1	0.6	1	0.3
Unknown	1	0.7	1	0.6	2	0.7

n= Number of Respondents

^a Chi-square test significantly different between the two groups ($p < 0.05$)

^b T-test significantly different between the two groups ($p < 0.05$)

Most respondents (n= 198, 65.1%) were females. The number of female shoppers who answered the questionnaire (n=198) was significantly higher than the number of male shoppers (n=103) ($p < .05$). Over 50% of questionnaire respondents (n=174, 57.3%) were between 25 to 54 years of age; however, shoppers at store B were on average significantly older (42.1% older than 45 years) than shoppers at store A (25.7% older than 45 years) ($p < 0.05$). The vast majority of questionnaire respondents (n=290, 95.4%) were white (Caucasian). Over 50% of questionnaire respondents (n=166, 54.6%) possessed at least a trade, college or university certificate, or diploma. Over 50% of respondents reported a household yearly income ranging from CAD\$25,000 to CAD\$74,999 (n=161, 52.9%). Shoppers at store A reported a significantly higher household yearly income when compared to shoppers at store B ($p < 0.05$).

When asked about their health, 81.2% of respondents (n=247) reported their health was very good or good. Shoppers at store A reported having a significant better subjective health than shoppers at store B ($p < 0.05$).

Table 4.4 presents the daily intake of selected foods of all questionnaire respondents. Frequencies for the daily intake of nuts, soy products, and beans, vegetables and fruits, and milk, cheese, and yogurt are reported.

Most questionnaires respondents (n=218, 71.7%) consumed 0 to ½ serving of nuts, soy products, and beans daily. Shoppers at store B had a significantly higher daily consumption of nuts, soy products, and beans when compared to the shoppers at store A ($p < 0.05$). Over 50% of respondents (n=157, 51.6%) consumed daily 3 or more servings of vegetables and fruits. Two or more servings of dairy products were consumed daily by 63.2% (n=192) of respondents.

Table 4.4 Daily intake of selected foods by shoppers (n=304)

Dietary factors (daily intake)	Respondents					
	Store A		Store B		All Shoppers	
	n	%	n	%	n	%
Nuts, soy products and beans ^b						
0 serving	52	37.1	62	37.8	114	37.5
½ serving	46	32.9	58	35.4	104	34.2
1 serving	28	20.0	27	16.5	55	18.1
2 servings	6	4.3	8	4.9	14	4.6
3 or more servings	0	0.0	1	0.6	1	0.3
Unknown	8	5.7	8	4.9	16	5.3
Vegetable and fruit						
0 serving	0	0.0	1	0.6	1	0.3
½ serving	4	2.9	7	4.3	11	3.6
1 serving	17	12.1	36	22.0	53	17.4
2 servings	44	31.4	36	22.0	80	26.3
3 or more servings	74	52.9	83	50.6	157	51.6
Unknown	1	0.7	1	0.6	2.0	0.7
Milk, cheese, yogurt						
0 serving	4	2.9	1	0.6	5	1.6
½ serving	12	8.6	17	10.4	29	9.5
1 serving	38	27.1	35	21.3	73	24.0
2 servings	48	34.3	59	36.0	107	35.2
3 or more servings	37	26.4	48	29.3	85	28.0
Unknown	1	0.7	4	2.4	5	1.6

n= Number of Respondents

^b T-test significantly different between the two groups ($p < 0.05$)

Table 4.5 presents the demographics and subjective health of all questionnaire respondents and those who declared to consume soy and not consume soy. Frequencies for gender, age, ethnicity, education level, household yearly income, and subjective health are reported.

Declared soy users and soy non-users were not significantly different with respect to the variables gender, age, ethnicity, education level, household income, and subjective health ($p > 0.05$).

Table 4.5 The demographics and subjective health of all shoppers (n=304) and those who were declared soy users (n=167) and soy non-users (n=88)

Characteristic	Respondents					
	Declared Soy Users		Declared Soy Non-users		All Shoppers (Stores A and B)	
	n	%	n	%	n	%
Gender						
Female	111	66.5	60	68.2	198	65.1
Male	56	33.5	27	30.7	103	33.9
Unknown	0	0.0	1	1.1	3	1.0
Age (years)						
19-24	14	8.4	7	8.0	23	7.6
25-44	52	31.1	29	33.0	95	31.3
45-54	42	25.1	26	29.5	79	26.0
55-64	26	15.6	15	17.0	51	16.8
>65	33	19.8	10	11.4	54	17.8
Unknown	0	0.0	1	1.1	2	0.7
Ethnicity						
Aboriginal	4	2.4	1	1.1	5	1.6
Chinese	2	1.2	1	1.1	3	1.0
Filipino	1	0.6	0	0.0	1	0.3
White (Caucasian)	159	95.2	84	95.5	290	95.4
Other	1	0.6	1	1.1	3	1.0
Unknown	0	0.0	1	1.1	2	0.7
Education level						
Less than a high school graduation certificate	17	10.2	9	10.2	31	10.2
High school graduate	23	13.8	14	15.9	51	16.8
Some postsecondary education	26	15.6	16	18.2	52	17.1
With a trade, college or university certificate or diploma (below bachelor's degree)	47	28.1	27	30.7	82	27.0
With a university degree at bachelor's level or higher	53	31.7	21	23.9	84	27.6
Unknown	1	0.6	1	1.1	4	1.3
Household yearly income (in Canadian dollar)						
Under \$25,000	17	10.2	8	9.1	33	10.9
\$25,000 to \$49,999	40	24.0	24	27.3	74	24.3
\$50,000 to \$74,999	49	29.3	28	31.8	87	28.6
\$75,000 to \$99,999	24	14.4	9	10.2	40	13.2
\$100,000 and over	24	14.4	13	14.8	41	13.5
Unknown	13	7.8	6	6.8	29	9.5
Subjective health						
Excellent	9	5.4	4	4.5	16	5.3
Very Good	59	35.3	28	31.8	101	33.2
Good	80	47.9	42	47.7	146	48.0
Fair	18	10.8	13	14.8	38	12.5
Poor	1	0.6	0	0.0	1	0.3
Unknown	0	0.0	1	1.1	2	0.7

n= Number of Respondents

Table 4.6 presents the daily intake of selected foods by all questionnaires respondents and those who declared to consume soy and not consume soy. Frequencies for the daily intake of nuts, soy products, and beans, vegetables and fruits, and milk, cheese, and yogurt are reported.

Table 4.6 Daily intake of selected foods by all shoppers (n=304) and those who were declared soy users (n=167) and soy non-users (n=88)

Dietary factors (daily intake)	Respondents					
	Declared Soy Users		Declared Soy Non-users		All Shoppers (Stores A and B)	
	n	%	n	%	n	%
Nuts, soy products and beans						
0 serving	48	28.7	43	48.9	114	37.5
½ serving	53	31.7	35	39.8	104	34.2
1 serving	45	26.9	5	5.7	55	18.1
2 servings	12	7.2	2	2.3	14	4.6
3 or more servings	1	0.6	0	0.0	1	0.3
Unknown	8	4.8	3	3.4	16	5.3
Vegetable and fruit						
0 serving	0	0.0	0	0.0	1	0.3
½ serving	6	3.6	5	5.7	11	3.6
1 serving	22	13.2	18	20.5	53	17.4
2 servings	42	25.1	23	26.1	80	26.3
3 or more servings	97	58.1	42	47.7	157	51.6
Unknown	0	0.0	0	0.0	2.0	0.7
Milk, cheese, yogurt						
0 serving	2	1.2	2	2.3	5	1.6
½ serving	15	9.0	9	10.2	29	9.5
1 serving	41	24.6	23	26.1	73	24.0
2 servings	59	35.3	28	31.8	107	35.2
3 or more servings	48	28.7	25	28.4	85	28.0
Unknown	2	1.2	1	1.1	5	1.6

n= Number of Respondents

Declared soy users and soy non-users were not significantly different with respect to these dietary factors ($p > 0.05$).

Table 4.7 presents the daily intake of selected foods by female and male declared soy users. Frequencies for the daily intake of nuts, soy products, and beans, vegetables and fruits, and milk, cheese, and yogurt are reported.

Table 4.7 Daily intake of selected foods by female and male declared soy users[†]

Dietary factors (daily intake)	Respondents					
	Declared Soy Users		Declared Soy Non-users		All Shoppers (Stores A and B)	
	n	%	n	%	n	%
Nuts, soy products and beans						
0 serving	31	29.5	17	31.5	48	30.2
½ serving	32	30.5	21	38.9	53	33.3
1 serving	34	32.4	11	20.4	45	28.3
2 servings	8	7.6	4	7.4	12	7.5
3 or more servings	0	0.0	1	1.9	1	0.6
Vegetable and fruit ^a						
0 serving	0	0.0	0	0.0	0	0.0
½ serving	2	1.8	4	7.1	6	3.6
1 serving	10	9.0	12	21.4	22	13.2
2 servings	23	20.7	19	33.9	42	25.1
3 or more servings	76	68.5	21	37.5	97	58.1
Milk, cheese, yogurt						
0 serving	1	0.9	1	1.8	2	1.2
½ serving	10	9.2	5	8.9	15	9.1
1 serving	23	21.1	18	32.1	41	24.8
2 servings	41	37.6	18	32.1	59	35.8
3 or more servings	34	31.2	14	25.0	48	29.1

n= Number of Respondents

[†] Missing values are not presented.

^a T-test significantly different between the two groups ($p < 0.05$)

With respect to these dietary factors, 68.5% of female declared soy users (n=76) indicated consuming 3 or more servings of fruits and vegetables per day compared to 37.5% of males (n=21) ($p < 0.05$).

Table 4.8 presents the subjective health of female and male declared soy users.

Frequencies are reported.

Table 4.8 Subjective health of female and male declared soy users[†]

Subjective Health	Declared Soy Users Females (n= 111)		Declared Soy Users Males (n= 56)		Declared Soy Users Total (n= 167)	
	n	%	n	%	n	%
Excellent	6	5.4	3	5.4	9	5.4
Very Good	42	37.8	17	30.4	59	35.3
Good	53	47.7	27	48.2	80	47.9
Fair	9	8.1	9	16.1	18	10.8
Poor	1	0.9	0	0	1	0.6
Total	111	100.0	56	100.0	167	100.0

n= Number of Respondents

[†] Missing values are not presented.

Table 4.9 presents the age groups of respondents who declared themselves to be female and male soy users. Frequencies are reported.

Table 4.9 Age groups of female and male declared soy users[†]

Age ^a	Declared Soy Users Females (n= 111)		Declared Soy Users Males (n= 56)		Declared Soy Users Total (n= 167)	
	n	%	n	%	n	%
19-24	11	9.9	3	5.4	14	8.4
25-44	37	33.3	15	26.8	52	31.1
45-54	30	27.0	12	21.4	42	25.1
55-64	16	14.4	10	17.9	26	15.6
>65	17	15.3	16	28.6	33	19.8
Total	111	100.0	56	100.0	167	100.0

n= Number of Respondents

[†] Missing values are not presented.

^a T-test significantly different between the two groups ($p < 0.05$)

Over half of male declared soy users (n=38, 67.9%) were over 45 years old.

Among declared soy users, males were significantly older than females ($p < 0.05$). The great majority of male (n=44, 78.6%) and female (n=95, 85.5%) declared soy users indicated their subjective health level being good or very good. Only 5.4% of declared soy users indicated their subjective health being excellent. There was no significant difference with respect to subjective health level between female and male declared soy users ($p > 0.05$).

Table 4.10 presents the level of education of female and male declared soy users. Frequencies are reported.

Over half of female (n=64, 58.2%) and male (n=36, 64.3%) declared soy users possessed at least trade, college or university certificate or diploma. There was no significant difference with respect to the level of education between female and male declared soy users ($p > 0.05$).

Table 4.10 Level of education of female and male declared soy users[†]

Level of Education	Declared Soy Users Females (n= 110)		Declared Soy Users Males (n= 56)		Declared Soy Users Total (n= 166)	
	n	%	n	%	n	%
Less than a high school graduation certificate	9	8.2	8	14.3	17	10.2
High school graduate	19	17.3	4	7.1	23	13.9
Some postsecondary education	18	16.4	8	14.3	26	15.7
With a trade, college or university certificate or diploma (below bachelor's degree)	33	30.0	14	25.0	47	28.3
With a university degree at bachelor's level or higher	31	28.2	22	39.3	53	31.9
Total	110	100.0	56	100.0	166	100.0

n= Number of Respondents

† Missing values are not presented.

Table 4.11 presents the household yearly income of female and male declared soy users. Frequencies are reported.

Table 4.11 Household yearly income of female and male declared soy users[†]

Household Yearly Income	Declared Soy Users Females (n= 99)		Declared Soy Users Males (n= 55)		Declared Soy Users Total (n= 154)	
	n	%	n	%	n	%
Under \$25,000	12	12.1	5	9.1	17	11.0
\$25,000 to \$49,999	25	25.3	15	27.3	40	26.0
\$50,000 to \$74,999	33	33.3	16	29.1	49	31.8
\$75,000 to \$99,999	16	16.2	8	20.0	24	15.6
\$100,000 and over	13	13.1	11	20.0	24	15.6
Total	99	100.0	55	100.0	154	100.0

n= Number of Respondents

† Missing values are not presented.

Over 60% of female (n=62, 62.6%) and male (n=35, 69.1%) declared soy users had a household yearly income higher than CAD\$50,000. There was no significant difference with respect to household yearly income between female and male declared soy users ($p > 0.05$).

4.1.2.2 Employees

Eight personal interviews were conducted. Four participants were employees at store A and had the following occupations within the supermarket: assistant store manager, produce manager, dairy clerk, and food clerk. The remaining participants were employees at store B and had the following responsibilities within the supermarket: grocery supervisor, grocery staff member, produce staff member, and customer service staff member. Most participants (n=6) were males. Most participants (n=6) were between 25 to 54 years of age. All employees (n=8) were white (Caucasian). The highest level of education of the majority of the employees interviewed in this study was high school graduation (n=5).

With respect to dietary intake, most (n=5) reported consuming daily ½ serving of nuts, soy products, and beans. Fifty per cent (n=4) of participants reported consuming daily 3 or more servings of fruits, vegetables, and dairy products.

4.1.3 Soy Consumption of Supermarket Shoppers

Table 4.12 presents the consumption of soy products by declared soy users. Frequencies are reported.

More than half of the participants (n=167) reported currently consuming soyfoods in their diet. Eighty-eight respondents have never tried soyfoods and 49 respondents (16.1%) did not answer the question regarding soy consumption and frequency. The three soy products most often consumed were soy sauce (n=96), soy beverage (n=74), and soy burger (n=71). Twenty-eight respondents reported consuming only soy sauce. Other commonly consumed soy products included tofu (n=64), soy nuts (n=46), veggie dogs (n=40), soy cheese (n=29), soy oil (n=26), and soy ice-cream (n=25).

Table 4.12 Shoppers' Consumption of Soy Products (n=163)

Product	Store A Declared Soy Users (n=84)		Store B Declared Soy Users (n=83)		Total Declared Soy Users (n=167)	
	n	%	n	%	n	%
Dairy-Like						
Soy beverage	37	44.0	37	44.5	74	44.3
Soy cheese	4	4.7	25	30.1	29	17.3
Soy ice-cream	12	14.2	13	15.6	25	14.9
Soy yogurt	7	8.3	14	16.8	21	12.5
Soy pudding	4	4.7	5	6.0	9	5.3
Meat-Like						
Veggie burgers	39	46.4	32	38.5	71	42.5
Veggie dogs	22	26.1	18	21.6	40	23.9
Veggie patties	20	23.8	18	21.6	38	22.7
Texturized soy protein	8	9.5	12	14.4	20	11.9
Others						
Soy sauce	46	54.7	50	60.2	96	57.4
Tofu	28	33.3	36	43.3	64	38.3
Soy nuts	23	27.3	23	27.7	46	27.5
Soy oil	13	15.4	13	15.6	26	15.5
Soy protein concentrate	7	8.3	4	4.8	11	6.5
Texturized soy flour	3	3.5	7	8.4	10	5.9
Soy protein isolate	3	3.5	4	4.8	7	4.1
Tempeh	2	2.3	1	1.2	3	1.8
Soy Supplements						
Soy protein bars	2	2.3	6	7.2	8	4.8
Soy shakes	2	2.3	5	6.0	7	4.2
Soy protein powder	3	3.5	2	2.4	5	3.0
Soy isoflavones in combination with other herbs/nutrients	3	3.5	2	2.4	5	3.0
Soy isoflavones (in tablets or capsules)	0	0.0	1	1.2	1	0.6
Others	0		3	3.6	3	1.8
Others (non-specified)	8	9.5	5	6.0	13	7.7

n= Number of Respondents

Twenty respondents out of 304 reported consuming soy supplements.

Fourteen of those consuming soy supplements were from store B. Supplements consumed included soy protein bars (n=8), soy shakes (n=7), soy protein powder (n=5), soy isoflavones in combination with other herbs/nutrients (n=5), and soy isoflavones (in tablets or capsules) (n=1). All soy supplement users but two reported consuming soyfoods as well.

4.1.4 Perceived Barriers to Soy Consumption by Shoppers

Table 4.13 depicts respondents' level of agreement with the eight statements that asked about perceived barriers to soy consumption. Frequencies, means, and standard deviations are reported.

Table 4.13 Perceived barriers to soy consumption by shoppers (n=304)^{†, **}

Statement Regarding Soy	n	% Agree	% Neutral	% Disagree	Mean* (SD)	Rank
I don't know how to cook with soy.	296	72.0	13.8	11.6	3 (1.5)	1
I do not buy soy-based products unless I know how they taste.	294	51.0	30.9	14.8	3 (1.4)	2
Soy is expensive to add to meals.	295	42.1	42.1	12.8	4 (1.1)	3
I am concerned about eating GM soy.	293	33.9	41.4	21.1	4 (1.5)	4
Soy has an after taste.	289	32.9	49.0	13.2	4 (1.2)	5
Soy alters estrogen level in women.	289	25.3	65.1	4.5	4 (0.9)	6
Soy is needed only by people who have specific health problems.	295	12.2	29.9	54.9	5 (1.3)	7
Allergy to soy is common.	294	12.2	59.2	25.3	4 (1.0)	7

n= Number of Respondents

[†] Missing values are not presented.

** agree = strongly agree, agree, somewhat agree; disagree = strongly disagree, disagree, somewhat disagree

* strongly agree = 1, agree = 2, somewhat agree = 3, neutral = 4, somewhat disagree = 5, disagree = 6, strongly disagree = 7

The major barrier to soy consumption was a lack of knowledge on how to cook with soy (72.0%). Roughly half of the total respondents also indicated that “they would not buy a soy product unless they know how it tastes” (51.0%). The percentage of respondents who indicated that they agreed (42.1%) that soy was expensive to add to meals was the same as those who were neutral. Participants were neutral with respect to the possible effects of soy on estrogen levels in women (65.1%) and with respect to soy having an after taste (49.0%). In addition, 41.4% of respondents were neutral with regards to eating genetically-modified (GM) soy. With respect to the statement, “Soy is

needed only by people who have specific health problems”, 54.9% of respondents disagreed. Over half of the respondents were neutral with regards to the statement “allergy to soy is common” (59.2%).

Table 4.12 displays the level of agreement with eight statements describing perceived barriers to soy consumption of consumers who were declared soy users and declared soy non-users. Frequencies, means, and standard deviations are reported.

The majority of soy non-users agreed with the statement “I don’t know how to cook with soy” (n=88, 81.8%). Soy users were significantly more skilled with regards to soy cooking when compared to soy non-users ($p < 0.05$).

Table 4.14 Perceived barriers to soy consumption by shoppers who were declared soy users (n=167) and soy non-users (n=88) ^{†, **}

Statement Regarding Soy	Declared Soy Users (n=167)				Declared Soy Non-users (n=88)			
	% Agree	% Neutral	% Disagree	Mean* (SD)	% Agree	% Neutral	% Disagree	Mean* (SD)
I don’t know how to cook with soy. ^a	66.6	16.8	15.6	3 (1.6)	81.8	8.0	7.9	2 (1.4)
Soy has an after taste.	36.6	41.3	21.0	4 (1.3)	28.3	62.5	3.4	4 (1.0)
I do not buy soy-based products unless I know how they taste.	54.5	25.1	19.2	3 (1.3)	46.6	42.0	6.7	3 (1.4)
I am concerned about eating GM soy.	37.8	39.5	21.0	4 (1.5)	25.0	45.5	25.0	4 (1.5)
Soy is expensive to add to meals.	47.9	34.1	17.4	3 (1.2)	38.6	51.1	5.7	4 (1.0)
Soy is needed only by people who have specific health problems.	11.4	23.4	63.5	5 (1.3)	13.7	38.6	44.3	5 (1.3)
Soy alters estrogen level in women.	31.2	60.5	6.0	4 (1.2)	19.3	76.1	1.1	4 (0.8)
Allergy to soy is common.	14.4	57.5	27.6	4 (1.0)	11.4	61.4	23.9	4 (1.0)

n= Number of Respondents

[†] Missing values are not presented

^{**} agree = strongly agree, agree, somewhat agree; disagree = strongly disagree, disagree, somewhat disagree

* strongly agree = 1, agree = 2, somewhat agree = 3, neutral = 4, somewhat disagree = 5, disagree = 6, strongly disagree = 7

^a T-test significantly different between the two groups ($p < 0.05$)

4.1.5 Factors that Would Increase Soy Consumption by Shoppers

Table 4.13 displays shoppers' level of agreement with four factors that would increase their consumption of soy products. Frequencies, means, and standard deviations are reported.

Table 4.15 Factors that would increase soy consumption by shoppers (n=304)^{†, **}

Statement Regarding Soy	<i>n</i>	% Agree	% Neutral	% Disagree	Mean* (SD)	Rank
I would consume more soy if it tasted different	294	47.0	38.5	11.2	3 (1.3)	1
I would eat or drink soy if it were less expensive.	295	43.8	38.5	14.8	3 (1.3)	2
I would eat or drink soy if it looked more appealing.	295	37.3	39.5	11.5	4 (1.3)	3
Soy tastes good if prepared properly	293	33.2	54.9	8.3	4 (1.1)	4

n = Number of Respondents

[†] Missing values are not presented

** agree = strongly agree, agree, somewhat agree; disagree = strongly disagree, disagree, somewhat disagree

* strongly agree = 1, agree = 2, somewhat agree = 3, neutral = 4, somewhat disagree = 5, disagree = 6, strongly disagree = 7

The two factors that respondents most often agreed would increase their soy consumption were a decrease in price (43.8%) and an improvement of taste (47.0%) of the products. Over half of the respondents (54.9%) were neutral with respect to the statement "Soy tastes good if prepared properly".

Table 4.16 displays the level of agreement with four factors that would increase the consumption of soy products of consumers who were declared soy users and declared soy non-users. Frequencies, means, and standard deviations are reported.

The percentage of declared soy users who agreed with the statement "Soy tastes good if prepared properly" was statistically higher when compared to soy non-users ($p < 0.05$).

Table 4.16 Factors that would increase soy consumption by shoppers who were declared soy users (n=167) and soy non-users (n=88)^{†, **}

Statement Regarding Soy	Declared Soy Users (n=167)				Declared Soy Non-users (n=88)			
	% Agree	% Neutral	% Disagree	Mean* (SD)	% Agree	% Neutral	% Disagree	Mean* (SD)
I would eat or drink soy if it looked more appealing.	36.6	37.1	24.6	4 (1.3)	32.9	44.3	20.5	4 (1.4)
I would eat or drink soy if it were less expensive.	53.9	27.5	16.8	3 (1.3)	27.3	56.8	13.6	4 (1.3)
I would consume more soy if it tasted different.	51.6	31.7	15.0	3 (1.3)	42.0	47.7	7.9	4 (1.2)
Soy tastes good if prepared properly. ^a	50.4	43.7	4.8	3 (1.1)	10.2	70.5	14.8	4 (1.0)

n= Number of Respondents

† Missing values are not presented

** agree = strongly agree, agree, somewhat agree; disagree = strongly disagree, disagree, somewhat disagree

* strongly agree = 1, agree = 2, somewhat agree = 3, neutral = 4, somewhat disagree = 5, disagree = 6, strongly disagree = 7

^a T-test significantly different between the two groups ($p < 0.05$)

4.1.6 Perceived Benefits of Soy Consumption by Shoppers

Table 4.17 presents respondents' level of agreement with the 10 statements that asked about perceived benefits of soy consumption. Frequencies, means, and standard deviations are reported.

Over half of respondents agreed with the statements that soy products were high in fibre (50.0%), low in fat (68.1%), low in cholesterol (68.4%), and high in protein (69.4%). In addition, 47.4% respondents indicated that “people would be healthier if they used more soy” and 79.4% indicated that “soy is healthy”. When asked about soy health benefits, most respondents (61.5%) indicated that soy helped reduce the risks of heart disease. Most respondents were neutral with respect to the soy's ability to help reduce the risk of cancer (54.3%) and bone loss (53.6%). Over half of the respondents (55.3%) indicated that “soy consumption is completely safe”.

Table 4.17 Perceived benefits of soy consumption by shoppers (n=304)^{†, **}

Statement Regarding Soy	n	% Agree	% Neutral	% Disagree	Mean* (SD)	Rank
Soy is healthy.	298	79.4	17.4	1.3	3 (0.9)	1
Soy can fulfill part of my protein needs.	296	69.4	26.0	2.0	3 (1.0)	2
Soy is low in cholesterol.	298	68.4	28.6	1.0	3 (1.0)	3
Soy is low in fat	297	68.1	26.0	3.5	3 (1.1)	4
Soy helps reduce the risks of heart disease.	297	61.5	34.2	1.9	3 (0.9)	5
Soy consumption is completely safe.	295	55.3	34.9	6.8	3 (1.2)	6
Soy is high in fibre.	297	50.0	39.5	8.2	3 (1.2)	7
People would be healthier if they used more soyfoods.	296	47.4	39.1	10.8	3 (1.2)	8
Soy helps reduce bone loss.	296	40.4	53.6	3.3	4 (1.0)	9
Soy helps reduce risk of cancer.	295	37.5	54.3	5.3	4 (0.9)	10

n= Number of Respondents

† Missing values are not presented

** agree = strongly agree, agree, somewhat agree; disagree = strongly disagree, disagree, somewhat disagree

* strongly agree = 1, agree = 2, somewhat agree = 3, neutral = 4, somewhat disagree = 5, disagree = 6, strongly disagree = 7

Table 4.18 displays the level of agreement with the 10 statements that asked about perceived benefits of soy consumption by shoppers who were declared soy users and declared soy non-users.

The percentage of soy users who agreed with the following statements “Soy is low in cholesterol”, “Soy helps reduce the risks of heart disease”, “Soy is healthy”, “Soy helps reduce risk of cancer”, “Soy consumption is completely safe”, and “Soy can fulfill part of my protein needs” was significantly higher when compared to soy non-users ($p < 0.05$).

Table 4.18 Perceived benefits of soy consumption by shoppers who were declared soy users (n=167) and soy non-users (n=88) ^{†, **}

Statement Regarding Soy	Declared Soy Users (n=167)				Declared Soy Non-users (n=88)			
	% Agree	% Neutral	% Disagree	Mean* (SD)	% Agree	% Neutral	% Disagree	Mean* (SD)
People would be healthier if they used more soyfoods.	56.3	34.1	8.4	3 (1.1)	34.0	47.7	14.7	4 (1.2)
Soy is low in fat.	76.7	18.0	3.6	3 (1.0)	44.3	34.1	2.2	3 (1.1)
Soy is high in fibre.	52.7	34.7	10.8	3 (1.2)	42.0	46.6	7.9	3 (1.2)
Soy is low in cholesterol. ^a	77.3	21.0	0.6	2 (0.95)	54.6	40.9	1.1	3 (1.1)
Soy helps reduce the risks of heart disease. ^a	73.0	25.1	1.2	3 (0.88)	44.3	47.7	4.5	3 (1.0)
Soy helps reduce bone loss.	49.1	47.3	3.0	3 (1.0)	31.8	59.1	5.6	4 (1.0)
Soy is healthy. ^a	91.1	7.8	0.6	2 (0.84)	63.7	29.5	3.4	3 (1.1)
Soy helps reduce risk of cancer. ^a	48.0	46.7	4.8	3 (1.02)	27.3	61.4	8.0	4 (0.9)
Soy consumption is completely safe. ^a	65.3	25.7	7.2	3 (1.1)	46.6	42.0	7.9	3 (1.3)
Soy can fulfill part of my protein needs. ^a	83.0	22.8	16.2	2 (0.9)	52.2	39.8	4.5	3 (1.1)

n= Number of Respondents

† Missing values are not presented

** agree = strongly agree, agree, somewhat agree; disagree = strongly disagree, disagree, somewhat disagree

* strongly agree = 1, agree = 2, somewhat agree = 3, neutral = 4, somewhat disagree = 5, disagree = 6, strongly disagree = 7

^a T-test significantly different between the two groups ($p < 0.05$)

4.1.7 Knowledge on Soy-related Issues

When asked about their level of interest in learning more about soy products, roughly 80% (n=244) of respondents (n=304) said they were interested in learning more about soy products. Respondents were asked to identify the sources of information that would positively influence their soy knowledge. Table 4.19 presents a summary of the sources most cited.

Table 4.19 Sources of information most cited that would positively influence soy knowledge of shoppers (n=158)

Source of Information	Respondents	
	n	%
Family/Friends	87	55.0
Health Experts	79	50.0
Magazines, newspapers, and books	77	48.7
Supermarket	45	28.4
Healthcare provider	41	25.9
Television	37	23.4
Media	28	17.7
Other	20	12.6
Internet	12	7.6
Directly from manufacturer	11	6.9
Radio	10	6.3
Conference, workshop	10	6.3

n= Number of Respondents

Although respondents were asked to rank their choices, 140 out of 158 respondents (n=88.6%) who answered to the question related to the preferred sources of information about soy did not do so. Instead, they chose to simply check their choices in the questionnaire. Therefore, the analysis took into consideration the most cited sources of information. The top three sources of information indicated by those participants were family and friends (n=87), health experts (n=79), and magazines, newspapers, and books (n=77). Supermarket was indicated as the fourth most preferred source of information about soy products (n=45). When asked if they believed the employees working at the Saskatoon Co-op supermarkets were prepared to answer to questions related to soy health benefits, 281 out of 298 respondents (94.2%) did not know whether employees were prepared or weren't prepared to answer to the questions, or believed employees were not prepared at all.

4.2 Results of the Qualitative Survey

4.2.1 Themes and Sub-themes

As indicated previously, five major themes emerged from the analysis of the interviews with supermarket employees. These were further divided into sub-themes where appropriate. Comments from the questionnaire survey were also included in the individual categories where appropriate. Themes and sub-themes are presented in Table 4.20.

Table 4.20 Themes and Sub-themes

Theme 1:	Soy Consumption of Supermarket Employees
Theme 2:	Perceived Barriers to Soy Consumption by Interview and Survey Respondents (Employees and Shoppers, respectively) <ul style="list-style-type: none">• Lack of Cooking Skills• Undesirable Organoleptic Characteristics• Agricultural and Socio-economic Aspects
Theme 3:	Perceived Benefits of Soy Consumption
Theme 4:	Factors that Would Increase Soy Consumption <ul style="list-style-type: none">• Dietary Aspects• Socio-cultural and Economic Aspects
Theme 5:	Perceived Skill Needs of Supermarket Employees <ul style="list-style-type: none">• Perceived Knowledge and Skills Needed on Soy-related Issues• Learning Strategies

Theme 1: Soy Consumption of Supermarket Employees

Interview respondents (supermarket employees) were asked to indicate how much soy products they consumed. The majority (n=7) indicated that they did not

consume any soy products. Three employees reported consuming soy products: Employee C consumed only soy sauce on rice (1-3 times every week) while Employee F used regularly soy beverages, soy sauce, and soy shakes. Employee G reported consuming a broad range of soy products: soy nuts (1-3 times each week), tofu (1-3 times each month), soy sauce (1-3 time each week), veggie burgers (1-3 each year), and veggie dogs (1-3 each year).

Theme 2: Perceived Barriers to Soy Consumption by Interview and Survey

Respondents (employees and shoppers, respectively)

Both interview respondents (employees) and survey respondents (shoppers) pointed out many barriers to soy consumption: lack of cooking skills, undesirable organoleptic characteristics of soy products, lack of knowledge and understanding about soy products, and agricultural and socio-economic aspects.

- **Lack of Cooking Skills**

Concerning lack of cooking skills, the majority of interview respondents stated that they did not know how to cook with soy products. Consequently, Employees B, C, D, E, F, and H indicated that they have never tried to cook with soy products. Employee (G) expressed that although he knew how to cook some recipes using soy, the cooking process was too time-consuming. He said:

I do know how to cook [with soy] but not a lot of dishes. I think it is just time consuming to prepare it. It is not a convenient food by any stretch. It is a planned meal. And with today's lifestyle, it's just very, very hectic, and the time restraints are there and there is just not that much time. [Employee G]

Participating shoppers' expressed similar views. A few offered comments such as the following:

I do not purchase soy products because I don't know what or how to prepare them for meals.

I do a fair bit of cooking but really know nothing about soy.

Just don't know enough about it [how to cook with soy]. I need more recipes.

- **Undesirable Organoleptic Characteristics**

Besides cooking concerns, interview respondents indicated that soyfood's organoleptic characteristics were important factors that affected the amounts of soy that they consumed. Many organoleptic characteristics such as taste, consistency, texture, and colour of soy products were identified as barriers to soy consumption. Concerning taste, there was no consensus; respondents either liked or disliked certain products. For example, three of the six food store employee respondents indicated they disliked the taste of the soy products they tried. These comments were generally based on reaction from family members or the individual consumer. Said employee A:

...some of the products in the store like the soy beverages, soy yogurt, soy ice cream, some of the veggie burgers...I just didn't care for them...And the taste wise...it just wasn't appealing to me. It's just a personal opinion. [Employee A]

Employee C agreed noting the reaction from his son that:

...just from tasting the [soy] milk, I found it chalky. I think it was the vanilla one. [Employee C]

Employee G explained:

My son and I...I vowed that I would try [soy beverage] if he tried. We [my wife and I] put some soy [beverage] on cereal one day and we gave him milk one day. We gave him soy beverage because we were thinking he might have been lactose intolerant. And I waited for his reaction. He said: "What is this?" [makes face]. You know. "Oh God, we are busted now!", I thought. [Employee G]

Employee E pointed out that while some soy products such as “strawberry, vanilla...are actually pretty good”, others such as chocolate soy beverage left “a little bit of an aftertaste when compared to the others.” Employee F concurred noting that “some [soy products] left a real chalky taste and then some were nice and smooth”. Most food store employee respondents felt that some soy products may taste good if prepared properly. Employee C based her comments on an experience she had at the University of Saskatchewan where she tried a tofu dessert prepared during a nutrition laboratory session, of the [tofu] dessert [prepared by someone else], she said ...I really liked it. A few respondent shoppers said they liked the taste of specific soy products such as “soy nuts and burgers,” “rice and stir-fries,” “soy burgers,” as well as “coffee, lattes”.

One respondent suggested that consumers tend to form misconceptions with regards to the taste of soy products before trying them. He commented:

I think there is kind of misconception what they [soy products] are going to taste before you actually try them. [Employee E]

A few interview respondents such as Employees C and D indicated they disliked this characteristic in soy products, particularly in tofu because of its mushy and runny consistency. Besides disliking the consistency of tofu, Employee D also indicated he disliked the texture and taste of other products he tried:

I have tried all that tofu veggie burgers and stuff like that. I didn't like the texture... Different taste...I would never eat them on a regular basis. [Employee D]

The colour of certain soy products such as soy cheese was also suggested by respondents as a barrier to soy consumption. For example, Employees C and E made the following observations:

I noticed it [soy cheese] is lighter...it's a different orange...it turns me away. [Employee C]

They [soy products] are not as appealing as some of the products that are out there when you look at their packaging...They are kind of "bla"...It could be a little more colourful...eye catching. [Employee E]

There was no consensus on the organoleptic characteristics of soy products. Respondents either liked or disliked certain products. Often their responses reflected their experience from trying the product for the first time, as one shopper pointed out "I have tried soy drinks and disliked them". Another indicated that he bought soy nuts about two weeks ago for the first time but "did not really like them".

- **Lack of Knowledge and Understanding about Soy Products**

Some interview respondents expressed a lack of understanding about the quality and content of soy product in explaining why they did not consume these products. For example, Employee A commented:

I think milk should come from a cow. I'm not a firm believer in the substitute like soy burgers and soy hot dogs. I think meat should be meat and same with ice cream. I think ice cream should be made with milk. [Employee A]

Another employee said:

My son consumes [soy] ice cream. I do not. I don't know if it's a mind-set or what. You always associate the ice cream with milk. It's too much of a contrast for me to do that. [Employee G]

Some questionnaire respondents also indicated they had no knowledge about the nutrition and health benefits of soy products. The following comments appear to relate a lack of knowledge to a lack of interest on the subject:

I personally never have really thought about soy and/or why people would need to or choose to consume it. My roommate loves soy milk and the taste, but I am reluctant to try it. Is it as healthy as milk? Does it contain calcium? What are the benefits? I do not have enough knowledge to answer part E [of questionnaire].

I am only vaguely aware of soy products and their benefits. I know they are considered healthy but not the specifics. I would not venture into buying them unless I had a sample which captured my attraction.

Sorry I didn't answer most of the questions [of the questionnaire]. I don't know anything about soy products except what some people have said. I have never eaten soy products.

I have not made an effort to learn about the benefits of soy or soy products. After this [filling the questionnaire], I'll do some reading as there is much I am ignorant of in this area.

I don't know what the benefits [of soy products] are and I do not purchase any.

According to questionnaire comments, many respondents had concerns regarding the health consequences of eating soy products. One of the major concerns was related to the likelihood that soy would increase the risk of breast cancer. Shoppers also voiced the confusion they face when dealing with media information on soy issues as indicated in the following comments:

I found this questionnaire very interesting. For years I regularly added soy products, including soy beverages, to my diet. But on [a Canadian television station] health news, [the host] stated "if you are on Tamoxifen or Arimidex, do not consume soy products". I e-mailed the makers of Arimidex, but was told no studies have been done on the above. They said: Ask your oncologist. I did not get a satisfactory answer...This info should be published, as I believe soy products are very beneficial to one's health.

...I have a personal concern that a high intake of soy may have negative effects regarding cancer. I have never researched that but have a friend with breast cancer who was told by her doctor to totally avoid soy products in all forms because of her cancer.

I have always been interested in soy for health benefits and was purchasing more soy products a number of years ago but I stopped using as many when I read of possible harmful effects for breast cancer (as I have a strong family history). Previously info was that it was helpful in prevention of it! I guess until I am sure I will only use minimal amounts of soy product.

One shopper raised another concern about the potential health effects of soy isoflavones noting that “soy accelerates brain aging, thinking loss, Alzheimer’s disease, sexual reduction in men...” Many consumers indicated no familiarity and knowledge about soy products. Some offered the following comments:

We are not familiar with soy products; therefore, we don’t use any.

I don’t know what the benefits are and I do not purchase any.

I know next to nothing about facts related to soy. I would like to learn more and sample soy to better answer the questionnaire.

I have never used any soy products but I’m just learning about the benefits so may try in the future.

- **Agricultural and Socio-economic Aspects**

One agricultural issue identified by interview respondents as a barrier to the consumption of soy products was the consumption of genetically-modified soybeans. Employee E expressed concerns about the process used on preparing soybeans for the market place. He said:

I would want to know what the process was and what they were doing to it. [Employee E]

In contrast, respondents B, C, and G expressed that they had no opinion with regards to genetically-modified foods. As Employee G pointed out, “I don’t know much about it, so it makes no difference”.

Regarding social aspects, influence of others was observed as being a barrier to soy purchasing. One interview respondent (Employee B) indicated that the opinion of family and friends about soy products is fundamental for deciding to incorporate soy or not into the family’s diet. She said:

That is extremely frustrating [to prepare a meal that kids will not like]. I hate to throw food out...I like everybody sharing the same meal...If they [friends] said “yeah, my kids loved it” or “we tried it and it was great”, then I would try it, absolutely...I might make a point of going out and making that recipe...And if it is healthy for you then it is a bonus!...I probably wouldn’t go with the healthy part of it. I would probably go with the taste. [Employee B]

Price of soy products was also identified by some interview respondents as a barrier to introducing soy products into their diets. Employee A made the following comment:

They [soy products] make sense to me but for me to purchase them on that value, no. [Employee A]

Interview respondent E suggested that price may be a barrier for new soy consumers, before they had the opportunity to sample the products:

...and price doesn’t help in that sense...If it [soy beverage] was cheaper then it wouldn’t be out that much money so they [consumers] would probably try it. [Employee E]

One interview respondent suggested that although he considered soy products expensive, the price would be justifiable due to the processing and the health concept

behind the products. When asked if he would eat or drink soy products if they were less expensive he said:

I would probably agree with it in a way. I realize it takes more from a manufacturing process of the stuff. So, your cost is going to be in there. You get something that is healthy; you are going to pay for it.
[Employee E]

At least one questionnaire respondent (shopper) identified an agricultural issue as a barrier to their consumption of soy products, namely a concern related to eating imported soybeans:

Since very little soybeans are Canadian grown, I prefer other sources of vegetable protein.

Regarding social aspects, influence of others was also observed as being a barrier to soy purchasing for shoppers. According to comments made in the questionnaires, family seemed to play an important role in the introduction of soy products into the diet:

My kids won't eat it, hard to make two different meals everyday.

My family strongly dislikes soybean oils and margarines.

Price of soy products was identified by some questionnaire respondents as a barrier to introducing soy products into their diets. They stated that by using the word *price* in their comments. One shopper agreed to that by saying:

Cost of soy products is also a big factor for the average consumer.

Theme 3: Perceived Benefits of Soy Consumption by All Respondents

Many perceived benefits of soy consumption were identified by both respondent shoppers (survey questionnaire) and employees (interview). Many respondents (n=94) who wrote comments believed soy products were rich sources of

nutrients (e.g. protein and calcium), good alternatives for milk with regards to digestibility, and beneficial for menopause symptoms. No comments were received with regards to the other potential health benefits claims that are widely seen in media vehicles, such as prevention of cardiovascular diseases and osteoporosis.

Although the majority of interview respondents indicated agreement with the statements that soy is healthy, helps reduce the risk of heart disease, and helps reduce bone loss. No comments were made with regards to the perceived health benefits of soy consumption.

Many shoppers who wrote comments indicated they were aware of the nutrition benefits of soy consumption. They believed soy products were rich sources of nutrients such as protein and calcium:

...from the little I know, [soy product] is much healthier than red meat for protein.

They [soy products] are healthy foods, lots of vitamins we can get needed for, especially young children and adults too.

I purchase soy milk because it's got more calcium and I heard it's better for you.

I use soy beverage in smoothies to increase calcium.

I very seldom drink milk so I buy soy beverage for my bones as soy is good in calcium...

I often choose the products like soy milk which in turn are a source of calcium.

A few respondent shoppers also indicated that soy beverage was more easily digested than milk. For example, shoppers made the following comments:

...[I have] problems with digesting milk products.

...[I consume] soy milk because regular milk upsets my stomach.

...I feel the soy products I buy help by not forming gas as much.

In addition, questionnaire respondents expressed their awareness of the potential health benefits from soy consumption. For instance, one shopper said that “soy promotes a healthier lifestyle”. The health benefit from soy consumption most mentioned by shoppers was related to the menopause. Female shoppers stated:

I tried using soy beverage as it was recommended as an aid for menopausal symptoms.

I use soy milk in a smoothy; I use it for post menopausal symptoms as I do not take estrogen.

Theme 4: Factors that would Increase Soy Consumption of All Respondents

Based on comments received from questionnaire and interview surveys, many factors were identified as likely to increase soy consumption. They were aggregated in two sub-themes: dietary aspects and socio-cultural and economic aspects.

- **Dietary Aspects**

More than half of the questionnaire respondents indicated that one of the factors that would increase soy consumption was the fact that soy was considered a healthy food. For example, one shopper said “I like to get more healthy foods”. Other shoppers pointed out that soy is a good food choice because soy is low in fat. They made the following comments:

I like to eat low fat products.

We like...veggie burgers, low fat and nutritious.

The majority of interview respondents, however, did not comment on any specific dietary factors that would increase their intake of soy. Employee F said that curiosity in trying new foods was the factor that made him try soy products. He said:

When I started drinking the [soy] milk and stuff like that I didn't care what it would do for me or if it did anything for me. I was just looking for something new to drink, something different, something away from juices and water and something to spice things up. [Employee F]

Soy seemed to be a favoured choice for those respondent shoppers who were vegetarians or who simply liked to include meat alternative as a source of protein in their diets. Several respondent shoppers made the following comments: "I am a vegetarian", "ethical vegetarianism", "border vegan", "vegetarianism", and "near vegetarian." Others indicated that even though they were not vegetarians, they still believed soy products were a good substitute for animal protein. One respondent said the "nutritional uses of soy products make more sense than using animal products." Another said that soy products provided "...a change from usual animal based products and sometimes to get more protein in my diet." The "...use [soy products] as a change for other protein sources or dairy was also seen as important by a third respondent shopper.

Respondents indicated that another motivation for including soyfoods in the diet was related to the presence of certain health conditions such as lactose intolerance- "I have been lactose intolerant since 1991..." ; irritable bowel syndrome- "I cannot use dairy products because I have irritable bowel syndrome" or [I consume soy beverages] as a substitute for dairy. Dairy doesn't always agree with me.

Besides the belief that soy beverages were a good substitute for milk, a couple of questionnaire respondents suggested that soy beverages were safer and healthier than cow milk. They said:

I buy So Good [brand] or So Nice [brand] soy milk. I use it on cereal and for cooking and I no longer trust cow milk; soy is better.

Soy products are more healthful for the body than dairy, less subjected to harmful additives...

- **Socio-cultural and Economic Aspects**

The socio-cultural aspects of soy consumption were well-expressed by Employee G who indicated that his soy consumption was strongly influenced by Asian students who regularly stay at his home through language exchange programs:

She [my wife] does a lot of different recipes with that [pressed soybeans]. We have a lot of Asian students staying with us. So, we use a lot of that sort of product. [Employee G]

It was also observed in the questionnaire comments that contact with Asian culture was a factor in increasing soy consumption among shoppers. In fact, a couple of questionnaire respondents pointed out they started enjoying and consuming tofu after being exposed to Japanese culinary practices during trips. They said:

I have spent time living and working in Japan and ate their diet. I like the taste, the process on preparing food, the freshness of ingredients. I feel better when I eat Japanese style diet. I especially like tofu in miso soup.

I try tofu once in a while because I've had it served to me in Japan and liked it.

Besides cultural aspects, it was also observed that contact with others in the community who might be motivated to eat soy would also increase soy consumption.

Many shoppers mentioned they purchased soy products because of the influence of family members who have dietary restrictions. For instance, shoppers commented:

My daughter is a vegetarian so I purchase soy products when she is coming home.

I have someone in my family who is a vegetarian.

...my 12 year-old daughter is getting more interested in soy products.

I bought soy milk for my grandson who is allergic to milk.

I purchase soy beverages for my son as he is lactose intolerant liked it.

Other shoppers said that the consumption of soy products may also be influenced by friends:

Only buy if vegetarian friends are over.

Economically speaking, price seemed to be a relevant aspect for soy consumption. Opposed to what was seen previously in this study, a few questionnaire respondents, in fact, indicated that soy products were reasonably priced and price was not a barrier to soy consumption. They used words and expressions such as “cheaper than meat” and “cheaper”.

Theme 5: Perceived Skill Needs of Supermarket Employees

Two sub-themes were identified in this section: (1) perceived knowledge and skills needed on soy-related issues by retail food employees and (2) learning strategies suggested by retail food employees.

- **Perceived knowledge and skills needed on soy-related issues by retail store employees**

Because soyfoods are considered important functional foods, every interview began by asking employees about their understanding of the term *functional food*. Most

respondents were not familiar with the term and expressed the lack of knowledge by using short answers such as “Not at all”, “Not particularly, no”, and “No, I have never heard that term before”. Employees C and E, however, indicated they had a general idea of the definition of the term *functional food*. After a few seconds of silence, they answered the question by saying:

...I had it as a food or something in the diet that provides health benefit to you. [Employee C]

I believe it's anything that prevents diseases like osteoporosis or cancer, those types of diseases. [Employee E]

When asked about their level of interest in learning more about soy products, about half of food store employees interviewed indicated they were somewhat interested. Employee A said he was not interested at all. Employee E, in contrast, said he was very interested due to his duties. He said:

Because I work in the dairy and I have some of the [soy] products there... Very interested. [Employee E]

Although the majority of employees stated they did not receive any questions from consumers about soy products, two employees said that they quite frequently do. No questions had ever been asked about the health benefits of soy, but shoppers seemed to be interested in learning more about other aspects of soy products (e.g. taste and price). These topics were identified by Employees A and D when they said:

That's the first one. “What does it taste like?” and “Does it taste like milk?” Because it [soy beverage] is sloughed into the dairy section, a lot of people have the perception that it's gotta taste like milk. That's the first thing they would say.’ And they look at the product and they read the information. And they say “How come it is so much more money?” That's usually the second: “How come it is so much more?” Does it really make that much difference?” And what they are doing is that they are trying to justify the price, I'm sure. They are buying it

[milk] in a two litter package for \$2.07 and a two litter soy beverage is \$3.29. In their minds, they are trying to justify if it is worth an extra dollar. [Employee A]

...“What does it taste like?”, “Does it taste like a regular hot dog?”, “Why is it so expensive?” [Employee D]

When asked about their levels of knowledge and skills pertaining to the benefits of soy, half of interview respondents gave themselves fair or average rating. Employee A rated himself as somewhat knowledgeable. Three employees indicated they have no knowledge about soy products.

The three sources of information most frequently mentioned by respondents that would positively influence their knowledge and consumption of soyfoods were health experts, family and friends, and media. Two interview participants listed supermarkets as a good source of information that would influence their consumption of soyfood.

- **Learning Strategies**

The majority of interview respondents believed that they should be receiving some training in order to increase their skills level with regards to soy products.

Employee A said:

Anything would be better than what’s happening now because nothing’s happening now. [Employee A]

Employees made different suggestions with regards to the type of training they could be receiving from their employer. Employees G and H indicated that the training sessions could be promoted by the representatives of the manufacturers of the soy products. According to Employees G and H, representatives could come into the store

and provide information on different ways of cooking with soy and also the health benefits associated to soy consumption. One employee stated:

...having manufacturers or representatives for the product come in and...talk about the products. I think we need some information on all the products that we handle. We need to have something to tell these customers. I think how to cook is one thing, but a lot of people that come in do know to cook because they are asking for the product. I think it is more on what are the benefits of the products, as far as health issues...I think a manual would be good...That would benefit. [Employee G]

Employees D and E also agreed that a training session would be beneficial and said:

I would think that probably a training course on different soy products and their advantages; what they have to offer to consumers, whether you are obviously going to have different needs if you are female or male. [Employee E]

A workshop, I think, would be the way to do it. That's what I would suggest, especially when I work with a lot of younger people that may have no clue [about soy products]. [Employee D]

However, Employee C disagreed with the previous comments by indicating that having pamphlets containing the information would be perhaps more appropriate than having training sessions.

Employee A suggested that pamphlets would be a good learning strategy:

I think an information pamphlet to put in the staff room, on the coffee table. [Employee A]

Besides pamphlets and training sessions, interview respondents said that the access to samples of soyfoods would also be a good tool for improving their knowledge of soy products. They said that by trying different products, they are able to report to

the consumer when asked about organoleptic characteristics. Interview respondent E said:

Again, sampling some of the stuff...Definitely, that's the biggest advantage you can have when you are dealing with consumers – being able to tell them “this is a good product, it tastes good”. [Employee E]

However, one interview respondent (H) seemed to believe that learning strategies for improving employees' level of knowledge about soy products would be irrelevant because these products represent a very small percentage of the supermarket's sales:

It's not a big part of our sales. I imagine it would be like 1% of our sales in produce. So, it kind of gets pushed to the side about knowledge. I want my guy to know more about bananas and oranges and fresh fruits. The stuff we sell a lot. If we had a bigger selection [of soy products] and if we would sell more of it then we would for sure have to know more about the products. But it is such a small area of our department. [Employee H]

Some interview respondents believed that greater employee knowledge about soy products would be a positive factor in increasing sales:

... We are out there in the sales floor and the more information you can give to the consumer, the more they feel relaxed, “this guy knows what he's talking about, I'm going to buy the product. [Employee E]

If we actually got training on the product? That would ultimately help us sell the stuff. [Employee F]

Although Employee F believed knowing more about soy products would help increase sales, he indicated that increasing his awareness on soy health benefits would not be enough to change his eating and purchasing patterns with respect to soy products:

I'll probably still just drink it and eat it as much as I have been. I don't think knowing more about it, it is going to make me change my patterns. [Employee F]

In sum, the perceived barriers to soy consumption identified in this study by employees and shoppers were lack of cooking skills, undesirable organoleptic characteristics, price, influence of significant others, lack of knowledge and understanding about the products, and agriculture issues. Perceived benefits were related to nutrition and health. Factors that would increase soy consumption were dietary and health concerns, taste, price, curiosity, cultural aspects, and the influence of significant others. Most interview participants or employees indicated that they were not familiar with the term *functional food* and did not consume any soyfoods. Half of employees indicated they were somewhat interested in learning more about soy products. Learning strategies suggested by employees included training sessions and information pamphlets. The questions they received from consumers were related to taste and price of soy products. Employees believed they had average knowledge and skills level for responding to questions about the benefits of soy. They also believed that an increase in employees' knowledge would help increase sales of soy products.

CHAPTER 5 - DISCUSSION

This section presents a discussion of each of the research questions in light of the study's findings and the literature review. Research questions discussed are: (1) What are the perceptions of consumers and retail food store employees with respect to soy products?, (2) Why do consumers purchase soy products and what factors influence their purchase decisions?, (3) What are the characteristics (demographics) of consumers who purchase soy products?, (4) What specific knowledge and skills are needed by consumers to make informed purchase decisions regarding soy products?, and (5) What specific knowledge and skills are perceived as necessary by retail food store employees to assist consumers in making informed purchase decisions about soy products?

5.1 Research Question One: What are the perceptions of consumers and retail food store employees with respect to soy products?

Despite the growing interest and the increasing consumption of functional foods such as soy products, little is found in the literature about how consumers perceive functional foods such as soy products (Saher et al., 2003). This study sought to understand the perceptions of shoppers and retail food store employees with regards to soy products and soy purchase decisions. Most shoppers and interview respondents perceived a lack of skills for cooking soyfoods as the major barrier to introducing these products into their diets. This finding is consistent with the results of the only study on consumers' perception on soy products found in the literature reviewed. Wenrich and Cason (2004) found that a lack of skills with respect to how to use and incorporate soy in the diet was perceived as the major barrier to soy consumption by U.S. consumers. This U.S. survey focused on low-income consumers whereas the present study considered all income levels. Thompson et al. (1994) found a strong correlation

between consumer attitude and behavioural intention with regards to making food choice decisions. Interestingly, the results of the present study also revealed that the lack of cooking skills was significantly more predominant in declared soy non-users ($p < 0.05$).

Besides being more skilled with regards to soy cooking, declared soy users also more frequently perceived soy as having desirable taste when cooked properly. In addition, declared soy users indicated greater awareness of soy health benefits related to its ability in preventing chronic diseases. This may suggest that in the formation of habits, consumer beliefs about the healthiness of soyfoods may play a significant role (Petrovici et al., 2004). Over half of respondents indicated neutral responses with respect to the potential of soy causing allergies (59.2%) and altering estrogen levels in the body (65.1%). Many respondents (41.4%) also indicated neutral responses with respect to being concerned about eating genetically-modified soy. In relation to food safety, most respondents perceived soy as being completely safe (55.3%) and healthy (79.4%). As well, many respondents (47.4%) believed that people would be healthier if they used more soyfoods. However, three female shoppers did comment on soy products as a potential factor in breast cancer induction.

In sum, a lack of cooking skills was perceived by many respondents as a major barrier for incorporating soyfoods into the diets. Taste was also perceived as an important contributor to introducing soyfoods into the diets of respondents. Over half of respondents were neutral with regards to soyfoods' potential for causing allergies and altering estrogen levels in the body. Many respondents were also neutral with respect to concerns about eating genetically-modified soyfood products.

5.2 Research Question Two: Why do consumers purchase soy products and what factors influence their purchase decisions?

The results of this study suggested that consumers purchase soyfoods mainly because of nutritional factors associated with these foods, in particular that the products are nutritious, healthy, and low in cholesterol. In addition, soy consumers showed some familiarity with respect to the protein content (and quality) of soy products. Soyfoods were included in the diet as a good substitute for animal protein. Interestingly, the results showed that this applies not only to shoppers who have dietary restrictions such as vegetarianism, lactose-intolerance, and dairy allergies, but also to meat-eaters. The results support the Theory of Reasoned Action (TRA), which says that the attitude towards performing a behaviour (e.g. purchase of soy products) depends on the belief that a particular behaviour leads to an outcome (e.g. obtain proteins), and the evaluation of the outcome (e.g. get healthier) (Petrovici et al., 2004).

In the literature reviewed, taste was identified as a crucial factor for functional food dietary adoption. As Verbeke (2006) stated, consumers in general are hardly willing to compromise on the taste of functional foods for health. Supporting Verbeke's viewpoint, Urala and Lähteenmäki's survey (2004) involving Finnish consumers demonstrated that taste was one of the most important choice factors when choosing functional foods. These findings are consistent with the results of this study. Many consumers declared they purchase soy products simply because these foods taste good. Therefore, the appreciation of the taste of soyfoods was a strong factor for influencing consumers' purchase decisions.

When looking at new soy users, the exposure of consumers to soy products in a social environment (e.g. restaurant or friend's house) seems to be influential for

subsequent soy purchase and change in dietary habits. Family and friends were also mentioned as factors that would influence purchase decisions. The results suggested that soy purchase behaviours may also be influenced by the subjective norm (i.e. the perceived social pressure to carry out a particular behaviour such as purchasing soy products) (Petrovici, 2004). For example, one respondent suggested that he/she purchased soy products because someone in the family is a vegetarian. Since the subjective norm mainly affects grocery buying intentions indirectly, it can also be suggested that while the influence of a consumer's social environment (when the consumer is considering purchasing soy products) is normative, it not a determinant.

Nestle and Wing (1998) pointed out that economic factors are important influences when consumers make dietary decisions. This study showed that price was influential with respect to decisions to purchase soy products. The majority of respondents believed that soy products were over priced and declared soy users indicated they would consume more soy products if they were less expensive. Wenrich et al. (2004) showed in a U.S. survey that price was considered one of the major barriers to soy consumption by the great majority of participants. Nevertheless, it was suggested by one of the interview respondents that although he considered soy products expensive, the price would be justifiable due to processing and the health concept behind the products. This may show that some consumers may be willing to pay higher prices for products that have health attributes, such as soy products. Based on the literature review and results from this study, more affordable prices for soy products would likely increase soy purchase and consumption.

In sum, respondents indicated they purchase soy products mainly because these foods are nutritious and a good source of protein. Others simply indicated

soyfoods taste good. Social exposure to the products was indicated as one factor promoting the adoption of soy as a regular component of diets. Interestingly, the health benefit usually associated to soy with respect to the prevention of chronic diseases was not mentioned as a major factor that would influence purchase of soyfoods. This study revealed that the purchase and consumption of soy were largely related to nutritional factors.

5.3 Research Question Three: What are the characteristics (demographics, dietary intake, and health status) of consumers who purchase soy products?

This research question investigated the characteristics, such as demographics, dietary intake, and subjective health of declared soy consumers. The results found in this study support other findings from the literature concerning the area of functional foods. It was found in this study that the majority of declared soy users were female and white (Caucasian). In most functional food studies, females were found to show a greater interest in functional foods (Poulsen, 1999; Childs & Poryzees, 1998), and were more frequent users of functional foods than men (Urala et al., 2003; Bogue & Ryan, 2000; National Institute of Nutrition, 2000). However, as Poulsen (1999) noted, caution should be exercised in concluding that females would be more interested in a particular functional food as there are clear product-dependent differences between genders. For example, a cholesterol-lowering spread has been reported to have more users among men than women in three representative samples of Finns (De Jong, Ocké, Branderhorst, & Friele, 2003).

With respect to age, more than half of declared soy users were older than 45 years in this study. A Canadian survey developed by National Institute of Nutrition

(2000) also showed that middle-aged Canadian consumers were more likely to be interested in functional foods and to believe in their health benefits. The U.S. International Food Information Council (2002) also indicated that U.S. consumers aged 55 and 64 years were more aware of the health claims of related foods when compared to young consumers. Bhaskaram and Harley (2002) found that young Australian consumers were less likely to make changes in their diets as a major disease prevention initiative when compared to older consumers. Bhaskaran and Hardley (2002) explain that generally, older people tend to emphasise the disease-preventing effects of food than younger people. Bhaskaran and Hardley (2002) found that health attributes only influence the purchase intent of one-fifth of younger participants (n=35, Australians). Younger population in their study emphasised taste, quality, price, and convenience as the primary factors affecting functional food purchase decisions.

Although the majority of declared soy users, both males and females, considered their health as being good or very good, the study found that females consumed higher amounts of fruits and vegetables when compared to males. The results were similar to the Statistics Canada's 2000/01 Community Health Survey, which reported that women 20 and older eat fruit and vegetables 4.9 times per day compared with 4.2 times for men in the same age category (Martin, 2002).

With regards to education level and household income, several studies (Miller & Russel, 2003; Martin, 2002; International Food Information Council, 2002) have shown that consumers who have higher level of education and higher income are more aware of the health benefits associated with particular foods and have healthier diets. In this study more than half of the respondents who were declared soy users possessed at least trade, college, or university certificate diploma and had a household yearly income

higher than CAD\$50,000. However, it cannot be concluded from the results of this study that declared soy users belonged to a privileged social class because the questionnaire question related to income did not explore the number of household members and per capita yearly income of participants.

When the demographics for this study was compared with that of Statistics Canada (2001) with regards to the metropolitan area of Saskatoon, it was revealed that the level of education and household income of the sample of this study represented the population of Saskatoon. According to Statistics Canada (2001), the highest level of schooling among 54.7% of residents is at least a trade, college or university certificate or diploma; and the average 2000 household income in Saskatoon was CAD\$53,025. With respect to ethnicity, this study sample is also representative of the metropolitan area of Saskatoon, which population is 94.4% white (Caucasian) (Statistics Canada, 2001). With regards to age, however, declared soy users were older than the median age of the population of the metropolitan area of Saskatoon, which is 34.4 years (Statistics Canada, 2001).

In short, in this study the majority of declared soy users mirrored the population who completed the survey questionnaire: female, white (Caucasian), older than 45 years, with at least trade, college, or university certificate diploma, and had a household yearly income higher than CAD\$50,000.

5.4 Research Question Four: What specific knowledge and skills are needed by consumers to make informed purchase decisions regarding soy products?

As indicated previously, with changes in eating habits over the past twenty years, it can be argued that traditional food purchasing and preparation skills may be

becoming redundant. Most developed countries have experienced a rapid growth of more ready-to-eat meals resulting in a loss of skills and knowledge in food purchasing and preparation in families (Jaffe & Gertler, 2006; Cooper, 2000; Hefferman, 2000; Caraher et al., 1999). In particular, social trends suggest a move from cooking in the home with basic ingredients to a consumer society that relies on the labour of others with ready-prepared foods (Ritzer, 2000; Lupton, 1996). This loss of skills may limit families in using the most nutritious foods available, thereby making nutrition education on food purchasing and preparation knowledge and skills important for consumers. This research question investigated the knowledge and skills needed by consumers to make informed purchase decisions regarding soy products.

Respondents identified knowledge of soyfoods and cooking skills as key factors for them to incorporate soy products in their diets. Wansink, Sonka, and Park (2001) write that product knowledge is important to consumers in their acceptance of foods. Although personal reasons varied, respondents in this study all agreed that it was crucial that individuals develop greater understanding of soy products to make purchase decisions. While respondents appeared to be already knowledgeable about soy's protein content and quality, they expressed a lack of knowledge on how to cook with soyfoods and incorporate soy in pre-existent recipes. Lang and Caraher (2001) suggested that cooking skills are an important part of an empowerment process for individuals who wish to exercise control over their diet and food intake. Without them, consumers do not have the full understanding of what constitutes a healthy diet (Lang & Caraher, 2001). By developing their soyfood cooking skills, consumers may be more willing to incorporate soy products into their diets in a palatable and pleasant manner. Food purchase and food preparation skills may include reading soy product labels,

understanding nutritional terminology relating to functional foods, and locating appropriate recipes. These are likely to have a positive impact on consumers' consumption of soy because they can provide consumers with a chance to try different soy products, to experiment with different recipes, and to learn how to incorporate soy in common dishes.

The most cited information sources about soyfoods were family, friends, and health experts. Research has shown (De Bourdeaudhuij, 1997) that family and friends are influential with respect to household purchases.

Having good oral communication skills to receive, give, and exchange thoughts, ideas, and concepts are important in making food purchase decisions. In addition, research on soy is constantly being developed and important new findings related to its health and nutritional benefits arise every month (Messina et al., 2004); therefore, consumers need to be in an ongoing process of acquiring knowledge.

In sum, participants expressed a need for greater knowledge and skills in the area of soy cooking. Educational strategies such as cooking classes were viewed as good learning strategies.

5.5 Research Question Five: What specific knowledge and skills are perceived as necessary by retail food store employees to assist consumers in making informed purchase decisions about soy products?

Many companies now seem to agree that human capital is clearly a company's most important asset, and training and learning are keys to making the most of that asset (Haapaniemi, 2001). However, educating and training staff not only ensure the sustainability of the enterprises but also may help ensure community health. This research question investigated the knowledge and skills perceived as necessary by retail

food store employees to assist consumers in making informed purchase decisions about soy products.

Functional foods, such as soy products, are considered one of the hottest trends in Canadian grocery stores (Felix, 2002). However, this study revealed that employees from the Saskatoon Co-op supermarkets who participated in this study were not familiar with the term *functional food*, nor did they express a great understanding about soy products. Participants, however, expressed a desire to gain knowledge about soyfood. This may provide an opportunity to educate employees about soyfood products. With the growing consumers' interest in functional foods such as soy products, an investment in training of employees could create lasting economic, educational, and health benefits for the retail food sector, its employees, and possibly consumers.

The results of this study suggest that Saskatoon Co-op staff did not receive a large number of questions about soy from shoppers. The two questions most asked by shoppers were related to taste and price because consumers want to understand the trade-offs they face when making the purchase decision. Employees, however, demonstrated a lack of knowledge required to correctly answer such questions. Interestingly, respondent employees indicated that they have not received any questions to date on specific health benefits of soy products, especially pertaining to those related to chronic disease prevention. This may help explain the neutral response reported by consumers when asked if they believed Saskatoon Co-op staff was prepared to answer questions related to soy health benefits. One of the goals of Saskatoon Co-op supermarkets studied is to help consumers and their food store employees develop food

purchasing and food preparation skills with respect to products offered (Blunt et al., 2005).

Haapaniemi (2001) pointed out that training retail food staff is needed as new products are brought onto the marketplace. The rate of change in consumer products on supermarket shelves is likely to make employee expertise out of date with unprecedented speed. The majority of employees seemed to agree with Haapaniemi (2001) and believed soyfoods training would be important as part of their professional development. By being more knowledgeable about soy products, staff would be able to help consumers make healthier choices, and also help to increase the sales of soy products. As Blackburn (1998) explain, training of retail food employees is mutually beneficial because it benefits the store by increasing the quality of customer service and the staff by learning so they can help the customer.

When asked about strategies for helping them learn about soy products, food store employee respondents indicated that a training program that included an information manual, cooking classes, and taste tests would be good options. Such a training strategy has been used with success by Community Mercantile Co-op (U.S.) described earlier (see p.40). In this natural food store, soy products are covered in depth, including brand comparative taste tests, information on the products, and strategies to introduce soy products to new consumers (O'Connor, 2004).

In sum, food store employee respondents expressed a need for knowledge and skill development about soy products in order that they be better able to advise shoppers about making healthy purchase decisions. Learning strategies suggested by employees were training sessions that would include general information on soy products, cooking

classes, and taste tests. Employees believed that by helping shoppers make wise purchase decisions, they would also help increase supermarket sales.

CHAPTER 6 –CONCLUSION

This study sought to develop an informed understanding of supermarket shoppers at the Saskatoon Co-op stores and Saskatoon Co-op retail food employees' attitudes, knowledge, and skills regarding soyfood purchase decisions. The main research questions were : (1) What are the perceptions of consumers and retail food store employees with respect to soy products?, (2) Why do consumers purchase soy products and what factors influence their purchase decisions?, (3) What are the characteristics (demographics, dietary intake, and health status) of consumers who purchase soy products?, (4) What specific knowledge and skills are needed by consumers to make informed purchase decisions regarding soy products?, and (5) What specific knowledge and skills are perceived as necessary by retail food store employees to assist consumers in making informed purchase decisions about soy products?

This chapter presents the conclusion as well as limitations of the study, recommendations for further research, and implications of the findings for professionals.

6.1 Conclusion

The results from this study suggested that female shoppers were more willing to participate in the survey. Twice as many females (n=198, 65.1%) than males (n=103, 33.9%) who agreed to fill out the questionnaire returned it. As well, over 50% of respondents belonged to the age group of 25-45 years. These may have implications for future research.

In addition, the study found that participants were more likely to consume soy because of its nutritional benefits than for the health claims. Most studies reviewed

(Urala et al., 2003; International Food Information Council, 2002; Wansink, 2001)

suggested that consumers were likely to place greater emphasis on health claims.

As new discoveries are made in the area of functional foods, nutritional information will be needed by consumers and retail food store employees so that they can make informed decisions.

6.2 Limitations of the Study

The conclusions drawn from the present study must be made with a degree of scientific prudence. The author wishes to acknowledge the limitations of the study.

The title chosen for the survey, *Soy for Healthy Living*, may have led respondents to answer positively to the questions related to the potential health benefits of soy products even when not having knowledge on the topic. Therefore, it is possible that the title of the survey questionnaire may have influenced how participants responded to the questionnaire section related to knowledge on soy products. Another limitation of the questionnaire design was the use of the “neutral” point in the Likert scale. The “neutral” category seemed to fail to function properly, in the sense that it did not effectively capture an attitude or knowledge to a statement that was between “agree” and “disagree”. The researcher acknowledges that a “neutral” opinion is different from “don’t know” or “not applicable”, and may have discouraged in-depth thinking because many respondents tended to choose the easy way out by choosing this category.

The refusal rate recorded in this study was 31.2%. However, it may be possible that research assistants were not completely accurate when taking note of shoppers who refused to take part on the research.

The sample size was another limitation. The small number of subjects enrolled in this study lowered the statistical power. Had there been larger number of participants, more statically significant outcomes may have been found. This study was conducted with a fairly small sample due to time and resource constraints.

With respect to the interviews, the lack of experience on the part of the researcher was identified as a limiting factor. Although the researcher received training from an experienced interviewer, the researcher realizes that many questions should have been asked differently in order to avoid introducing a bias. In many questions, the researcher may have given nonverbal cues such as nodding or smiling while respondents were speaking, which may have signalled to respondents that they were answering correctly or in the way the researcher wanted them to answer. In addition, selection bias was a possible limitation because purposeful sampling was used to recruit Saskatoon Co-op employees to participate in the interviews. It is also possible that a larger probability sample that included employees from other kinds of retail food stores would have had an effect on the results.

The researcher was closely involved in all facets of this study, including collecting and analysing the data. This could have led to certain level of bias and inaccuracy. In order to minimize bias and maintain objectivity, peer-debriefing meetings were held with the research supervisor and thesis committee members.

The numbers of respondents providing data on knowledge and understanding of soy products are sufficient for a future analysis of responses in the development of knowledge about soy products and their uses. However, similar data from a sufficiently large number of retail store employees has not yet been collected.

6.3 Recommendations for Further Research

The research sought to provide an informed understanding of consumers' attitudes, knowledge, and skills with regards to purchase decisions of soyfoods. This study identified important factors contributing to the consumption of soyfoods that can be used to develop a specific framework in which to examine other components of soyfoods' consumption behaviour by consumers.

It would also be interesting to develop an education program on soy products for retail food store employees starting with the ideas raised in this study, and to analyse how effective this program would be in developing employees' skills on food and nutrition related to soy. After the implementation of this education program, it would be interesting to analyse the impact of the program on consumers' knowledge and on their purchase decisions related to soy.

One of the goals of this study was to explore current understandings and knowledge of consumers and retail food store employees in preparation for an in-depth investigation of the Essential Skills each group may require. The study findings confirm the need for Essential Skills program to be developed for both consumers and retail food store employees to further enhance the appropriate consumption of soyfood products by current consumers and to support a more effective marketing to current non-soy consumers. For example, the study found that only 50% of employees said that soy taste good if prepared properly. Retail food store employees are the first line provider of information on soy products for consumers. While the employees are well educated for their current roles, it appears that a skills program would greatly enhance their capacity to provide consumers with the knowledge and understanding required for

the consumption of soy to a level equivalent with their knowledge and understanding of other food products.

6.4 Implications of Findings for Professionals

The results of this study have several implications for professional practice.

This study reveals that most consumers and retail food staff are interested in but not very well informed about functional foods, including soyfoods, and their potential health and nutritional benefits. Therefore, opportunities exist for health professionals, health associations, government agencies, and the food industry to bridge this knowledge gap and contribute to the appropriate positioning of functional foods in the context of the total diet (National Institute of Nutrition, 2000). The main findings of this study can be used to design an in-depth food skills survey of the needs of retail food workers and consumers. In fact, this study shows that it is important that those involved in retail food store sector have a good understanding of the functional food technologies and products available in the market because consumers will increasingly look to them for information as new products such as soyfoods appear on the market. By developing their knowledge and skills with respect to nutrition and functional foods (e.g. soyfoods), retail food store staff could help consumers personally link the nutritional and functional attributes of the food to the health consequences of consuming it.

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APPENDICES

Appendix 1. Ethics Approval



University of Saskatchewan
Behavioural Research Ethics Board (Beh-REB)

12-Jan-2006

Certificate of Approval

PRINCIPAL INVESTIGATOR
Carol Henry

DEPARTMENT
Nutrition and Dietetics

BEH#
05-54

STUDENT RESEARCHER(S)
Paula Negroes

INSTITUTION(S) WHERE RESEARCH WILL BE CONDUCTED (STUDY SITE)
University of Saskatchewan

SPONSOR
SSHRC

TITLE
Consumer Attitudes and Purchase Decisions With Regards to Soy Products

ORIGINAL APPROVAL DATE
20-May-2005

CURRENT RENEWAL DATE
01-May-2006

CERTIFICATION

The University of Saskatchewan Behavioural Research Ethics Board has reviewed the above-named research project. The proposal was found to be acceptable on ethical grounds. The principal investigator has the responsibility for any other administrative or regulatory approvals that may pertain to this research project, and for ensuring that the authorized research is carried out according to the conditions outlined in the original protocol submitted for ethics review. This Certificate of Approval is valid for the above time period provided there is no change in experimental protocol or consent process or documents.

Any significant changes to your proposed method, or your consent and recruitment procedures should be reported to the Chair for Research Ethics Board consideration in advance of its implementation.

ONGOING REVIEW REQUIREMENTS

The term of this approval is five years. However, the approval must be renewed on an annual basis. In order to receive annual renewal, a status report must be submitted to the REB Chair for Board consideration within one month of the current expiry date each year the study remains open, and upon study completion. Please refer to the following website for further instructions: <http://www.usask.ca/research/ethical.shtml>.

APPROVED.

Dr. Valerie Thompson, Chair
Behavioural Research Ethics Board
University of Saskatchewan

Please send all correspondence to:

Ethics Office:
University of Saskatchewan
Room 304 Kirk Hall, 117 Science Place
Saskatoon SK S7N 5C8
Telephone: (306) 966-2084 Fax: (306) 966-2069

Appendix 2. Information Letter: Consumer

SOY FOR HEALTHY LIVING SURVEY

Information Letter

Dear Shopper:

We are pleased to learn of your willingness to participate in the "Soy for Healthy Living" survey questionnaire concerning consumers' awareness, attitude, and knowledge about soy products.

The research is being carried out by the College of Pharmacy and Nutrition, University of Saskatchewan, in collaboration with the Saskatoon Co-op supermarkets in Saskatoon. Results of the study may be used to influence education and training policies/ procedures for employees at the Saskatoon Co-op supermarkets.

This letter serves as to provide you with some details about the survey. The survey will involve consumers and selected employees from two Saskatoon Co-op supermarkets. A self-administered questionnaire will be given to those consumers who agree in participating in this study. Each participant will be given the option to fill the questionnaire out at the store or to take home and return it in the self-addressed, pre-stamped envelope provided with the survey. The questionnaire is designed to be filled out in about 15 to 20 minutes, and will seek information primarily about the extent to which participants consume soy products, or use soy supplements; reasons for using soy products, and nutrition knowledge relating to soy products; and demographics information.

Participation in this study is voluntary. Any participant may decline to participate or withdraw at any time. The name of the participants will not appear in any written report arising from the study. The identity of the participants will not be recorded or used in any way, except to characterize participants. All identifying information once the data collection is complete will be destroyed. The completed questionnaire will be taken as your willingness to participate in the study.

The study has been approved by the University of Saskatchewan Behavioural Research Ethic Board on April 14, 2005. Please, address any questions or concerns about the research study to Professor Carol J. Henry, researcher, College of Pharmacy and Nutrition, (306) 966-5833, or Paula Negraes, College of Pharmacy and Nutrition, (306) 966-6346.

Sincerely,

Carol J. Henry, PhD., RD

Appendix 3. Survey Questionnaire

A - Use of Soy and Other Foods

Questions in this section relate to how many servings of soyfoods and other foods you consume every day.

1. How many servings of **nuts, soy products, and beans** (such as baked beans, pinto beans, kidney beans, lima beans, and black-eyed peas) do you usually eat every day?

(1 serving = $\frac{1}{2}$ to 1 cup of beans, 1 cup tofu, $\frac{1}{4}$ cup of nuts, or 2 tablespoons of nut butter)

0 serving	$\frac{1}{2}$ serving	1 serving	2 servings	3 or more servings
[]	[]	[]	[]	[]

COMMENT: _____

2. How many servings of **vegetables and fruits** do you usually eat every day?

(1 serving = 1 cup raw salad greens; $\frac{1}{2}$ cup cooked or chopped raw vegetables; or $\frac{1}{2}$ cup juice)

0 serving	$\frac{1}{2}$ serving	1 serving	2 servings	3 or more servings
[]	[]	[]	[]	[]

COMMENT: _____

3. How many servings of **milk, cheese, yogurt, or calcium rich soy products** do you usually eat every day? (1 serving = 1 cup milk, $\frac{3}{4}$ cup yogurt; or 1 piece of hard cheese; or 2 slices of processed cheese)

0 serving	$\frac{1}{2}$ serving	1 serving	2 servings	3 or more servings
[]	[]	[]	[]	[]

COMMENT: _____

B - Use of Soy Products and Dietary Supplements

Questions in this section relate to what soy products you consume and how often you do.

1. In general, you would say your health is:

Excellent	Very Good	Good	Fair	Poor
[]	[]	[]	[]	[]

2. Do you take any dietary supplement containing soy?

Yes	No
[]	[]

3. If you take any soy supplement, which do you take? Please, check all that apply:

[] Soy protein powder, with or without isoflavones	[] Soy shakes
---	----------------

☐ Soy isoflavones (in tablets or capsules)

☐ Soy protein bars

☐ Soy isoflavones in combination with other herbs/nutrients

☐ Other _____

4. Which of the following soy products do you eat or drink, and how often?

Product	Consumption Frequency				
	Daily	1-3 times each week	1-3 times each month	1-3 times each year	Never
Soy beverage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Texturized soy protein	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Texturized soy flour	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tempeh	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Soy nuts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Soy pudding	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Soy sauce	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Soy ice-cream	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Soy cheese	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Soy yogurt	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Soy protein isolate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Soy protein concentrate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Soy oil	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tofu	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Veggie burgers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Veggie dogs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Veggie patties	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Others	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Others: _____

C. Attitudes about Soy

We are looking to understand your attitudes with regards to soyfoods. Please, rate the following statements:

1. I don't know how to cook with soy products.

Strongly

Agree

☐

Agree

☐

Somewhat

Agree

☐

Neutral

☐

Somewhat

Disagree

☐

Disagree

☐

Strongly

Disagree

☐

2. I would eat or drink soy products if they looked more appealing.
- | | | | | | | |
|----------------|-------|----------------|---------|-------------------|----------|-------------------|
| Strongly Agree | Agree | Somewhat Agree | Neutral | Somewhat Disagree | Disagree | Strongly Disagree |
| [] | [] | [] | [] | [] | [] | [] |
3. I would eat or drink soy products if they were less expensive.
- | | | | | | | |
|----------------|-------|----------------|---------|-------------------|----------|-------------------|
| Strongly Agree | Agree | Somewhat Agree | Neutral | Somewhat Disagree | Disagree | Strongly Disagree |
| [] | [] | [] | [] | [] | [] | [] |
4. I would consume more soy products if they tasted different.
- | | | | | | | |
|----------------|-------|----------------|---------|-------------------|----------|-------------------|
| Strongly Agree | Agree | Somewhat Agree | Neutral | Somewhat Disagree | Disagree | Strongly Disagree |
| [] | [] | [] | [] | [] | [] | [] |
5. Soy has an after taste.
- | | | | | | | |
|----------------|-------|----------------|---------|-------------------|----------|-------------------|
| Strongly Agree | Agree | Somewhat Agree | Neutral | Somewhat Disagree | Disagree | Strongly Disagree |
| [] | [] | [] | [] | [] | [] | [] |
6. I am likely to buy a soy-related product in the next week.
- | | | | | | | |
|----------------|-------|----------------|---------|-------------------|----------|-------------------|
| Strongly Agree | Agree | Somewhat Agree | Neutral | Somewhat Disagree | Disagree | Strongly Disagree |
| [] | [] | [] | [] | [] | [] | [] |
7. I would try a soy dish at a restaurant.
- | | | | | | | |
|----------------|-------|----------------|---------|-------------------|----------|-------------------|
| Strongly Agree | Agree | Somewhat Agree | Neutral | Somewhat Disagree | Disagree | Strongly Disagree |
| [] | [] | [] | [] | [] | [] | [] |
8. I would buy a frozen soy-based meal.
- | | | | | | | |
|----------------|-------|----------------|---------|-------------------|----------|-------------------|
| Strongly Agree | Agree | Somewhat Agree | Neutral | Somewhat Disagree | Disagree | Strongly Disagree |
| [] | [] | [] | [] | [] | [] | [] |
9. I get pleasure from eating soy products.
- | | | | | | | |
|----------------|-------|----------------|---------|-------------------|----------|-------------------|
| Strongly Agree | Agree | Somewhat Agree | Neutral | Somewhat Disagree | Disagree | Strongly Disagree |
| [] | [] | [] | [] | [] | [] | [] |
10. I like the taste of soy.
- | | | | | | | |
|----------------|-------|----------------|---------|-------------------|----------|-------------------|
| Strongly Agree | Agree | Somewhat Agree | Neutral | Somewhat Disagree | Disagree | Strongly Disagree |
| [] | [] | [] | [] | [] | [] | [] |
11. Soy tastes good if prepared properly.
- | | | | | | | |
|----------------|-------|----------------|---------|-------------------|----------|-------------------|
| Strongly Agree | Agree | Somewhat Agree | Neutral | Somewhat Disagree | Disagree | Strongly Disagree |
| [] | [] | [] | [] | [] | [] | [] |

12. I do not buy soy-based product unless I know how they taste.

Strongly		Somewhat		Somewhat		Strongly
Agree	Agree	Agree	Neutral	Disagree	Disagree	Disagree
[]	[]	[]	[]	[]	[]	[]

13. I am concerned about eating genetically-modified soy.

Strongly		Somewhat		Somewhat		Strongly
Agree	Agree	Agree	Neutral	Disagree	Disagree	Disagree
[]	[]	[]	[]	[]	[]	[]

14. I willingly try new soy products.

Strongly		Somewhat		Somewhat		Strongly
Agree	Agree	Agree	Neutral	Disagree	Disagree	Disagree
[]	[]	[]	[]	[]	[]	[]

15. Soy products are needed only by people who have specific health problems.

Strongly		Somewhat		Somewhat		Strongly
Agree	Agree	Agree	Neutral	Disagree	Disagree	Disagree
[]	[]	[]	[]	[]	[]	[]

16. People would be healthier if they used more soyfoods.

Strongly		Somewhat		Somewhat		Strongly
Agree	Agree	Agree	Neutral	Disagree	Disagree	Disagree
[]	[]	[]	[]	[]	[]	[]

D – Benefits Derived from Soy Use

1. If you purchase soy products, please list the reasons why you do so (e.g health-promotion, specific diet such as vegetarianism, cultural aspects, and others).

E – Knowledge and Interest in Soy Products

Questions in this section relate to your knowledge and interest in soyfoods. Please, rate the following statements:

1. Soy is low in fat.

Strongly		Somewhat		Somewhat		Strongly
Agree	Agree	Agree	Neutral	Disagree	Disagree	Disagree
[]	[]	[]	[]	[]	[]	[]

2. Soy is high in fibre.

Strongly		Somewhat		Somewhat		Strongly
Agree	Agree	Agree	Neutral	Disagree	Disagree	Disagree
[]	[]	[]	[]	[]	[]	[]

3. Soy is low in cholesterol.

Strongly		Somewhat		Somewhat		Strongly
Agree	Agree	Agree	Neutral	Disagree	Disagree	Disagree
[]	[]	[]	[]	[]	[]	[]

4. Soy helps reduce the risks of heart disease.

Strongly		Somewhat		Somewhat		Strongly
Agree	Agree	Agree	Neutral	Disagree	Disagree	Disagree
[]	[]	[]	[]	[]	[]	[]

5. Soy helps reduce bone loss.

Strongly		Somewhat		Somewhat		Strongly
Agree	Agree	Agree	Neutral	Disagree	Disagree	Disagree
[]	[]	[]	[]	[]	[]	[]

6. Soy is healthy.

Strongly		Somewhat		Somewhat		Strongly
Agree	Agree	Agree	Neutral	Disagree	Disagree	Disagree
[]	[]	[]	[]	[]	[]	[]

7. Soy helps reduce risk of cancer.

Strongly		Somewhat		Somewhat		Strongly
Agree	Agree	Agree	Neutral	Disagree	Disagree	Disagree
[]	[]	[]	[]	[]	[]	[]

8. Soy consumption is completely safe.

Strongly		Somewhat		Somewhat		Strongly
Agree	Agree	Agree	Neutral	Disagree	Disagree	Disagree
[]	[]	[]	[]	[]	[]	[]

9. Soy is expensive to add to meals.

Strongly		Somewhat		Somewhat		Strongly
Agree	Agree	Agree	Neutral	Disagree	Disagree	Disagree
[]	[]	[]	[]	[]	[]	[]

10. Allergy to soy is common.

Strongly		Somewhat		Somewhat		Strongly
Agree	Agree	Agree	Neutral	Disagree	Disagree	Disagree
[]	[]	[]	[]	[]	[]	[]

11. Soy can fulfill part of my protein needs.

Strongly		Somewhat		Somewhat		Strongly
Agree	Agree	Agree	Neutral	Disagree	Disagree	Disagree
[]	[]	[]	[]	[]	[]	[]

12. Soy alters estrogen levels in women.

Strongly		Somewhat		Somewhat		Strongly
Agree	Agree	Agree	Neutral	Disagree	Disagree	Disagree
[]	[]	[]	[]	[]	[]	[]

13. What sources of information positively influence your soy consumption? Please, rank your choices:

[] Health experts	[] Radio
[] Media	[] Conference, workshop
[] Family/ Friends	[] Directly from manufacturer
[] Internet	[] Supermarket

☐ Magazines, newspapers, and books
☐ Television

☐ Healthcare provider
☐ Others _____

14. What is your level of interest in learning more about soy products?

Very	Somewhat		Somewhat	
Interested	Interested	Neutral	Not interested	Not interested
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

15. Do you think the employees working at your grocery store are prepared to answer questions regarding soy health benefits?

Yes	No	Don't Know
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

F - Demographics

We would like to learn more about you.

1. What is your gender?

Female	Male
<input type="checkbox"/>	<input type="checkbox"/>

2. What is your age group?

19-24	25-44	45-54	55-64	65 and over
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3. What is your ethnic background?

<input type="checkbox"/> Aboriginal (Inuit, Métis, North American Indian)	<input type="checkbox"/> Korean
<input type="checkbox"/> Arab/West Asian (e.g., Armenian, Egyptian, Iranian, Lebanese, Moroccan)	<input type="checkbox"/> Latin American
<input type="checkbox"/> Black (e.g., African, Haitian, Caribbean, Somali)	<input type="checkbox"/> South Asian
<input type="checkbox"/> Chinese	<input type="checkbox"/> South East Asian
<input type="checkbox"/> Filipino	<input type="checkbox"/> White (Caucasian)
<input type="checkbox"/> Japanese	<input type="checkbox"/> Other

4. What is your highest level of education?

☐ Less than a high school graduation certificate
☐ High school graduate
☐ Some postsecondary education
☐ With a trade, college or university certificate or diploma (below bachelor's degree)
☐ With a university degree at bachelor's level or higher

5. What is your yearly household income?

Under \$25,000	\$25,000 to \$49,999	\$50,000 to \$74,999	\$75,000 to \$99,999	\$100,000 and over
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

THANK YOU FOR COMPLETING THIS SURVEY!

Appendix 4. Information Letter: Saskatoon Co-op

SOY FOR HEALTHY LIVING SURVEY

Information Letter

Date:

Name:

Address:

RE:

Dear:

We would like your assistance in a study that is being carried out at the College of Pharmacy and Nutrition, University of Saskatchewan. The goals of this study are to develop an understanding of consumers' and employees' awareness, attitudes, and knowledge about soy products; how purchase decisions are made and what essential skills are needed to make decisions that will maintain individual health and the health of others. Findings from this study may help Saskatoon Co-op in its development of training policies and practices to enhance employee attitude and nutrition knowledge about soy.

The study will be conducted in two steps. In step 1, trained research assistants will approach shoppers entering the study areas and invite them to participate in the study. Shoppers expressing a willingness to participate will receive a survey package containing an information letter, questionnaire, self-addressed envelope. The research assistants will also ask for shoppers' telephone numbers in order to do follow-up calls as needed. The questionnaire is designed to be filled out in about 15 to 20 minutes and will seek information primarily about the extent to which participants consume soy products, or use soy supplements; reasons for using soy products, and nutrition knowledge relating to soy products; and demographics information.

Secondly, we will interview selected employees of both supermarkets at a time suitable to each participant. Each interview is designed to last about 30 to 45 minutes. We would like to interview staff and management members, who will be randomly chosen. We will consult with Co-op managers about the names of prospective participants.

Participation in this study is voluntary. Any participant [consumers and employees] may decline to participate or withdraw at any time. Each participant will be asked for permission to conduct the study [completed questionnaire for shoppers]. The study has been approved by the University of Saskatchewan Behavioural Research Ethic Board on April 14, 2005. Please, address any questions or concerns about the research study to Professor Carol J. Henry, researcher, College of Pharmacy and Nutrition, (306) 966-5833, or Paula Negraes, College of Pharmacy and Nutrition, (306) 966-6346.

Appendix 5. Interview Consent Form: Employee

NAME OF RESEARCHERS

Paula Negraes, B.S.A, M.Sc. Student

Carol J. Henry, PhD, Professor

College of Pharmacy and Nutrition,

University of Saskatchewan

Saskatoon, SK S7N 5C9

TITLE OF STUDY

Consumers' Attitude and Purchase Decisions with Regards to Soy Products

PURPOSE AND OBJECTIVES OF THE STUDY

We would like your help in a study that is being carried out at the College of Pharmacy and Nutrition, University of Saskatchewan.

The goals of the study are to understand how soyfoods purchase decisions are made; what essential skills are needed in order to make decisions that will maintain the individuals' health and the health of their dependants; and identify the sources through which knowledge on functional foods, specifically on soyfoods, enters into family, community, and workplace nutritional practices. Findings from this study will provide valuable information to assist health educators and education program planners develop future programs for combating the erosion of skills necessary for making healthy food choices among consumers.

During an interview, we would like you to discuss, with the principal investigator, Paula Negraes, what you know about functional foods and the health benefits of soy products as well as tell us what type of questions (if any) consumers ask you with regards to these products.

PROCEDURE FOR DATA COLLECTION

The interview will be scheduled by your manager and will take place at your working place, during your regular working hours.

During the actual interview, you can expect to spend from a half hour to 45 minutes answering the research questions. We would like that you not share the information discussed with your co-workers.

The interview will be audio-recorded and notes will be taken to be used for analysis later on.

The interview will be transcribed. You will be sent a copy of the transcription or notes taken during the interview for your clarification review, to give you the opportunity to revise it so that it reflects what you intended to say. Once you are satisfied with the transcript, we ask that you sign a Transcript Release Form so that the data can be used in the study.

You may be quoted in our study. If so, you will be shown the quotations selected, and will be invited to change anything you believe misrepresents them. All changes will be made as your request. Then, you will be asked to sign off on the quotation.

RISKS OR SIDE EFFECTS

There should be no risks or side effects from participating in this study.

WITHDRAWAL FROM STUDY

Your participation in this study is completely voluntary. You do not have to talk to me if you do not want to. Your decision to participate in this study will have no bearing on your employment status.

You are free to withdraw from the study at any time for any reason, without fear of negative retribution of any kind. A withdrawal will neither affect your relationship with the researchers nor with your manager. If withdraw should occur, the data collected will not be used in the study, and will be destroyed. You may withdraw just by letting Ms. Negraes (principal investigator) know that you wish to do so.

CONFIDENTIALITY

Response will be recorded by audiotape or in writing in order to complete all interviews in a short period of time. The results you provide will be kept confidential; however some anonymous quotations may be used, as is typical in qualitative research reports. Every attempt will be made so that the source cannot be traced to the subject.

The data collected will be safeguarded and securely stored at the University of Saskatchewan for a minimum of five years as per university regulations. The only ones who will have access to the interviews will be the researcher, supervisor, and the auditor.

The results will be presented in aggregate form only and will be included in the researcher's thesis and may occasionally be presented at seminars or conferences. The study may also be published in journals. However, your name will not appear in any published report.

The information you provide will not be shared with your employer.

All identifying information once the data collection is complete will be destroyed.

You will be anonymous in all reported results of the research; however, you may be identifiable on the basis of what you say because the research sample is made of a small number of individuals, in a closed group.

CONTACT PERSONS

If you have any questions or concerns about your rights as a subject participating in a study of this nature, please contact the Office of Research Services (966-8576) or the University of Saskatchewan Research Ethics Boards (966-2084). If you have any questions regarding the research project itself, please do not hesitate to contact any one of the researchers at the numbers or e-mail addresses below.

Paula Negraes – pfn878@mail.usask.ca – (306) 966.6346

Dr. Carol J. Henry – cjh815@duke.usask.ca – (306) 966.5833

UNANTICIPATED CHANGES TO STUDY

You will be advised immediately if any new information or changes take place that might have a bearing on your decision to continue in the study.

DEBRIEFING AND FEEDBACK

After the tapes have been transcribed or notes recorded, the researcher will meet with the supervisor to discuss the findings for clarity and accuracy of interpretation. A copy of the transcription or notes will also be sent to you for further clarification. The findings will be analyzed after you have reviewed the notes and sent back your responses. A final consultation will take place with the researcher's supervisor for approval of research results.

Once the study is completed, a summary report will be made available for you to look at.

The University of Saskatchewan Research Ethics Board has approved the research on April 14th, 2005.

SUBJECT CONSENT

I, the undersigned, have read and understand the goals of the study and my involvement in this study. I am aware that my participation in this study is strictly voluntary. I will be anonymous in all reported results of the research. However, I acknowledge that I may be identifiable on the basis of what I say because the research sample is made of a small number of individuals, in a closed group. All identifying information once the data collection is complete will be destroyed. I acknowledge that I have received a copy of the consent letter for my own records. I agree to participate in this study in the role of a key informant, and understand that I am free to withdraw from this study at any time without retribution.

☐ I agree to have my interview audiotaped.

☐ I do not agree to have my interview audiotaped.

Signature of Key Informant

Date

Signature of Researcher

Date

Paula Negraes, B.S.A

Carol J. Henry, PhD

Supervisor

Appendix 6. Interview Guide

A – Knowledge of Functional Foods

1. As you may be aware there is a growing interest in some foods that help prevent diseases. What is your understanding of the term “functional food”?

B - Use of Soy and Other Foods

Questions in this section relate to how many servings of soyfoods and other foods you consume every day.

1. How many servings of **nuts, soy products, and beans** (such as baked beans, pinto beans, kidney beans, lima beans, and black-eyed peas) do you usually eat every day?

(1 serving = ½ to 1 cup of beans, 1 cup tofu, ¼ cup of nuts, or 2 tablespoons of nut butter)

0 serving	½ serving	1 serving	2 servings	3 or more servings
[]	[]	[]	[]	[]

COMMENT: _____

2. How many servings of **vegetables and fruits** do you usually eat every day?

(1 serving = 1 cup raw salad greens; ½ cup cooked or chopped raw vegetables; or ½ cup juice)

0 serving	½ serving	1 serving	2 servings	3 or more servings
[]	[]	[]	[]	[]

COMMENT: _____

3. How many servings of **milk, cheese, yogurt, or calcium rich soy products** do you usually eat every day? (1 serving = 1 cup milk, ¾ cup yogurt; or 1 piece of hard cheese; or 2 slices of processed cheese)

0 serving	½ serving	1 serving	2 servings	3 or more servings
[]	[]	[]	[]	[]

COMMENT: _____

C - Use of Soy Products and Dietary Supplements

Questions in this section relate to what soy products you consume and how often you do.

1. Do you take any dietary supplement containing soy?

Yes No
☐ ☐

2. If you take any soy supplement, which do you take? Please, check all that apply:

☐ Soy protein powder, with or without isoflavones ☐ Soy shakes
☐ Soy isoflavones (in tablets or capsules) ☐ Soy protein bars
☐ Soy isoflavones in combination with other herbs/nutrients ☐ Other _____

3. Which of the following soy products do you eat or drink, and how often?

Product	Consumption Frequency				
	Daily	1-3 times each week	1-3 times each month	1-3 times each year	Never
Soy beverage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Texturized soy protein	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Texturized soy flour	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tempeh	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Soy nuts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Soy pudding	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Soy sauce	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Soy ice-cream	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Soy cheese	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Soy yogurt	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Soy protein isolate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Soy protein concentrate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Soy oil	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tofu	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Veggie burgers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Veggie dogs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Veggie patties	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Others	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Others [probe type(s) and frequency]

D. Attitudes about Soy

We are looking to understand your attitudes with regards to soyfoods. How would you rate the following statements?

1. I don't know how to cook with soy products.

Strongly		Somewhat		Somewhat		Strongly
Agree	Agree	Agree	Neutral	Disagree	Disagree	Disagree
[]	[]	[]	[]	[]	[]	[]
2. I would eat or drink soy products if they looked more appealing.

Strongly		Somewhat		Somewhat		Strongly
Agree	Agree	Agree	Neutral	Disagree	Disagree	Disagree
[]	[]	[]	[]	[]	[]	[]
3. I would eat or drink soy products if they were less expensive.

Strongly		Somewhat		Somewhat		Strongly
Agree	Agree	Agree	Neutral	Disagree	Disagree	Disagree
[]	[]	[]	[]	[]	[]	[]
4. I would consume more soy products if they tasted different.

Strongly		Somewhat		Somewhat		Strongly
Agree	Agree	Agree	Neutral	Disagree	Disagree	Disagree
[]	[]	[]	[]	[]	[]	[]
5. Soy has an after taste.

Strongly		Somewhat		Somewhat		Strongly
Agree	Agree	Agree	Neutral	Disagree	Disagree	Disagree
[]	[]	[]	[]	[]	[]	[]
6. I am likely to buy a soy-related product in the next week.

Strongly		Somewhat		Somewhat		Strongly
Agree	Agree	Agree	Neutral	Disagree	Disagree	Disagree
[]	[]	[]	[]	[]	[]	[]
7. I would try a soy dish at a restaurant.

Strongly		Somewhat		Somewhat		Strongly
Agree	Agree	Agree	Neutral	Disagree	Disagree	Disagree
[]	[]	[]	[]	[]	[]	[]
8. I would buy a frozen soy-based meal.

Strongly		Somewhat		Somewhat		Strongly
Agree	Agree	Agree	Neutral	Disagree	Disagree	Disagree
[]	[]	[]	[]	[]	[]	[]
9. I get pleasure from eating soy products.

Strongly		Somewhat		Somewhat		Strongly
Agree	Agree	Agree	Neutral	Disagree	Disagree	Disagree
[]	[]	[]	[]	[]	[]	[]
10. I like the taste of soy.

Strongly		Somewhat		Somewhat		Strongly
Agree	Agree	Agree	Neutral	Disagree	Disagree	Disagree
[]	[]	[]	[]	[]	[]	[]

11. Soy tastes good if prepared properly.
- | | | | | | | |
|----------------|-------|----------------|---------|-------------------|----------|-------------------|
| Strongly Agree | Agree | Somewhat Agree | Neutral | Somewhat Disagree | Disagree | Strongly Disagree |
| [] | [] | [] | [] | [] | [] | [] |
12. I do not buy soy-based product unless I know how they taste.
- | | | | | | | |
|----------------|-------|----------------|---------|-------------------|----------|-------------------|
| Strongly Agree | Agree | Somewhat Agree | Neutral | Somewhat Disagree | Disagree | Strongly Disagree |
| [] | [] | [] | [] | [] | [] | [] |
13. I am concerned about eating genetically-modified soy.
- | | | | | | | |
|----------------|-------|----------------|---------|-------------------|----------|-------------------|
| Strongly Agree | Agree | Somewhat Agree | Neutral | Somewhat Disagree | Disagree | Strongly Disagree |
| [] | [] | [] | [] | [] | [] | [] |
14. I willingly try new soy products.
- | | | | | | | |
|----------------|-------|----------------|---------|-------------------|----------|-------------------|
| Strongly Agree | Agree | Somewhat Agree | Neutral | Somewhat Disagree | Disagree | Strongly Disagree |
| [] | [] | [] | [] | [] | [] | [] |
15. Soy products are needed only by people who have specific health problems.
- | | | | | | | |
|----------------|-------|----------------|---------|-------------------|----------|-------------------|
| Strongly Agree | Agree | Somewhat Agree | Neutral | Somewhat Disagree | Disagree | Strongly Disagree |
| [] | [] | [] | [] | [] | [] | [] |
16. People would be healthier if they used more soyfoods.
- | | | | | | | |
|----------------|-------|----------------|---------|-------------------|----------|-------------------|
| Strongly Agree | Agree | Somewhat Agree | Neutral | Somewhat Disagree | Disagree | Strongly Disagree |
| [] | [] | [] | [] | [] | [] | [] |

Comments: [probe for additional comments about the ratings]

E – Benefits Derived from Soy Use

1. If you purchase soy products, please list the reasons why you do so (probe for reasons e.g. health-promotion, specific diet such as vegetarianism, cultural aspects, and others).

F – Knowledge and Interest in Soy Products

Questions in this section relate to your knowledge and interest in soyfoods. How would you rate the following statements?

1. Soy is low in fat.
- | | | | | | | |
|----------------|-------|----------------|---------|-------------------|----------|-------------------|
| Strongly Agree | Agree | Somewhat Agree | Neutral | Somewhat Disagree | Disagree | Strongly Disagree |
| [] | [] | [] | [] | [] | [] | [] |

2. Soy is high in fibre.
- | | | | | | | | |
|----------|-------|-------|----------|----------|----------|----------|----------|
| Strongly | | | Somewhat | | Somewhat | | Strongly |
| Agree | Agree | Agree | Neutral | Disagree | Disagree | Disagree | Disagree |
| [] | [] | [] | [] | [] | [] | [] | [] |
3. Soy is low in cholesterol.
- | | | | | | | | |
|----------|-------|-------|----------|----------|----------|----------|----------|
| Strongly | | | Somewhat | | Somewhat | | Strongly |
| Agree | Agree | Agree | Neutral | Disagree | Disagree | Disagree | Disagree |
| [] | [] | [] | [] | [] | [] | [] | [] |
4. Soy helps reduce the risks of heart disease.
- | | | | | | | | |
|----------|-------|-------|----------|----------|----------|----------|----------|
| Strongly | | | Somewhat | | Somewhat | | Strongly |
| Agree | Agree | Agree | Neutral | Disagree | Disagree | Disagree | Disagree |
| [] | [] | [] | [] | [] | [] | [] | [] |
5. Soy helps reduce bone loss.
- | | | | | | | | |
|----------|-------|-------|----------|----------|----------|----------|----------|
| Strongly | | | Somewhat | | Somewhat | | Strongly |
| Agree | Agree | Agree | Neutral | Disagree | Disagree | Disagree | Disagree |
| [] | [] | [] | [] | [] | [] | [] | [] |
6. Soy is healthy.
- | | | | | | | | |
|----------|-------|-------|----------|----------|----------|----------|----------|
| Strongly | | | Somewhat | | Somewhat | | Strongly |
| Agree | Agree | Agree | Neutral | Disagree | Disagree | Disagree | Disagree |
| [] | [] | [] | [] | [] | [] | [] | [] |
7. Soy helps reduce risk of cancer.
- | | | | | | | | |
|----------|-------|-------|----------|----------|----------|----------|----------|
| Strongly | | | Somewhat | | Somewhat | | Strongly |
| Agree | Agree | Agree | Neutral | Disagree | Disagree | Disagree | Disagree |
| [] | [] | [] | [] | [] | [] | [] | [] |
8. Soy consumption is completely safe.
- | | | | | | | | |
|----------|-------|-------|----------|----------|----------|----------|----------|
| Strongly | | | Somewhat | | Somewhat | | Strongly |
| Agree | Agree | Agree | Neutral | Disagree | Disagree | Disagree | Disagree |
| [] | [] | [] | [] | [] | [] | [] | [] |
9. Soy is expensive to add to meals.
- | | | | | | | | |
|----------|-------|-------|----------|----------|----------|----------|----------|
| Strongly | | | Somewhat | | Somewhat | | Strongly |
| Agree | Agree | Agree | Neutral | Disagree | Disagree | Disagree | Disagree |
| [] | [] | [] | [] | [] | [] | [] | [] |
10. Allergy to soy is common.
- | | | | | | | | |
|----------|-------|-------|----------|----------|----------|----------|----------|
| Strongly | | | Somewhat | | Somewhat | | Strongly |
| Agree | Agree | Agree | Neutral | Disagree | Disagree | Disagree | Disagree |
| [] | [] | [] | [] | [] | [] | [] | [] |
11. Soy can fulfill part of my protein needs.
- | | | | | | | | |
|----------|-------|-------|----------|----------|----------|----------|----------|
| Strongly | | | Somewhat | | Somewhat | | Strongly |
| Agree | Agree | Agree | Neutral | Disagree | Disagree | Disagree | Disagree |
| [] | [] | [] | [] | [] | [] | [] | [] |
12. Soy alters estrogen levels in women.
- | | | | | | | | |
|----------|-------|-------|----------|----------|----------|----------|----------|
| Strongly | | | Somewhat | | Somewhat | | Strongly |
| Agree | Agree | Agree | Neutral | Disagree | Disagree | Disagree | Disagree |
| [] | [] | [] | [] | [] | [] | [] | [] |

13. What sources of information positively influence your soy consumption? How would you rank your choices?

- | | |
|---|---|
| <input type="checkbox"/> Health experts | <input type="checkbox"/> Radio |
| <input type="checkbox"/> Media | <input type="checkbox"/> Conference, workshop |
| <input type="checkbox"/> Family/ Friends | <input type="checkbox"/> Directly from manufacturer |
| <input type="checkbox"/> Internet | <input type="checkbox"/> Supermarket |
| <input type="checkbox"/> Magazines, newspapers, and books | <input type="checkbox"/> Healthcare provider |
| <input type="checkbox"/> Television | <input type="checkbox"/> Others _____ |

14. What is your level of interest in learning more about soy products?

- | | | | | |
|--------------------------|--------------------------|--------------------------|----------------------------|--------------------------|
| Very
Interested | Somewhat
Interested | Neutral | Somewhat
Not interested | Not interested |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

G – Essential Skills

1. Do you often receive questions from consumers about soy?

- | | |
|--------------------------|--------------------------|
| Yes | No |
| <input type="checkbox"/> | <input type="checkbox"/> |

If yes, probe type(s) of questions received

2. How would you rate your knowledge and skill level for responding to questions about the benefits of soy?

- | | | | | |
|--------------------------|---------------------------|--------------------------|-------------------------------|--------------------------|
| Very
knowledgeable | Somewhat
Knowledgeable | Average | Somewhat
Not Knowledgeable | Unknowledgeable |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

COMMENT: _____

3. In your opinion, what factors within your work environment may provide opportunities for or would are likely to impede staff opportunities to obtain needed knowledge/ skills?

H - Demographics

We would like to learn more about you.

1. Gender

Female	Male
<input type="checkbox"/>	<input type="checkbox"/>

2. What is your age group?

19-24	25-44	45-54	55-64	65 and over
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3. What is your ethnic background?

<input type="checkbox"/> Aboriginal (Inuit, Métis, North American Indian)	<input type="checkbox"/> Korean
<input type="checkbox"/> Arab/West Asian (e.g., Armenian, Egyptian, Iranian, Lebanese, Moroccan)	<input type="checkbox"/> Latin American
<input type="checkbox"/> Black (e.g., African, Haitian, Caribbean, Somali)	<input type="checkbox"/> South Asian
<input type="checkbox"/> Chinese	<input type="checkbox"/> South East Asian
<input type="checkbox"/> Filipino	<input type="checkbox"/> White (Caucasian)
<input type="checkbox"/> Japanese	<input type="checkbox"/> Other

4. What is your highest level of education?

- ☐ Less than a high school graduation certificate
- ☐ High school graduate
- ☐ Some postsecondary education
- ☐ With a trade, college or university certificate or diploma (below bachelor's degree)
- ☐ With a university degree at bachelor's level or higher

THANK YOU FOR COMPLETING THIS SURVEY!

Appendix 7. Transcript Release Form

Dear:

Thank you for taking the time to participate in the interview. I appreciated the time and insight you gave me in helping with this study.

Please find enclosed the interview transcript transcribed verbatim from the tape. If you wish, please review and elaborate or make any comments on anything you said. You can write directly on the front or back of the draft copy. Please note that a transcribed conversation does not have the grammatical finesse as the same written thoughts. Thus, you don't have to worry about the grammar and so on. The important thing for me is that you focus on the ideas you presented. Also, note that the words in italics are my words.

If you are comfortable with the interview and agreeable to me using your data, please sign the enclosed Transcript Release Form. Remember that your anonymity will be ensured and results from the interviews will be presented in aggregate form only.

Please return one copy of the Transcript Release Form to me at the university address found on this letterhead, by [date]. The other copy may be retained by you for your own records. If you have made any changes to the transcript, please return these at this time, as well.

Once again, thank you for your participation. I look forward to sharing the results of my study with you.

Sincerely,

Paula Negraes

Nutrition Graduate Student

encl.

Transcript Release Form

I, _____, have reviewed the complete transcript of my personal interview for this study, and acknowledge that it accurately reflects what I said in my personal interview with the researcher, Paula Negraes. I hereby authorize the release of this transcript to the researcher to be used in the manner as described in the consent form. I have received a copy of the Transcript Release Form for my own records.

Signature of Key Informant

Date

Signature of Researcher

Date

Paula Negraes, B.S.A.

Carol J. Henry, PhD
Supervisor