1994

An Analysis of Flaxseed Utilization in the Health Food Industry

Holstun, Jennifer

North Dakota State University

http://hdl.handle.net/10365/10446

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Prepared for:

North Dakota Oilseed Council

and

North Dakota Agricultural Products Utilization Commission

Prepared by:

Jennifer Holstun
Dale Zetocha
Institute for Business and Industry Development
North Dakota State University

January 1994

Acknowledgements

Special recognition is given for financial support provided by the North Dakota Oilseed Council and North Dakota Agricultural Products Utilization Commission.

The authors extend a special thank you to Dr. Jack Carter for initiating the study, helping to secure financial support, for providing considerable amounts of information, suggestions, and guidance in completing the final reports. Also, thanks to Jennifer Howell, Larry Stearns, Tim Petry, Wayne Moore, and Pat Berglund for their valuable critiques and suggestions for the content of this report, and health food company representatives who provided product and market information on flaxseed products offered through the health food industry.

Preface

This report assesses trends of the health food industry and analyzes potential opportunities for growth in sales of flaxseed products offered through health food outlets. The Potential for Flaxseed Utilization in the Baking Industry report covered bakery products and health/breakfast/granola bars, so although these items are available in health food outlets, this report will focus on flaxseed oil, ground flaxseed and whole seed flaxseed availability and potential growth.

After consumers become more aware of flaxseed and its potential benefits, flaxseed could be offered as a salad bar condiment assuming flaxseed is accepted by consumers. A small section is included on potential opportunities for flaxseed as a salad bar condiment.

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INTRODUCTION

Flaxseed oil and other forms of flaxseed are available in health food stores nationwide. Although mainstream consumers are not aware of the potential health benefits of consuming flaxseed, flaxseed oil is among the top sellers in some health food stores. The increased interest in flaxseed consumption is driven by evidence that flaxseed is high in Omega-3 alpha-linolenic acid, high in fiber, and may have anti-cancer properties (Schiefer 68).

The health/natural food industry has grown significantly over the past 15 years (Oliveri 1). Although the industry offers trendy products, the attraction for more healthful foods has been increasing for years. Industry experts do not believe the trend toward more healthful foods is a fad. They consider this trend as a "longer-term lifestyle change" (Oliveri 1). Consumers' increasing concern for eating more healthful products has contributed to the industry's growth.

Healthful eating trends, once strictly applied to "health food nuts" of the 60s and 70s, have now become mainstream America (Duxbury 22). A national survey by HealthFocus found that 90 percent of total U.S. shoppers' purchasing decisions are influenced by health concerns ("Brand Loyalty" 1993). Approximately 81 percent of those influenced by health concerns, labeled "health-active shoppers," always or usually consider health in their food purchase decisions and 19 percent stated health sometimes plays a role in their purchase decisions ("Brand Loyalty" 1993). Purchasing habits of these consumers ("health-active shoppers") vary by gender and age. Eighty-one percent of women versus 70 percent of men always or usually buy foods for health reasons. Ninety-two percent of consumers between 50 and 64 years of age versus 60 percent of consumers 18 to 29 years of age always or usually buy for healthful reasons ("Brand Loyalty" 1993). See Table 1.

Table 1 . Purchasing Habits of Health Active Consumers Based on Age

Always or Usually Buy for Healthful Reasons	
Consumer's Age	Percent
50-64	92%
45-49	80
40-44	75
30-39	77
18-29	60

Source:"HealthFocus on U.S. Consumers, A National Study of Attitudes and Actions Toward Healthy Food Choices 1992." Health Focus, Inc.

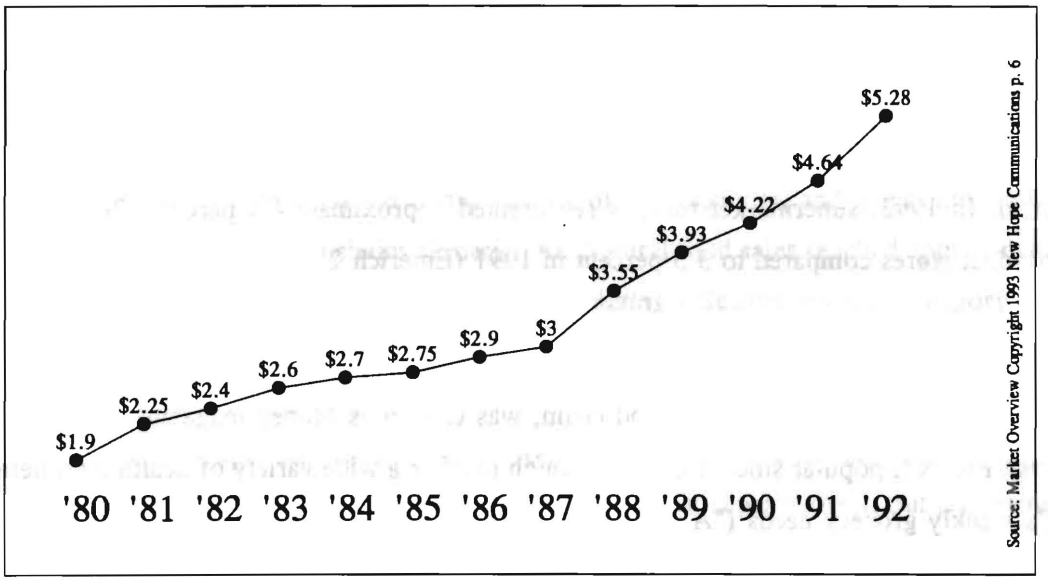
As consumers continue to demand more healthful foods, food marketers face the challenge of delivering health messages without making claims that violate new labeling laws (Dillon 101). Approximately 60 percent of health-active consumers always or usually read food labels. However, only 46 percent actually believe health claims on labels. Consumers who do believe the health claims are less interested in what has been put in or taken out than they are with the product's freshness ("Brand Loyalty" 1993).

Supermarkets are becoming the popular outlet of choice for health active consumers. In 1990 and 1992, 96 percent of health-active shoppers always or usually shopped in supermarkets ("Brand Loyalty" 1993). Mainstream supermarkets present a challenge for health food stores since major food companies are reformulating established products into more healthful versions in response to growing consumer demand for low-fat and fat-free products (Boles 43). More low-fat and fat-free products are appearing in mainstream supermarkets as these categories expand. However, product selection and customer service set health food stores apart from mainstream supermarkets. More brands are available through health food stores and health food retailers provide more health product knowledge than offered by mainstream supermarkets (Boles 43). Therefore, although supermarkets have become a major outlet for health/natural foods, traditional health food stores still offer some advantages.

HEALTH/NATURAL FOODS INDUSTRY TRENDS

Demographic trends affect the health food market, as with most nationwide consumer products industries (Business Trend Analyst 13). Natural food sales growth from 1980 to 1987 was minimal. However, toward the end of 1987, when consumers became more concerned about cholesterol and fiber and manufacturers, wholesalers and retailers increased marketing efforts, natural food sales increased 7 percent (Emerich 6). In 1992, retail natural food industry sales exceeded $5 billion (including sales from health and natural food sections within mass-market outlets merchandised as a separate section or delivered by traditional natural food vendors), a 13.8 percent increase from 1991, representing the largest percentage increase in 13 years (Emerich 6). See Figure 1.

Figure 1. History of Natural Product Sales
($ in billions)



The structure of the industry is changing, stores are larger, better quality products are offered, margins are lower, customers are more knowledgeable, and competition for shelf space and customers is greater (Emerich 1). Although health food stores did not experience an increase in customers during 1992, the average sales per person increased from $2.53 (in 1991) to $16.42 (Geslewitz 25). Health food chains, featuring General Nutrition Centers (GNC) and Nature Food Centers, showed the largest percentage of sales growth (16.9 percent) compared with other natural food outlets in 1992 (Emerich 1). The mass market increased 10.3 percent over 1991 with sales of $1.02 billion (see Table 2).

Table 2. Number of Natural Food Outlets and Gross Volume

Type of Store	Number of Stores	Sales[1]	Sales % Change 1991-1992
Independents	5,730	$3.59	13.9%
Chains	1,598	$.668	16.9%
Mass Market[2]		$1.02	10.3%
Total	7,328	$5.28	13.8%

[1]Sales in billions.
[2]Supermarkets
Source: Natural Foods Merchandiser's 12th Annual Market Overview 1992. June 1993.

Store Formats

Health food supermarket chains were introduced in hopes of increasing sales of natural foods and attracting more mainstream consumers by featuring more healthful versions of products offered in traditional supermarkets (Miller 2). The proliferation of chain supermarket natural product stores, which may have increased visibility of the industry and its products to consumers, was the key trend in 1992 (Emerich 2). In 1992, supermarket formats represented approximately 5 percent (286 stores) of total natural product stores compared to 3.5 percent in 1991 (Emerich 2).

Whole Foods Market is the largest natural food supermarket chain. However, Fresh Fields, a Rockville, MD-based five-store health food chain, was chosen as Money magazine's 1993 Store of the Year. Fresh Fields is popular since it is large enough to offer a wide variety of health food items to meet a family's weekly grocery needs ("A New Generation" 28). Other top health food supermarket chains include Wild Oats Markets, Boulder, CO, and Mrs. Gooch's Natural Food Markets, Herman Oaks, CA. Natural product supermarkets attract customers through their one-stop shopping appeal (Emerich 2).

Small to medium health food store formats (stores with up to 2,000 square feet that focus on vitamins, supplements and herbs) account for 35 percent of the total number of health food outlets with approximately 2,000 stores. Small natural food store formats (stores with up to 2,000 square feet focusing on food) claim 18 percent of the total number of outlets or 1,031 stores (Emerich 2).

To protect their territories from larger chains, many successful operators of smaller natural food stores opened new stores in 1992 (Emerich 2). In the Midwest, major movements were toward modified supermarket formats ranging from 8,000 to 20,000 square feet with an emphasis on perishables (Emerich 2).

Larger stores opening in areas with small retailers may present more product visibility and new customers for the industry. Natural food supermarket chains are trying to draw mainstream customers away from mass market stores, not from small natural food stores (Emerich 2). With large stores expanding and increasing the total market size, new opportunities are provided for small stores. For example, the small store can cater to those consumers who prefer to shop in smaller stores by providing products those consumers demand (Emerich 2).

Mass Market Competition

Mainstream consumer demands for healthful, low-fat and low sodium products are major contributors to increased natural food sales in the mass market (Emerich 4). Mainstream manufacturers are offering more healthful versions of traditional foods to satisfy consumer demands. Natural product sales in the mass market recorded a 10.3 percent increase in 1992 over 1991 because of more sophisticated product marketing, a clearer understanding of the consumer, and more commitment to the market by several large supermarket chains (Emerich 4). Natural food sales reached approximately $500 million in the mainstream market based on *Grocery Marketing's* Second Annual Category Movement Study.

The mass market supermarkets and natural food supermarkets are direct competitors since both target the "crossover" market: consumers who shop at conventional supermarkets, but are learning more about healthful foods (Emerich 5). To remain competitive with mainstream outlets, natural product retailers are carrying full product lines and trying to match prices of popular items that are also available in the mass market. Natural product retailers also are offering national brands of truly healthful product versions developed by mainstream manufacturers.

More healthful products are appearing in supermarkets. However, natural/health food stores offer unique services such as providing informational pamphlets and handouts, and training store employees to be knowledgeable about natural foods to assist consumers. Health food stores carry convenience foods that do not contain chemical additives or preservatives, and because of their shorter shelf life, these products may not be available in mass market outlets (Kleiner 15). The trend toward more refrigeration and freezer units continues as more than 1 out of 10 health food retailers added refrigerator units and 1 out of approximately 8 added freezer space in 1992, illustrating that convenience foods are essential for health food customers (Geslewitz 38). Some companies have chosen to distribute their products in health food stores, gourmet food stores and specialty shops due to the lower cost of entry and rapid distribution compared to traditional supermarkets ("Health Concerns" 24).

Health/Natural Foods Distribution

Health/natural food stores represent the largest single distribution channel for the health/natural foods industry. Distribution through other channels such as supermarkets is growing, since mainstream consumers are more receptive to health/natural foods (Business Trend Analyst 55).

Health/natural food stores serve as educational resource centers. Consumers expect to obtain information from knowledgeable sales staff and from free product literature that is available in most health/natural food stores. Health/natural food store owners present themselves as "educators fulfilling a mission to help people enjoy better health" (Business Trend Analyst 56). Retailers keep current on new medical and nutritional developments and often are active in local health education organizations. Nutritional educational resources including books about allergies, hyperactivity, and homeopathic medicine are available in many health/natural food stores. Books represent nearly 3 percent of health/natural food store sales, according to a survey by *Whole Foods* magazine.

Health/natural food store owners have reported difficulties in adding mainstream consumers to their clientele base. Some have expanded their consumer base by increasing product lines. However, such expansion often includes introducing "healthful" mainstream products into the store. The increased penetration of health/natural foods into the mainstream market has been most effective at expanding the consumer base of health/natural food industry (Business Trend Analyst 57).

Health/natural foods have expanded into supermarkets and drug stores. In 1989, these two distribution channels produced $440 million in manufacturer's sales, compared with $260 million in 1984. The growth is attributed to consumers becoming more receptive to health/natural foods (Business Trend Analyst 58). All segments of the health/natural food industry have successfully penetrated supermarkets. Drug stores offer selected categories of health/natural foods. Health/natural snack foods account for approximately 85 percent of the total health/natural food sales from drug stores. Herbal teas, grains and cereals also achieve significant sales volume through drug stores (Business Trend Analyst 58).

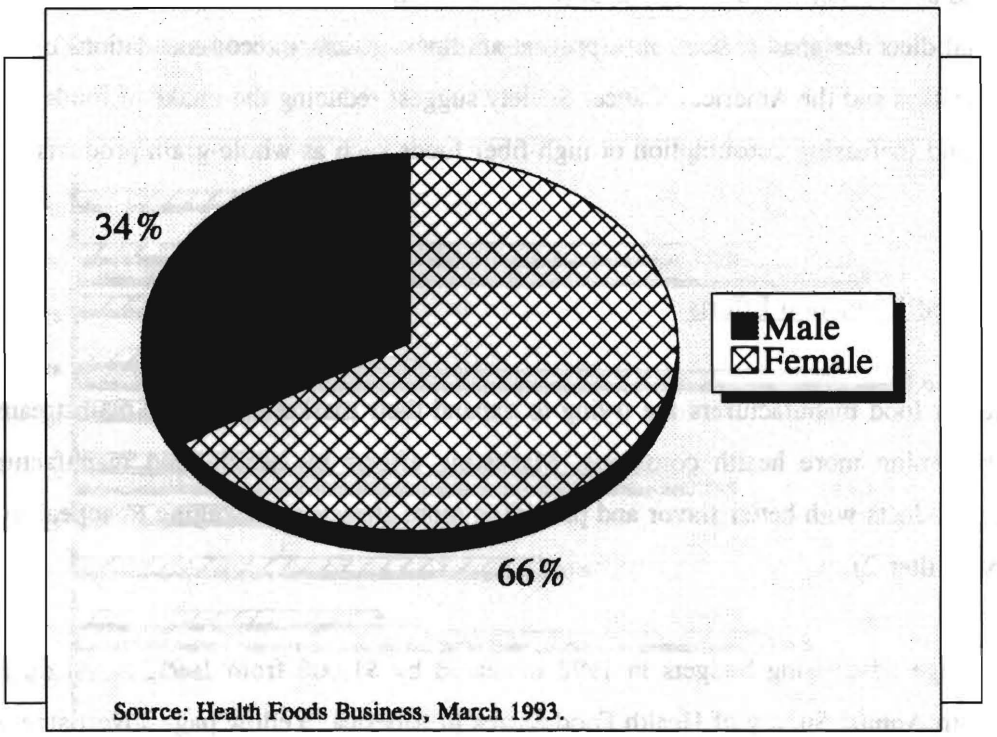
Health Food Consumers

Health food consumers have changed from the traditional "health food nuts" to include health conscious mainstream consumers. Health food consumers consist of three separate groups. The first group includes people who eat health foods for its healthfulness (traditional health food consumers). These consumers carefully read the list of ingredients on food packages and make every effort to maintain good health for the longest possible time. If these consumers have questions about a product, they often ask store employees for assistance or call the manufacturers directly. Only a small portion of this category is comprised of consumers who appear to be hypochondriacs, believing they are sick even if nothing is medically wrong (Business Trend Analyst 16).

The remaining two groups are composed of consumers who are or were part of the mainstream consumer population. One group consists of people who are required to modify their diets due to an illness or other medical condition. The other group contains people who eat all kinds of foods, including health foods. These consumers believe that health foods are beneficial even when eaten with mainstream foods, or they may eat health foods because products with comparable flavors are not available in mainstream supermarkets (Business Trend Analyst 16).

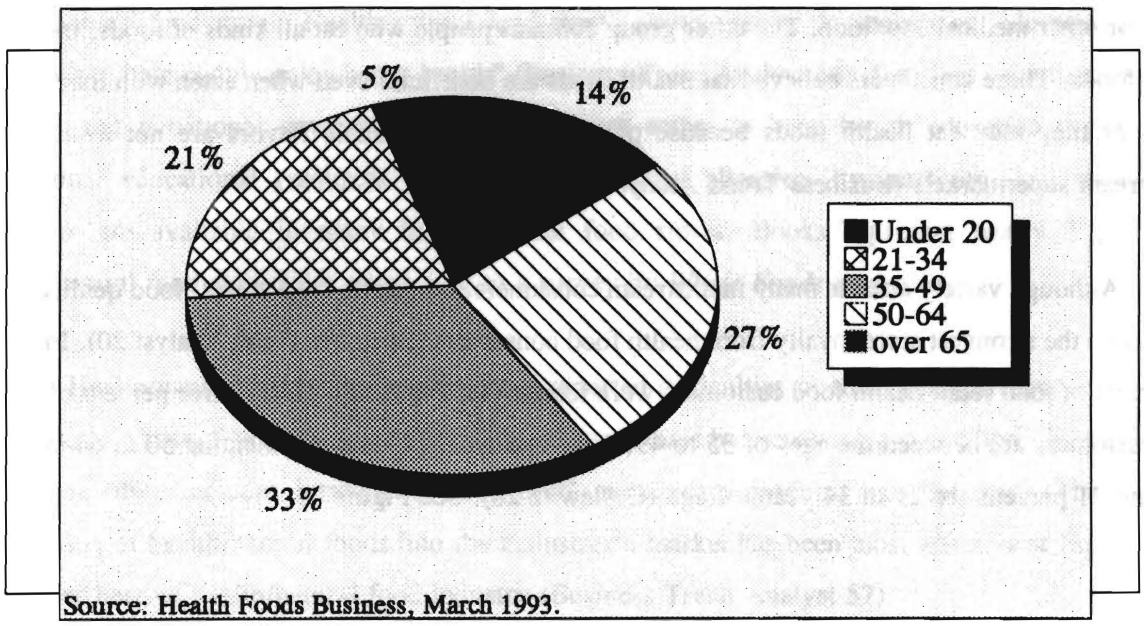
Although variety attracts many mainstream consumers into health food stores, food quality tends to generate the strongest store loyalty from health food consumers (Business Trend Analyst 20). In 1992, 66 percent of total retail health food customers were female (see Figure 2). Thirty-three percent of health food customers are between the ages of 35 to 49, followed by 27 percent representing 50 to 64 years of age, and 21 percent are 21 to 34 years of age (Geslewitz 28). See Figure 3.

Figure 2. Health Food Customer Gender Profile



Source: Health Foods Business, March 1993.

Figure 3. Health Food Customer Age Profile



Source: Health Foods Business, March 1993.

Unlike mainstream consumers, health food consumers educate themselves about how to control their diet and act on their desire for control (Business Trend Analyst 17). Many health food consumers are on special diets designed to control or prevent an illness. Dietary recommendations by the American Heart Association and the American Cancer Society suggest reducing the intake of foods high in fat and cholesterol and increasing consumption of high-fiber foods such as whole-grain products.

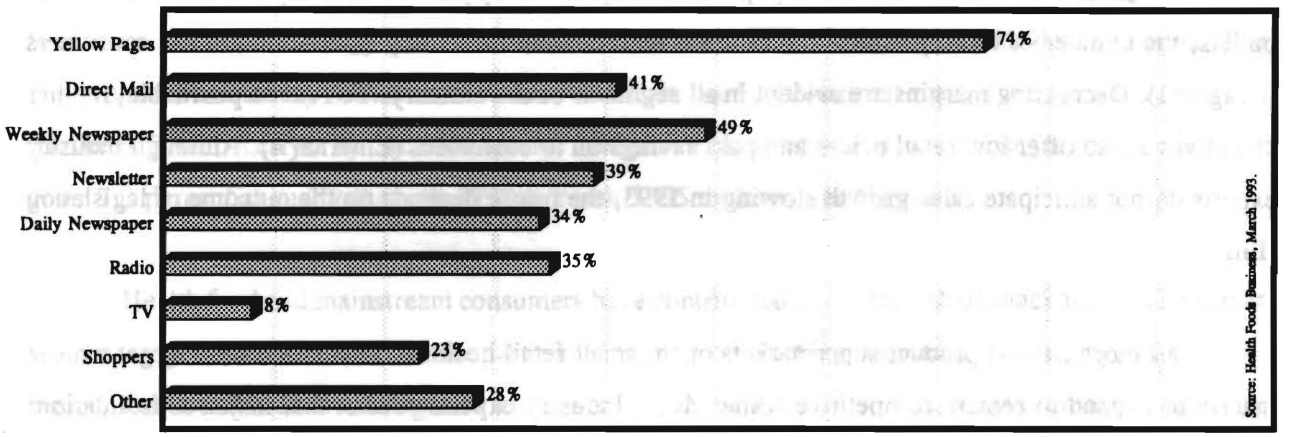
Advertising and Promotion Efforts

Health food manufacturers are trying to expand their market to include mainstream consumers who are becoming more health conscious. Marketing efforts by health food manufacturers include developing products with better flavor and providing more attractive packaging to appeal to mainstream consumers (Miller 2).

Average advertising budgets in 1992 increased by $1,000 from 1991, based on *Health Food Business'* 18th Annual Survey of Health Food Stores in America. Yellow page advertising was listed as the most common method with 74 percent of the stores using this method, followed by weekly newspaper (49%), and direct mail (41%). See Figure 4.

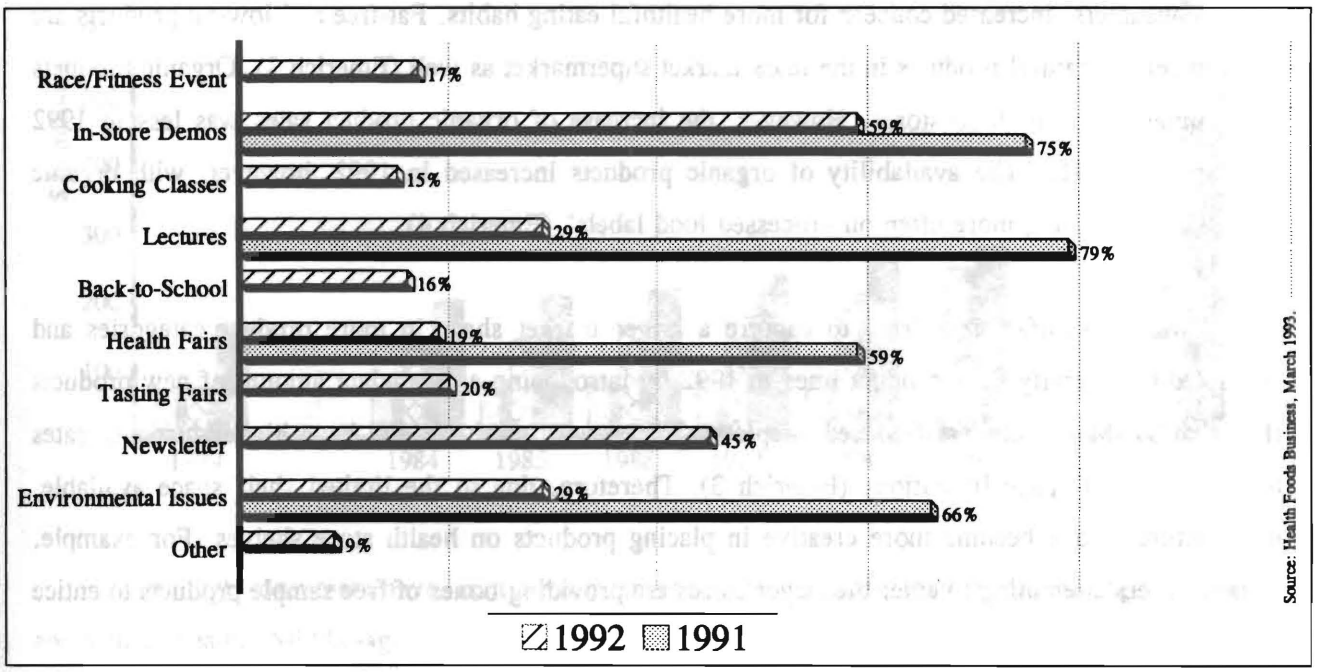
Figure 4. Advertising Methods Used by Health Food Stores in 1992

(Percent of Stores)



Retailers organized fewer promotional events in 1992 compared with 1991. In-store demos continued to be the leading promotional tool at 59 percent, a decline from 75 percent usage in 1991. Newsletters were used by 45 percent of the stores in 1992, followed by lectures at 29 percent. See Figure 5.

Figure 5. Promotional Events Organized by Health Food Retailers



Outlook

As natural foods become more popular items carried by mainstream supermarkets and other outlets, the number of those products offered will increase and eventually lower the cost for consumers (Aragon 1). Decreasing margins are evident in all segments of the industry. To remain profitable, retailer objectives are to offer low retail prices and pass savings on to customers (Emerich 4). Although industry experts do not anticipate sales growth slowing in 1993, the future depends on the outcome of legislation (Emerich 6).

As more natural product supermarkets open, small retail health food stores should target a niche market or expand to remain competitive (Emerich 5). Industry experts predict that major consolidations will take place in the next several years as competition increases between chains. Distributors also predict consolidation within the supply side of the industry as buyers lean toward using fewer suppliers (Emerich 6).

Product Trends

Over the past several years sports nutrition, homeopathy, herbs, fat-free foods and frozen foods have been the top-sellers in health food stores (Emerich 3). Fat-free product sales have increased largely due to consumers' increased concern for more healthful eating habits. Fat-free and low-fat products are also top selling natural products in the mass market supermarket as well (Emerich 3). Organic products are popular in health food stores. However, the increase of organic product sales was less in 1992 compared to 1991. "The availability of organic products increased in 1992, however, with organic ingredients appearing more often on processed food labels" (Emerich 4).

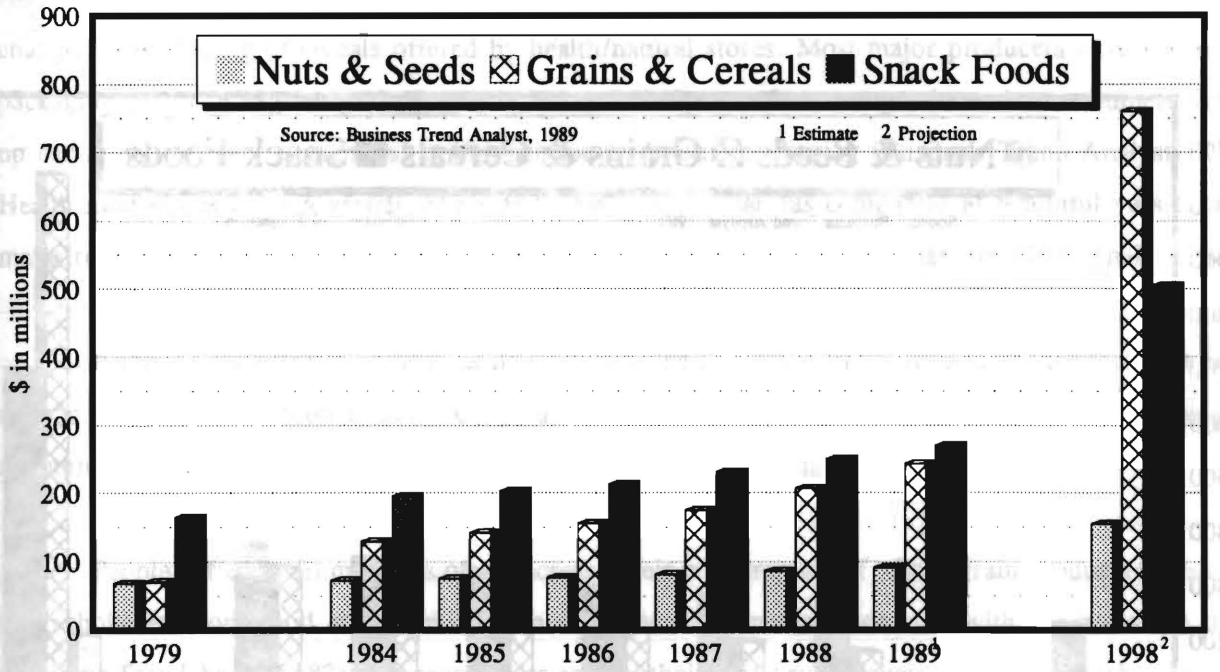
Many manufacturers tried to capture a larger market share in more product categories and attempted to diversify their product lines in 1992 by introducing an abundant amount of new products (Emerich 3). Many retailers replaced "depleting" lines with products that have higher turnover rates because of shelf space limitations (Emerich 3). Therefore, due to the limited shelf space available, manufacturers have become more creative in placing products on health store shelves. For example, manufacturers attempting to enter the larger stores are providing boxes of free sample products to entice store managers to carry their lines (Emerich 3).

Health/Natural Snack Foods Market

The health/natural snack segment has profited from consumers' eating fewer regular meals. Snacks are convenient energy foods for consumers who do not have the time and/or desire to cook. And, unlike snacks offered by mainstream outlets, snacks in the health/natural market are genuinely healthful (Business Trend Analyst 9). Manufacturers' sales of the health/natural snack category are expected to grow 7.3 percent annually through 1998 to reach $505 million (See Figure 6).

Health food and mainstream consumers have contributed to the growth of snack foods. Consumers are snacking more often than in the past. The number of working women is increasing, families are busier, and households are sitting down to fewer "family-style" meals, with people turning to nutritious snacks to get them through the day (Business Trend Analyst 122). Snacks offer "ready-to-eat" convenience and are portable.

Figure 6. Manufacturers' Sales in Selected Health/Natural Food Categories



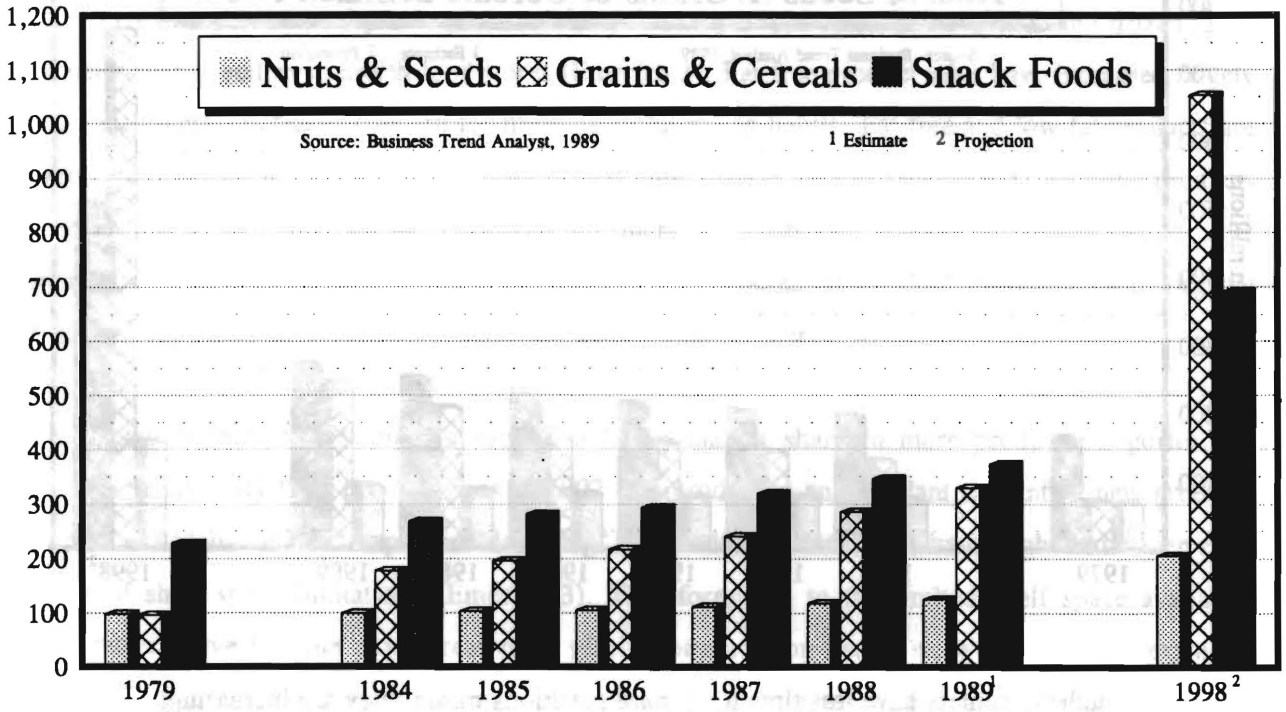
Although consumers have less time to prepare nutritious meals, they are increasingly concerned about their health. Middle-aged consumers, a growing portion of the population, must monitor their health more carefully as they grow older. Mainstream snack companies have retained most of their adult

market by offering "healthful" products catering to adults' mature tastes. These companies have also responded to consumers' most common nutritional concerns by removing tropical oils from their products. However, many consumers do not believe these "healthful" mainstream products are genuinely nutritious (Business Trend Analyst 123). Health/natural food producers can increase sales by promoting their products as having good flavor and being nutritious. To many consumers, flavor is more important than nutritional quality (Business Trend Analyst 123).

Natural Nuts and Seeds

Natural nuts and seeds are considered a segment of the snack foods market. Increased sales of natural nuts and seeds have benefitted from their high fiber content and their being enjoyable snacks (Business Trend Analyst 127). By 1998, manufacturer and retail sales of natural nuts and seeds are expected to reach $155 million and $205 million, respectively (see Figures 6 and 7).

Figure 7. Retail Sales in Selected Health/Natural Food Categories



Health/Natural Grains and Cereals Market

Whole grains, stone-ground flours, baked goods made with these ingredients, and granola and other cereal items make up the grains and cereals category. The grains and cereal segment of the health/natural foods industry is growing as more product offerings satisfy consumer demands for healthfulness and convenience. Manufacturer and retail sales of health/natural grains and cereals are projected to reach $760 million and $1 billion, respectively by 1998 (see Figures 6 and 7). Releases of studies suggesting that oat bran may help lower serum cholesterol have also contributed to the segment's growth. Studies showing that rice bran may be even more healthful than oat bran suggest that rice bran will likely drive the segment toward continued strong growth during the decade (Business Trend Analyst 179). However, more recent studies may not be as strongly favoring cholesterol reductions in the general population by oat and rice brans. Other trends influencing this segment include an increased emphasis on products low in sodium and products made with natural sweeteners (Business Trend Analyst 179).

Breakfast cereals constitute over half of all health/natural grain and cereal sales (Business Trend Analysts 179). Convenience of healthful ready-to-eat cereals has become popular products among adult consumers who do not have time to cook breakfast. Increased cereal sales also can be attributed to changes in packaging of cereals offered by health/natural stores. Most major producers have switched packaging cereal in bags to packaging it in boxes to imitate mainstream products that consumers grew up eating and to meet consumers' preference for traditional packaging (Business Trend Analyst 181). Health food stores carry a variety of products designed by various companies as healthful versions of mainstream cereals including "Wheaties," "Cheerios," and "Corn Flakes" (Business Trend Analyst 181).

Although mainstream companies have entered the granola market, granola has for the most part returned to the health food market. Granola continues to be a stable category due to the increased attention to whole-grain products and oat bran (Business Trend Analyst 182).

People suffering from illness often increase their consumption of whole-grain products to reduce their cholesterol or blood sugar, or to gain other health benefits associated with a wholesome diet (Business Trend Analyst 182). For example, to control their blood sugar levels, diabetics eat whole grains or breads made from whole-grain flour, instead of refined grains and white bread (Business Trend Analyst 182). Research in the *British Medical Journal* noted that whole grains are especially effective at reducing blood sugar levels; even more than whole-grain flour.

Doctors, nutritionists and dieticians promote fiber for its contributions to a healthful diet, for maintenance of a healthy body, and for prevention of heart disease and reduction of cancer risk (Duxbury 44). In 1992, few products contained added fiber, but consumers could choose from a variety of products naturally high in fiber such as fruits, vegetables, whole grain breads, and legumes (Dornblaser 8).

Health/Natural Groceries

Groceries are the most diverse segment of the health/natural foods market, with products ranging from soups to oils to baby foods (Business Trend Analyst 101). The category's sales are difficult to predict from year to year due to its diversity of products. "During the mid-80s, sales declined, but the category bounced back in 1988, largely because of increased concern about the healthfulness of many oils available in the mainstream market" (Business Trend Analyst 101).

FLAXSEED AVAILABILITY AND GROWTH POTENTIAL

Flaxseed sold in health food stores include whole seed, cold-pressed oil, ground (granular, powder (flour), or meal) and capsules or tablets. Flaxseed is also used as an ingredient in some cereals, health/breakfast bars, and cookies available in health food outlets.

The principal attributes of flaxseed in human nutrition are the high levels of α-linolenic acid (ALA; $C_{18:3}$n-3) in its oil and the high content of both soluble and insoluble fiber in the seed (Carter 753). Consumers purchase flaxseed products for potential health benefits. Several studies have been conducted by universities and the Food and Drug Administration of feeding flaxseed to people to evaluate the potential health benefits (Carter 754).

Flaxseed has a nutty, palatable flavor and contains several potential healthful compounds. Flaxseed is comprised of approximately 35 to 40 percent dietary fiber, 30 percent insoluble and 5 to 10 percent soluble; 35 percent oil of which 55 percent is alpha linolenic fatty acid; 26 to 28 percent protein; and vitamins and minerals including 100 percent recommended daily allowance of potassium and manganese in 100 grams (Carter 758).

Cold-Pressed Flaxseed Oil

Consumers are concerned about high levels of cholesterol and saturated fat in tropical oils. Therefore, food manufacturers are using more healthful oils. Consumers are switching from oils high in polyunsaturated fats to oils high in monounsaturated fats. Polyunsaturated fats reduce levels of both HDL (high-density lipoprotein) and LDL (low-density lipoprotein) cholesterol, while monounsaturates mainly reduce levels of harmful LDL cholesterol (Business Trend Analyst 102). Olive oil and canola oil are considered healthful oils. Safflower and sunflower oils are available in high-oleic forms, making them high in monounsaturated fats (Business Trend Analyst 102).

Recent nutritional studies indicate that today's average diet supplies only 20 percent of the required amount of Omega-3. This is most likely due to a substantial increase in the consumption of refined vegetable oils, hardened margarines, spreads and shortenings, saturated fats and fried foods over the last 50 years ("Is Omega-3 Lacking").

Omega-3 (alpha-linolenic acid) and Omega-6 (linoleic acid) are two essential fatty acids (EFA's) to the human diet. A deficiency of either results in progressively poorer health. Flaxseed oil provides an excellent source of both Omega 3 and Omega 6 EFA's ("The Sensible Essential").

Flaxseed oil contains approximately 50 to 55 percent Omega-3 EFA, 15 to 18 percent Omega-6 and has a favorable balance of polyunsaturated to monounsaturated and saturated fatty acids. Flaxseed oil is also naturally high in the anti-oxidant nutrients Beta Carotene and Vitamin E ("The Sensible Essential")

Oils may oxidize producing an "off" or less desirable flavor when exposed to light, oxygen and heat; therefore, special care is required in pressing, filling and storing operations (Erasmus 262). Refrigeration does not prevent these changes, but reduces the rate to about one-third of the rate at room temperature (Erasmus 135). No light exposure is the only guarantee for the oil to remain high quality (Erasmus 136). For complete protection, oils should be filled and stored in completely opaque glass or "earthen" containers, and nitrogen packed to exclude oxygen (Erasmus 136). For example, flaxseed oil is packaged in opaque bottles to provide protection from damaging light. One flaxseed oil label states that the product is flushed with an inert gas and is sealed to expel oxygen until consumed.

Once opened, oils should be kept in the refrigerator and used quite rapidly (Erasmus 136). To preserve the oil's freshness, the oil is mainly offered in small bottles (for individual household use); and should be purchased in bottles containing no more than 250 ml (8.5 oz.) due to its high linolenic acid (LNA) content. Safflower, sunflower and other oils high in linoleic acid should be purchased in bottles containing no more than 500 ml, and 1000 ml for olive oil which is high in oleic acid (Erasmus 136).

LNA (which is present in flaxseed oil) reacts with oxygen 5 times faster than the other essential fatty acid linoleic acid, and linoleic acid reacts 2.5 times faster than oleic acid (Erasmus 136). To ensure freshness, flaxseed oil can be stored about 3 months in a cool and unopened container and should be used within 2 to 3 weeks after opening. Safflower, sunflower, sesame and pumpkin oils have a shelf life of 9 to 12 months when in a cool and closed container and should be used within 2 to 3 months after opening. Olive oil will keep for up to 2 years in cool and closed containers and should be used within 9 months after opening (Erasmus 137).

Since flaxseed oil has a limited shelf life of three months, it should be marketed as a perishable, unlike oils with long shelf lives. For example, stamped expiration dates on the bottles force distributors to demand-order and move the oil rapidly and make consumers aware of its limited shelf life (Erasmus 1990).

Flaxseed Oil Advantages

Nutritionally, flaxseed oil is a very valuable oil (Erasmus 137). Fresh flaxseed oil contains approximately 70 to 80 percent EFAs with the majority being linolenic acid. One tablespoonful of flaxseed oil per day is recommended for the average adult (Rass 1993).

When compared with major vegetable oils, flaxseed oil contains the highest level of Omega-3 EFA with approximately 50 to 55 percent. If not hydogenated, canola oil contains 10 percent Omega-3, followed by soybean oil with 7 percent, corn and olive oil contain 1 percent, and safflower oil with only a trace. (Carter 754)

Vegetable sources of Omega-3 EFA such as flaxseed oil are preferable to fish oil in Omega-3 content, flavor and nutritional quality. Flaxseed oil is considered the richest natural source of the essential nutrient most consistently lacking in our foods: alpha-linolenic acid (Erasmus 1990). Fish oil is high in

cholesterol compared to vegetable oils and contains less (approximately one-half, but in a more available chemical form) Omega-3 EFA than flaxseed oil that does not contain cholesterol. Other advantages of flaxseed oil: "it is more stable than fish oil, requires less processing (keeping its nutrients intact), costs less, provides Omega 3s for both vegetarians and meat-eaters, and has a long history and tradition of food use and successful clinical application in degenerative conditions" (Erasmus 1990). Unlike fish oil, flaxseed oil can be used as salad dressing (Bob Wallberg, Omega Nutrition, personal communication, November 19, 1993).

Flaxseed oil can replace less nutritious oils in salads and be used on cereals, in soups, on vegetables, in mayonnaise, with yogurt, and in shakes (Erasmus 1990). Dr. Johanna Budwig of West Germany, considered the world's leading authority on flaxseed oil, recommends mixing flaxseed oil with non-fat or low-fat yogurt or cottage cheese (Rass 1993). The flaxseed oil-cottage cheese combination is healthful in providing the essential fatty acids Dr. Budwig has found lacking in many Western diets ("Essential Fatty Acids" 72).

Flaxseed Powder/Meal

To receive the full benefits of flaxseed's healthful components, the seeds should be freshly ground or milled prior to use since the hard seed coat makes it difficult to digest. Flaxseed powder (ground flaxseed) can be purchased in many natural/health food stores or through mail order. Ground flaxseed is fortified with zinc and vitamins B_6 and E. Bob Wallberg, Omega Nutrition, stated that vitamin B_6 is added to compensate for the anti-B_6 factor contained in flax seeds. He also noted that vitamin E is added to protect against possible rancidity of the oil and to obtain the most beneficial results of the alpha-linolenic acid (B. Wallberg, personal communication, December 9, 1993, and P. Stitt's "Power of Flax"). Zinc is also added since "flaxseed contains a considerable amount of phytic acid, which could inhibit the absorption of zinc" (Ratnayake, et al. 41).

Flaxseed powder is packaged in sealed opaque containers, shielding the product from light and oxygen for consumers to obtain maximum health benefits. Flaxseed powder is a good source of the Omega-3 essential fatty acid found in flaxseed oil. Flaxseed powder has a longer shelf life than flaxseed oil, nine months compared to three months. Refrigeration is not required until after the package is opened. Flaxseed powder has a nutty flavor and can be used in blender drinks, sprinkled on salads, cereals, yogurt and other foods.

Flaxseed Versus Other Fiber Sources

Flaxseed is unique compared to other fiber sources for its favorable Omega-3 to Omega-6 ratio. A perspective on the dietary fiber content of flaxseed relative to other seeds or components including psyllium seed, oat bran, and oat meal is provided in Table 3. However, these seeds/grains may not be regarded as perfect substitutes.

Table 3. Total Dietary Fiber Content (%) of Certain Plant Seeds or Components

Fiber Component	Flaxseed	Psyllium Seed	Oat Bran	Oat Meal	Rice Bran
Total dietary fiber	40	80	17	11	75
Soluble fiber	10	70	8	5	4
Insoluble fiber	30	10	8	6	71

Source: Cereal Foods World, October 1993, pg. 754.

Psyllium is obtained from the seed husks of a plant grown primarily in India and the Mediterranean. For many years, psyllium has been used as a bulk forming laxative and is a major ingredient in Metamucil and Fiberall nonprescription laxatives ("Psyllium Psafety" 1989). Psyllium is a natural grain with a very high soluble fiber content of 65 to 70 percent, or more than 8 times the amount contained in oat bran (Duxbury 44). However, FDA has serious concerns about the introduction of significant amounts of psyllium seed husks in foods without an appropriate safety review ("Psyllium Psafety" 1989).

Rice bran is another good food fiber source. Rice bran has an oil content of 22 to 24 percent and is rich in lecithin. Rice bran fiber has a superior water-holding capacity, a natural sweetness and a slightly nutty flavor (Duxbury 44).

For many years, oats have been a leader in fiber ingredient marketing for health benefits. Conventional oat bran contains 12 to 18 percent total dietary fiber content. Oat bran and other oat ingredients, ranging from rolled oats to flakes to flour, contain lower levels of fiber (1 to 2%). (Duxbury 44)

Price Comparison of Flaxseed and Other Fiber and Omega-3 Sources

Local health food stores and mail order health food companies were contacted for prices of flaxseed, fish oil, psyllium, oat bran, oat meal, and rice bran (see Table 4). Prices do not include shipping charges if purchased through a mail order company. Various forms of these products are available including liquid, capsule, powder and bulk. Consumers may have preferences over one form versus another. Flaxseed is price competitive with fish oil, oat bran, rice bran, psyllium seed and husk, and oat meal. Table 4 provides price summaries of the various forms available.

Table 4. Price Comparison of Flaxseed Products and Alternative Fiber Sources

Product	Retail Price Range	Wholesale Price Range
Flaxseed (bulk)	$0.60 - $1.65/lb.	$0.15 - $0.40/lb.
Flaxseed Oil (sizes include 8.5, 12, and 16.9 fl. oz. bottles)	$0.75 - $1.29/ fl. oz.	$0.50 - $0.77/fl. oz.
Flax Oil Capsules	$7.16 - $9.95 (100 ct.) $15.99 - $19.95 (250 ct.) $15.96 - $19.95 (300 ct.)	$5.37 - $5.97 (100 ct.) $11.97 (250 ct.) $19.95 (300 ct.)
Flaxseed (powdered form)	$4.85 (8 oz.) $6.29 - $8.24 (16 oz.)	N.A. N.A.
Flaxseed (granular form)	$8.95 (16 oz.)	N.A.
Psyllium Seed (bulk) Psyllium Seed (capsules)	$4.35/lb. $7.49 (100 ct.)	N.A. $3.75 (100 ct.)
Psyllium Husk (powder) Psyllium Husk (bulk) Psyllium Husk (capsules)	$7.95 (12 oz.) $16.95 (12 oz.) $7.95 (100 ct.)	N.A. N.A. $4.00 (100 ct.)
Omega 3 Fish Oil (soft gels)	$6.95 (50 ct.) $5.75 - $12.95 (100 ct.) $10.99 (120 ct.)	$3.48 (50 ct.) $6.48 (100 ct.) $5.50 (120 ct.)
Omega 3 Fish Oil (liquid) (available in 12 fl. oz. bottle)	$0.56/fl. oz.	N.A.
Oat Bran (bulk) Oat Bran (tablets)	$1.32 - $2.28/lb. $1.79 (100 ct.) $10.95 (360 ct.) $5.59 (500 ct.) $9.79 (1000 ct.)	N.A. N.A. $6.57 (360 ct.) N.A. N.A.
Oat Meal (bulk) Oat Meal (tablets)	$0.55 - $2.39/lb. $6.95 (120 ct.)	N.A. $4.17 (120 ct.)
Rice Bran (bulk)	$1.59 (8 oz.)	N.A.

*Price quotes are based on local retail health food stores and mail order catalogs (excludes shipping). Lower prices for larger quantities and sizes are available-- all sizes were not included. Wholesale prices were not available for some products.
Cleaned, fresh whole flaxseed is available in 1 to 56 lb. bags for $0.15 to $0.20/ lb. from several seed company sources in North Dakota.

MARKET OUTLOOK

In North America, flaxseed has been used very little, except for the last two decades, in small quantities, in baked goods. There is also a limited market for freshly pressed oil. The increased interest in flaxseed consumption is driven by evidence that flaxseed is high in Omega-3 alpha-linolenic acid, high in fiber content, and may have anti-cancer properties (Schiefer 68).

B. Wallberg of Omega Nutrition, Inc. estimates that 4 to 5 million pounds of flaxseed go into products offered by national health food stores annually. He also noted that Omega Nutrition was the first company in North America to offer flaxseed oil for human consumption in 1987. In 1987, very little flaxseed (including the oil) was sold, but now it is a popular item in health food stores (personal communication, November 19, 1993).

Flaxseed and cold-pressed flaxseed oil can be purchased in most "health food" stores in North America. Several health food manufacturers and retailers indicated that of all flaxseed products available, flaxseed oil is the most popular form sold and is also considered a top seller when compared to total products sold. Swanson's Health Foods began offering flaxseed oil three years ago, and it is one of their best sellers (J. Strandness personal communication, December 2, 1993). Strandness also mentioned that flaxseed oil capsules were added later, but have become popular for consumers who do not want to bother with mixing the oil or prefer to use capsules when traveling instead of carrying the oil.

Cold-pressed flaxseed oil is popular due to cancer research in Germany and published articles regarding the potential benefits of consuming flaxseed. However, health food companies are unable to advertise its health benefits. Health food company employees consider this to be a major disadvantage. Employees can inform consumers that flaxseed products contain Omega-3, but cannot discuss any of the potential benefits.

Based on several contacts to retail health food stores and manufacturers of health foods, very few health food stores carry the Omega (golden) flaxseed variety. One Fargo health food store carries the Omega flaxseed which retails $.12 per pound higher than the brown flaxseed. The better "eye appeal" and easier grinding of the golden Omega flaxseed may lead to a preference for it in the future.

Consumers' increasing interest in healthful eating along with research and more articles published on the potential benefits of consuming flaxseed over the past few years have contributed to sales growth

of flaxseed products. A manufacturer of flaxseed oil and flaxseed meal estimated flaxseed sales growth of 20 percent per year over the last five years. A distributor of flaxseed and flaxseed oil also indicated sales increases over the last four years.

SUMMARY/CONCLUSIONS

Health food consumers consist of three groups: those who eat health foods for its healthfulness, people who are required to modify their diets, and people who eat all kinds of foods. Approximately two-thirds of retail health consumers are female. One-third of the health food consumers are between 35 and 49 years of age, followed by 27 percent aged 50 to 64, and 21 percent are 21 to 34 years of age. Health food consumers educate themselves about how to control their diet and act on their desire for control. Many health food consumers are on special diets designed to control or prevent an illness.

Sports nutrition, homeopathy, herbs, fat-free foods and frozen foods have been top-sellers in health food stores. Other health food categories have also experienced increased sales. The health/natural snack segment has profited from consumers eating fewer meals and snacking more. The number of working women is increasing, families are busier, and households are sitting down to fewer "family-style" meals, with people turning to nutritious snacks.. Snacks offer "ready-to-eat" convenience and are portable. Natural nuts and seeds, a segment of the snack foods, have benefitted from their high fiber content and being an enjoyable snack. The grains and cereal category is growing as more offerings satisfy consumer demands for healthfulness and convenience.

Manufacturers of health foods are trying to expand their market to include mainstream consumers who are becoming more health conscious. Marketing efforts include developing products with better flavor and providing more attractive packaging. All segments of the industry are experiencing decreasing margins. To remain profitable, retailer objectives are to offer low retail prices and pass savings to consumers.

Health food stores, in general, offer lower entry costs and rapid distribution compared to mainstream supermarkets. Therefore, initially promoting the Omega (golden) variety to health food manufacturers may provide opportunities for increased sales of flaxseed in the health food industry. Flaxseed producers who are interested in entering the health food market should contact various manufacturers (or retailers) for specific purchasing/packaging requirements desired. In-store demos

continue to be the leading promotional tool used by health food retailers. In-store demos of flaxseed products would provide an opportunity for consumers to sample flaxseed and may increase sales of these products. Publishing articles in health food newsletters, used extensively by health food outlets, would be another channel to provide consumers with valuable information about flaxseed. Other marketing tactics include: imitating the packaging of mainstream nuts and seeds, offering flaxseed at a competitive price, offering flaxseed in small quantities to ensure product freshness, providing free product samples to selected health food stores to increase the potential for obtaining shelf space, and offering free product information to customers. Yellow page advertising is the most common advertising method used by retailers of health food stores, followed by weekly newspapers. Advertising through these channels may increase consumer awareness of flaxseed products as well.

Health/natural food producers can increase sales by promoting their products as having good flavor and being nutritious. To many consumers, flavor is more important than nutritional quality. Focus groups could be used to determine the interest in flaxseed products. These groups should consist of rural and urban consumers.

Although health foods are appearing in many supermarkets, flaxseed and flaxseed oil are not currently available in local supermarkets. However, with the continued emphasis on healthful eating habits and if educational efforts are successful in promoting flaxseed, supermarkets could be a potential distribution channel for flaxseed products. (Refer to The Potential for Flaxseed Utilization in the U.S. Baking Industry report for other recommendations on educating and promoting flaxseed).

FLAXSEED AS A POTENTIAL SALAD BAR CONDIMENT

After mainstream consumers become more aware of flaxseed, its potential health benefits, and accept flaxseed as a "flavorable" seed, it could potentially be introduced as a salad bar condiment.

The National Sunflower Association was contacted for a perspective on how sunflower seeds were introduced as a salad bar condiment. The process was not documented, but extensive promotion and education by the National Sunflower Association contributed to the success of sunflower seeds. Bob Majkrzak of Red River Commodities indicated that the National Sunflower Association organized a major promotional campaign for sunflower seeds. Sunflower seeds were first introduced into the snack market and a roasted flavor was offered. After sunflower seeds were accepted as a snack food by consumers, it

was natural to look for other uses and markets. At the same time that companies were looking for other uses for sunflower seeds, salad bars were becoming popular and many outlets with salad bars were looking for unique ingredients to diversify. Sunflower seeds met this niche, since sunflower seeds were considered "healthy nuts" and no nuts or seeds were yet offered on salad bars. Large companies became involved in packaging sunflower seeds for sale as a salad bar condiment. Another factor adding to the success of sunflower seeds is that people associate the sunflower plant with "beauty" and therefore expect the seed will taste good. Consumers associate beauty with good flavor (B. Majkrzak, personal communication, October 27, 1993).

B. Majkrzak of Red River Commodities said he has pushed flaxseed hard at trade shows. However, many people do not know what flaxseed is or what it looks like (personal communication, October 27, 1993). Before trying to introduce flaxseed as a salad bar ingredient, consumers must first be able to recognize flaxseed (consumer education), have an opportunity to taste the seed by itself to appreciate its flavor. If consumers believe the seed has a good flavor, they can visualize how its flavor would contribute as a salad topping. Flavor remains the key for success.

Potential problems for using whole flaxseed as a salad bar condiment are that the seed can easily get stuck in teeth and not all of the health benefits would be received from the whole seed unless the seeds were chewed several times. One option is to grind the flaxseed in the kitchen and offer as a ground powder topping. Another option would be to grind the flaxseed in a pepper grinder and sprinkle it on salads. Restaurant chains that offer fresh ground pepper on salads would be potential contacts to test market fresh ground flaxseed. However, frequent cleaning of the grinder and/or refrigeration (storage) requirements to prevent possible rancidity would have to be addressed.

References

Amin, Melanie. "The most important meal of the day." Prepared Foods 15 April 1992: 65.

"A New Generation of Health Food Stores; Fresh Fields Treats Niche with Chain Efficiency." Chain Store Age Executive with Shopping Center Age Apr. 1993: 28.

"Another Snack Goes Mini." Prepared Foods Mar. 1993: 39.

Aragon, Lawrence. "As Profits Rise, Bread of Life is Rolling in Dough." The Business Journal-San Jose 6 Feb. 1989: 1.

"Arrowhead Mills Nutriflax." Product Alert 22 Mar. 1993.

Best, Daniel. "A New Age in Preventative Eating." Prepared Foods May 1992: 62.

Best, Daniel. "Breakfast Cereals: What Comes After Fiber." Prepared Foods 15 July 1990: 101.

"Bio-EFA FiPro Flax 100% Cold-Milled Flax Seed." Product Alert 2 Nov. 1992.

Boles, Mark. "Fat-Free and Low-Fat Foods: Heavyweights In Today's Market." Health Food Business Mar. 1993: 41-44.

"Brand Loyalty: Targeting the Health-Active Shopper." Research Alert 15 Jan. 1993.

Business Trend Analysts, Inc. "The Health and Natural Food Market." July 1989.

Carter, J.F. "Potential of Flaxseed and Flaxseed Oil in Baked Goods and Other Products in Human Nutrition." Cereal Foods World Oct. 1993: 753-758.

Conlan, Michael F. "Taking Charge of Their Own Health." Drug Topics 17 July 1989: 51.

Davis, Sue. " A Natural Way to Start the Day." Prepared Foods 15 Apr. 1993: 63.

Davis, Sue. "New Soup Offerings are Usin' the Old Noodle." Prepared Foods 15 Apr. 1993: 105.

Dillon, Patricia M. "Going Nuts...or Maybe a Little Fruity: Fruits and Nuts are the 'Secret' Ingredients that Help Create Naturally Nutritious Foods." Food Engineering May 1991: 101.

Dornblaser, Lynn. "Healthy Claims Make Healthy Gains." Prepared Foods 15 Apr. 1993: 8.

Dornblaser, Lynn. "Watch Out! It's Oat Bran-Omania." Bakery Production & Marketing 24 Mar. 1989: 70.

Duxbury, Dean D. "Fiber: Form Follows Function; Right Fiber Mix Provides Functionality While Enriching Healthy Foods." Food Processing Mar. 1993: 44.

Duxbury, Dean D and Robert J. Swientek. "'Eating Healthy' Trend Spurs Therapeutic Foods." Food Processing Mar 1992: 22.

Emerich, Monica. "NFM's 12th Annual Market Overview 1992." Natural Foods Merchandiser June 1993.

Erasmus, Udo. Healing Fats...Killing Fats. 1990: 1-14.

Erasmus, Udo. Fats and Oils. Burnaby, BC: Alive Books, 1986.

"Essential Fatty Acids Play Key Role in Optimal Health According to Top Nutritionist Dr. Johanna Budwig." Swanson's Health Shopper Swanson Health Products, Inc. Jan. 1994: 72.

Friedman, Martin. "Grain-based Products Promote 'Well-bred' Bodies." Prepared Foods Jan. 1993: 49.

Geslewitz, Gina. "1992: Remaining Steadfast, Despite Tough Conditions." Health Foods Business March 1993: 25-40.

"Health Concerns Set Stage in Snacks; Producers Reformulate Product Lines to Meet Nutritional Needs, While Striving to Introduce Innovative Crackers and Salted Snacks." Milling & Baking News 19 June 1990: 24.

"Health Food Outlets." Marketing 27 Sep. 1990: 20.

"Healthy Foods: More and More, Better and Better." Food Manufacture Mar. 1992: 23.

Hernan, Michael. "Taking a Liking Naturally to Natural Foods Business." Philadelphia Business Journal 6 Mar. 1989: 1.

Holstun, Jennifer L., Dale F. Zetocha, Larry D. Stearns, and Timothy A. Petry. The Potential for Flaxseed Utilization in the U.S. Baking Industry. North Dakota State University, Institute for Business and Industry Development, Fargo, North Dakota, December 1993.

"Is Omega-3 Lacking in the North American Diet?" Arrowhead Mills informational pamphlet.

Kleiner, Susan N. "Health Food Stores: Are They Really More Healthful?" The Physician and Sports Medicine Feb. 1991: 15.

"Manufacturer: Rudolph's Specialty Bakeries, Ltd." Product Alert 7 Dec. 1992.

McMath, Robert. "Smelling Great and Eating Healthfully." Adweek's Marketing Week 23 Oct. 1989: 73.

Miller, Cyndee. "Health Food Sheds 'Hippie' Image; Mainstream Consumers Targeted." Marketing News 14 Sep. 1992: 2.

Murphy, Liz. "Natural Foods Grow Up." Food & Beverage Marketing Sep. 1989: 32.

"Oat Bran, Microwave, No-Cholesterol Key Trends in Consumer Baking Mixes." Milling & Baking News 20 June 1989: 32.

Oliveri, David. "Nature Foods Turns a Healthy Profit." Boston Business Journal 15 June 1992: 1.

"Omega Nutrition Sesame Oil; Safflower Oil; Hazelnut Oil; Sunflower Oil; Canola Oil; Olive Oil; Flax Oil."Product Alert 29 Mar. 1993.

Price, Caroline. "Food for Thought." Michigan Business Mar. 1990: 24.

"Psyllium: Food or Drug?" FDA Consumer Dec. 1989/Jan. 1990: 2. and Journal of the American Dietetic Association 1990.

"Psyllium Psafety." FDA Talk Paper 29 Sept. 1989.

Rass, Don. "Flaxseed Oil Filling a Vital Need." Reprint by Tochi Products.

Ratnayake, W.M.N., et al. "Flaxseed: Chemical Stability and Nutritional Properties." Proceedings of the 54th Flax Institute of the United States 1992: 37-47.

"Roman Meal Hot Cereal - Cream of Rye: Hot Cereal - Original." Product Alert 26 Oct. 1992.

Schiefer, H.B. "In Pursuit of GRAS Status for Flaxseed: Some Practical and Hypothetical Considerations." Proceedings of the 54th Flax Institute of the United States 30 Jan. 1992: 67-71.

"Spectrum Naturals Veg-Omega-3 Organic Fresh Flax Seed Oil." Product Alert 26 Oct. 1992.

Stitt, Paul. "The Power of Flax." informational pamphlet.

"The Fish-Free Alternative." Arrowhead Mills informational pamphlet.

"The Sensible Essential." Arrowhead Mills informational pamphlet.

"Walnut Acres Nutriflax - Powdered Supplement." Product Alert 1 Mar. 1993.

"What Makes Omegaflo Flax Seed Oil Superior?" Arrowhead Mills informational pamphlet.

"Why Is Flax Seed Oil So Important?" Arrowhead Mills informational pamphlet.