Natural Foods Training Manual

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Introduction

Objectives

Food co-op shoppers, like all consumers, appreciate knowledgeable and helpful store staff. Historically, food co-ops have been the grocery industry leaders in providing education to their shoppers. And many food co-ops are the best local source of natural foods. The objectives of this manual are to help co-op employees to:

- Increase their knowledge of natural foods
- Discover special qualities of individual foods
- Learn ways to answer common shopper questions

Overview

- The Natural Foods Training Manual originated in 1995 as a training program for the Twin Cities Natural Foods Co-ops. TCNFC member stores were expanding and hiring many new employees, some with no knowledge of natural foods. Wanting to improve customer service as well as develop their employees' knowledge base, TCNFC hired two local dietitians who were members of TCNFC stores and interested in developing the program. They put together a course that was then offered to employees as a training program within TCNFC and later in a "Train the Trainer" format across the Midwest.
- When TCNFC merged with NCGA, the Natural Foods Training Course became the property of NCGA and in 2007, NCGA invited one of the original developers to revise and update the program for NCGA member stores to have as a training resource.
- The revised and updated Natural Foods Training Manual features web or print formats, six operationally designed content sections with additional material covering newer products such as agave and stevia sweeteners and white whole wheat flour. As with the original, the material in the manual uses and complements information found in the NCGA Food Brochures (which also began as a TCNFC project). The new manual also features web links and a more comprehensive resources section.

Using the Natural Foods Training Manual

- The manual can be used as the basis of a self-study program or as the course material for a group session.
- There are pretest questions to test participants' existing knowledge at the beginning of each section and review questions to assess their knowledge at the end of each section Answers to these questions are provided as a separate downloadable file.
- If you are offering the course as a self study program simply direct the employee to the sections you would like them to complete and review their answers to the knowledge questions at the end of their self-study period.
- For a group session, refer to the document called "Information for Trainers" for ideas and suggestions for a successful classroom experience.

Section One – Definitions

Test Your Knowledge

True or False Natural foods have not been processed

True or False Vinegar is a natural preservative

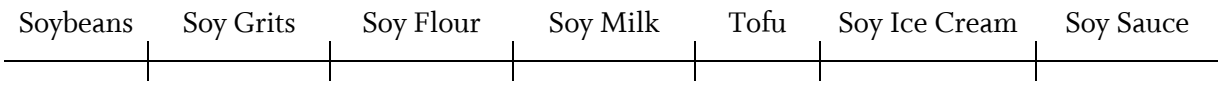
True or False Farms may certify their crop as organic after one year of using no chemicals

True or False Foods with less than 95% organic ingredients may not display the organic seal

True or False Retail stores that offer organic products cannot be certified as retailers

Natural Foods

One definition of natural is "existing in or produced by nature." So natural foods are foods that are as close to how they grow as possible. Natural foods have a higher nutrient content because nutrients are not lost in processing. One way to consider natural foods is as a continuum with the whole grain or other "closest to nature" food on one end and the highly processed food on the other.



The term "natural" has no official or legal definition except for meat and poultry products as defined by the US Department of Agriculture. Meat and poultry products carrying the "natural" claim must not contain any artificial flavoring, color ingredients, chemical preservatives, or synthetic ingredients, and are only "minimally processed" defined by USDA as a process that does not fundamentally alter the raw product.

Processing

Processing is probably the most important thing that makes natural foods special. Processing refers to things that are done to or added to foods to make them easier to eat, prepare or store. One of the goals of the early co-op pioneers in Rochdale, England was to provide pure food. They had to contend with flour that was adulterated with ground beans, plaster of Paris and ground bones. We just worry about getting the whole grain and no chemicals.

Even though natural foods are often referred to as unprocessed, it is more accurate to consider them minimally processed or naturally processed. Generally, most foods sold in a natural foods co-op are minimally processed and those with more processing use natural additives. For example packaged items like macaroni and cheese and canned beans do not have synthetic additives like colors or chemical preservatives.

There are several differences between natural processing and synthetic or chemical processing. Chemical processing can extract important nutrients and add potential toxins. Chemical additives may be harmful and many must be removed from the body by the liver instead of

traveling through a normal digestive process. Also, many synthetic food chemicals are petroleum by-products and continue our reliance on petroleum, a non-renewable energy source.

Type of Processing	*Natural*	*Synthetic*
Preservatives; delay spoilage	salt, vinegar, spices	sodium nitrite, sulphur dioxide, calcium propionate, sorbic acid
Colorings	turmeric, annatto	Yellow #5, Red #50, etc.
Flavorings	salt, spices, vanilla	artificial flavors (>1600 in the U.S.)
Emulsifiers; prevent separation	Lecithin	mono- and diglycerides
Oil Extraction	cold pressed, expeller pressed	chemical solvents
Flour Milling	hammer or stone mill, unrefined	refined (germ and bran removed); bleached

Genetic Engineering

Genetic engineering (GE) is the process of isolating a particular trait, or gene, from a plant variety or animal species and inserting it into a different plant or animal. The resulting organism is called transgenic or a genetically modified organism (GMO). It is estimated that up to 70% of processed foods in American supermarkets now contain genetically modified ingredients.

Genetic engineering is different from traditional hybridization or cross breeding in which genes are only transferred within closely-related species. With genetic engineering, genes from completely different materials and organisms can be inserted into each other.

Certified Organic products may not contain any GMOs. There are several issues with GE and GMO foods including their impact on the environment. Learn more at www.sustainabletable.org/issues/ge

Organic Certification

Certified Organic Products

Organically grown food is produced without the use of synthetic pesticides, chemicals and fertilizers. Organic agricultural practices promote sustainable growing methods that nurture the soil, crops and animals, creating a beneficial habitat for all living things. Organically produced foods tend to have more flavor and richer color from higher levels of phytochemicals that also provide health benefits in addition to color and flavor.

All foods labeled and sold as "organic" must be certified by the United States Department of Agriculture's (USDA) accredited independent certifying agencies.

Organic farming and certified products are defined by the USDA Organic Foods Production Act as follows:

- Three years with no application of prohibited materials (no synthetic fertilizers, pesticides, or genetically modified organisms) prior to certification.
- No use of prohibited substances while certified; no sewage sludge; no irradiation.
- Proactive soil building, conservation, manure management, and crop rotation systems.
- Mandatory outdoor access for livestock, access to pasture for ruminants
- No antibiotics or hormones used
- 100 percent organic feed
- Organic management from birth or hatching
- No commingling or contamination of organic products during processing, and mandatory recordkeeping for all operations

Labeling of Organic Products

The following labels or claims are allowed for organic products

- 100% Organic – all ingredients in these products must be certified organic. These products may carry the USDA organic seal.
- Organic – at least 95% of the ingredients must be certified organic. These products may also carry the USDA organic seal.
- Made with Organic (specified ingredients or food groups) – in these items at least 70% of the ingredients must be certified organic but the product may not carry the USDA organic seal.
- For more information go to http://www.ams.usda.gov/NOP/FactSheets/LabelingE.html

Organic Certification of Retailers

Retailers selling organic food may become a certified organic retailer. This certification is based on site inspections by an organic certifying agency and requires that retailers:

- Adhere to a comprehensive plan to protect organic products from contamination and commingling with non-organic product and non-organic cleaning supplies
- Keep documentation that tracks connections between the retailer and organic suppliers for five years.
- Display organic product with proper and accurate signage
- Keep organic certificates on file for farms from whom the store buys directly
- Submit to an annual review of organic certification

Eco-Labels

An increasing number of labels can be found on food products. Most of these, like the UDSA Organic seal, identify products that have met specific criteria in terms of how they have been procured, produced or processed. Some of the more prevalent of these eco-labels are described below. A very comprehensive and well-indexed list and review of eco-labels can be found at www.eco-labels.org

Certified Humane

The Certified Humane Raised & Handled Label is a consumer certification and labeling program. The Certified Humane Raised & Handled label means that an egg, dairy, meat or poultry product has been produced with the welfare of the farm animal in mind. Food products that carry the label are certified to have come from facilities that meet precise, objective standards for farm animal treatment. For more information visit www.certifiedhumane.org

Certified Vegan

The Certified Vegan logo is found on foods that contain no animal ingredients or by-products, use no animal ingredients or by-products in their production and are not tested on animals. The logo is administered by the Vegan Awareness Foundation, also known as Vegan Action, a nonprofit organization that relies on written statements and annual agreements. To learn more about this logo go to www.vegan.org.

Fair Trade

The Fair Trade Certified™ label is an independent, third-party consumer guarantee that companies have complied with strict economic, social and environmental criteria for particular products, thereby creating a more equitable and sustainable trade system for producers.

The principal criteria of Fair Trade certification are:

- Direct trade with farmer organizations, bypassing unnecessary middlemen
- Fair prices for farmers, and decent working and living conditions for workers
- Free association of workers and farmers, with structures for democratic decision-making
- Access to pre-financing, and additional premiums for community and business development
- Sustainable agricultural and farm management practices, including restricted use of agrochemicals and no GMOs

For more information go to www.transfairusa.org

Food Alliance Certified

Food Alliance (FA) is a coalition of farmers, consumers, scientists, grocers, processors, distributors, farm worker representatives and environmentalists that certifies farmers for sustainable agriculture practices. Farmers must meet FA standards for pest and disease

management, soil and water conservation, and human resource development. For more information visit www.foodalliance.org.

Review Questions

Multiple Choice – Select the best answer.

1. Which list best represents potatoes from least to most processed?

a) Russet Potatoes, Instant Mashed Potato Flakes, French Fries, Potato Chips

b) Russet Potatoes, Potato Chips, French Fries, Instant Mashed Potato Flakes

c) Russet Potatoes, French Fries, Potato Chips, Instant Mashed Potato Flakes

d) Russet Potatoes, French Fries, Instant Mashed Potato Flakes, Potato Chips

2. Which of the following is not a natural method of processing?

a) Stone-grinding grain into flour

b) Mixing soybean meal with hexane to separate the oil

c) Adding salt to preserve fish

d) Pressing olives to extract the oil

3. Items carrying the Organic seal are certified by

a) US Department of Agriculture

b) Third party certifiers such as Oregon Tilth and Quality Assurance International

c) The individual farmer or producer

d) US Food and Drug Administration

4. A Certified Organic Retailer must do all of the following except:

a) Keep documentation tracking connections with organic suppliers for five years.

b) Display organic product with proper and accurate signage

c) Keep organic certificates on file for farms from whom the store buys directly

d) Submit pricing information on a monthly basis

5. Which of the following is true about Fair Trade Certification?

a) Direct trade with farmer organizations and all known middlemen

b) Fair prices for farmers, and decent working and living conditions for workers

c) No access to pre-financing, and additional premiums for business development

d) Agricultural and farm management practices that include use of agrochemicals and GMOs

Section Two – Whole Grains

Test Your Knowledge

True or False The high fiber outer layer of a grain is called the germ

True or False Kasha is another name for roasted buckwheat

True or False Whole wheat pastry flour has more gluten than whole wheat bread flour

True or False Most wheat pasta is made from durum wheat

True or False Amasake, mirin and mochi are all made from rice

Introduction

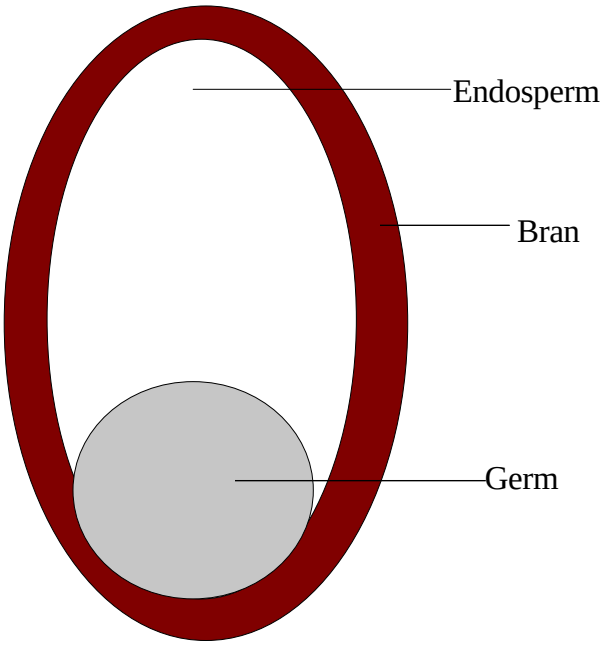
Grains, along with beans, are the foundation of most natural foods diets. Why?

- Grains are an excellent carbohydrate source. Carbohydrates are the fuel-food of human beings. As a car uses gasoline to "make it go," we use carbohydrates.
- Grains are a source of protein. Protein is important for building and repair of the body.
- Grains are low in fat, and the fat they do contain is unsaturated, a healthy fat.
- Grains are a good source of vitamins, minerals and fiber. In fact, grains contain two different kinds of fiber that are needed by our bodies. Barley and oats provide soluble fiber which dissolves into the bloodstream and helps keep arteries clear. Wheat and other grains provide insoluble fiber which acts like a brush in the digestive tract and keeps it running smoothly.
- Grains are a whole food; an alive food. If planted; they burst into life. When eaten, they provide sustaining energy and regenerative properties.

Whole Grains versus Refined Grains

The difference between the majority of grains and grain products found in conventional supermarkets or restaurants and food cooperatives is the degree of refinement. Grains are refined to remove the oil-containing germ which can cause the grain to become rancid when stored for long periods of time. But, the difference nutritionally between whole, unrefined grains, i.e. whole wheat flour, and refined grains, i.e., white flour, is substantial.

Diagram of a Whole Grain



Bran = fiber, vitamins and minerals
Germ = oil, vitamins and minerals
Endosperm = protein and carbohydrate

A whole grain contains all of the bran, germ and endosperm. After refining only the endosperm remains. If that refined grain is then enriched 5 of the more than 20 original vitamins and minerals are added back to the grain product. The nutrients required for grain enrichment are set by the federal government and currently are iron, thiamin (B1), riboflavin (B2), niacin (B3) and folic acid.

Ways to use whole grains

Whole grains can be found in many forms: whole, milled or cracked, rolled into flakes, ground into a course meal, or finely ground into flour. Grains can be cooked into a cereal, used in soups, salads, pilafs, casseroles, burgers, "meat" loaves, puddings, etc. Because grains are a whole or intact food, they are a "live" food and can be sprouted.

There are many benefits to using a variety of grains in the daily diet. Each grain has its own nutritional "picture." When using a variety of grains you increase your chance of obtaining a more diverse assortment of nutrients and energy balance from grains. The more varied your diet, the more complete nutritional support you are giving your body. Eating a variety of grains also can reduce the chance of allergy. Allergies may be triggered by an overload of the offending food. One of the most common food allergies in this country is wheat perhaps because we eat so much of it.

Another reason to eat a variety of grains is to enjoy many tastes, textures, and variations in preparing food. From an ecological perspective, much of the world's soil is not well-adapted to wheat which is by far the world's biggest crop. Learning to enjoy grains that grow easily where wheat does not is a step toward supporting more sustainable farming and more prudent economics. For more information about whole grains visit www.wholegrainscouncil.org/

Storing Whole Grains

Because whole grains still contain the oil-rich germ they are susceptible to rancidity. To ensure freshness, buy whole grains in small quantities and store in an airtight container in a cool, dry, dark place for up to six months.

Basic cooking instructions for grains

Name of Grain (1 cup)	Water Needed (cups)	Cooking Time (mins.)	Approx. Yield (cups)
Amaranth	2.5 – 3	20-25	2.5
Whole Barley**	2.5 – 3	55	2.5-3
Buckwheat Groats*	2	15-25	2.5
Millet	2.5 – 3	35-40	3.5
Oat Groats**	2	45-60	3
Steel-cut Oats**	4	40-45	3
Rolled Oats	1.5	10	2.5
Quinoa*	2	15	3
Rye Berries**	3 ½ - 4	50-60	2 ½ - 3
Rolled Rye	2	15-20	2 ½
Spelt	3-4	40	2
Bulgur Wheat	2	15-20	2 ½
Cracked Wheat	2 ¼	35-40	2 ½
Couscous	2 ½	15	3
Rolled Wheat	2 ½	15-20	2 ½
Wheat Berries**	3 ½ - 4	50-55	2 ½
* Flavor is improved by toasting prior to cooking ** Soak overnight to reduce cooking time			

Types of whole grains

Amaranth

- Originally grown by the Aztec culture in what is now Mexico, it was discovered in the U.S. in 1975.
- Its protein quantity and quality are impressive, as are its fiber, calcium and iron contents. Amaranth consists of dark round seeds whose texture is sticky and dense when cooked. This texture makes it most suitable for use as hot cereal and puddings.
- Uncooked amaranth may be toasted and used to top cereals, breads, salads, casseroles and noodles.

Barley

- Barley is an ancient grain commonly available in pearled and whole hulled forms.
- Pearled barley is refined; much of the vitamin, mineral and fiber content is lost when the outer layers are removed through the pearling process. Pearling is similar to the process used to polish rocks.
- Natural foods processors provide co-ops with roughly polished or pearled barley with some bran and germ intact, but conventional pearled barley is almost white and has lost almost all of its bran and germ.
- Whole hulled barley has only its tough outer shell, or hull, removed so all its nutrients are all intact.
- Barley is also sold in a rolled or flake form. Rolled grains are whole grains which have been steamed and then flattened.
- Next to rice, barley is the easiest grain to digest.
- Barley bran contains soluble fiber with the same cholesterol-lowering properties as oat bran. Barley is especially tasty in soups, stews, casseroles, pilafs, or salads.

Buckwheat

- Whole buckwheat, known as kasha when roasted, has the strongest flavor of the grains.
- Despite its name, buckwheat is not wheat. In fact, technically it's not even a grain, but rather is a member of the rhubarb family. It is referred to as a grain because it compares favorably to other grains nutritionally and behaves like a grain.
- Buckwheat can be cooked as a breakfast cereal but is more commonly used as flour in pancakes and pasta (buckwheat soba).

Corn

- Many people in the US generally think of corn as a vegetable, or maybe as popcorn, but it is actually better known worldwide as a grain. Sweet corn is the variety of corn that is eaten as a vegetable. Dent corn is a harder and starchier corn used to make corn meal or flour.
- Corn is the only common grain that contains Vitamin A.
- Blue corn, recently introduced by corn chip and tortilla manufacturers, is higher in protein and minerals than yellow corn.
- Whole grain corn is typically sold in a ground form. The most coarsely ground is polenta, next is cornmeal, then corn flour.
- Cornstarch, used as a thickener, is a refined corn product.

Kamut

- Kamut is an ancient variety of wheat with greater nutritional value than modern hybridized wheat.
- Kamut is less allergenic than wheat and is typically used in baked foods, cereals or trail mixes.

Millet

- Millet is one of the oldest foods known to humans, although in this country the majority of people have never heard of millet as a food people eat. Rather, Americans commonly recognize millet as bird seed.
- Millet is a very nutritious food for humans too. Its small yellow round seeds are high in protein, B-vitamins, iron, zinc, and other minerals.
- Cooked millet is good in casseroles, breads, stews, "meat" loaves, burgers, and as a breakfast cereal.

Oats

- Oats are one of the only grains that are never refined of their bran and germ; they retain their nutrients through many types of processing. Oats contain a natural antioxidant that acts as a preservative to extend shelf life.
- Oats are available in several forms.
- Oat groats are whole grain oats with only the hull removed. They are good in soups or stews. Steel-cut oats are oat groats that have been thinly sliced lengthwise. They are a tasty addition to hot breakfast cereals.
- Rolled oats are whole oats that have been steamed and flattened.
- Oat bran is the digestible outer covering of whole oats and is a soluble fiber that has been found to lower blood cholesterol levels.

Quinoa

- An ancient sacred staple of the Incas in the South American Andes, quinoa (*keenwa*) was brought to the U.S. in the mid 80's and grows in the Colorado Rockies.
- Quinoa has a unique star-shaped hull which contains orange-colored saponins or soaps. The hull and most of the saponins are removed before shipping but quinoa should be rinsed well or toasted before cooking to remove any remaining bitter-tasting saponins.
- Tiny, light-colored grains with a "tail," quinoa shines nutritionally with twice as much protein as many of the common cereal grains. Its balance of essential amino acids is close to ideal.
- Because quinoa is unique and its production limited in the U.S., its price seems fairly high when compared to that of other grains. When cooked though, quinoa quadruples in size, so you actually get more per pound.

Rice

- Rice is a staple food for over half the world's population. Its versatility is unlike any other.
- There are many types of rice.

- Brown rice is the whole grain form with only the hull removed. It is available as short-, medium- and long-grain. Longer grains produce rice that is separate and fluffy. Shorter grains tend to be more moist and sticky.
- White rice is rice that has the bran and germ removed making it nutritionally inferior.
- Sweet rice is a short-grain brown rice variety that is very sticky when cooked. It is used to make some special products which will be discussed shortly.
- Basmati rice is a special long grain rice originally found in the foothills of the Himalayas. It has a distinct aroma and flavor, a nutty flavor almost resembling buttered peanuts. It is available in both refined and unrefined forms.
- Japonica is a short-grain black rice originating in Japan. Japonica has a sticky texture and grassy flavor. It is found primarily in gourmet rice blends combined with brown rice.
- Texmati rice is a hybrid of long grain rice and basmati rice that is grown primarily in Texas. Its rich flavor and aroma is similar to basmati rice.
- Wehani rice is a rust-colored variety developed by the Lundberg brothers, the California farmers who pioneered the cultivation of organic rice. When cooked it smells like corn popping. Wehani is an acronym of the brothers' names.
- Wild rice is available in two distinct forms. Two-thirds of the wild rice grown in the US is harvested in northern Minnesota. This wild rice has not been hybridized and is grown using labor-intensive traditional methods. The kernels are longer and less uniform than cultivated wild rice which is imported from Canada. Wild rice is not actually a rice or even a grain, but the seeds of a wild aquatic grass.

Rye

- Rye is second only to wheat in world popularity for bread baking.
- The whole grain form of rye is rye berries (the term for whole kernels with just the hull removed), cracked rye, and rolled rye.
- Rye berries are especially hearty and are good in hot cereal or winter pilafs. Soak them overnight to reduce cooking time.

Sorghum

- Worldwide, more than 50% of grain sorghum is grown to be used directly for human food needs. In the US about 12% of the grain sorghum crop is used to produce ethanol and much of the remainder is used as livestock feed. Food uses of sorghum are beginning to increase in the U.S.
- Sorghum grain has no gluten and as a flour is appearing more frequently in gluten-free products and recipes.
- Sorghum syrup is produced from an entirely different plant. Learn more in the Sweeteners section.

Spelt

- Spelt is among the first original, natural grains known to man. Although always considered a tasty grain with a nutty flavor, it was forgotten because of its lower yield in comparison to wheat. Also called German wheat.
- Spelt contains more protein, fats, and fiber than wheat.
- Spelt contains a special carbohydrate called mucopolysaccharide which stimulates the immune system to increase resistance to infection.
- Spelt is good news for wheat-sensitive individuals. Spelt is more easily digested than wheat and can be tolerated by many people with wheat allergies.

Teff

- Ethiopian in origin, teff yields small, beige seeds similar in size to millet.
- Teff flour is traditionally used to make injera, the flat spongy bread basic to Ethiopian cuisine.
- Teff is gluten-free and higher in protein, iron and calcium than most other grains.

Triticale

- Triticale is the first human-made grain. It is a cross between wheat and rye, and is nutritionally superior to both.
- In texture and taste, triticale is a blend of wheat's nuttiness and rye's chewiness, with a hint of rye's distinct taste.
- Triticale failed to become very popular but can still be found in some multigrain cereals and flour mixes and sometimes as flakes or berries.

Wheat

- Wheat is by far the world's largest food crop. It provides more nourishment to the people of this planet than any other single food. The popularity of wheat results predominately because of its versatility, crop durability, and nutritional value.
- Wheat comes in many forms.
- Wheat berries is the term applied to whole wheat with just the outer hull removed. Cooked whole wheat berries are used in casseroles, soups, or as a side dish.
- Rolled wheat or wheat flakes are a whole grain form of wheat
- Cracked wheat is whole wheat that is broken into small pieces by very coarse milling. It is a popular breakfast cereal and may be served as a grain dish for dinner or formed into croquettes.
- Bulgur is whole wheat that has been steamed, dried and cracked. This process yields a quicker-cooking, lighter-textured, and nuttier-flavored product than cracked wheat or whole wheat berries. Bulgur, a popular Mideast staple, has also basically become a staple in the American whole foods cuisine. It is tasty with any meal, by itself, cooked with vegetables, or as a salad base as in tabouli.

Grain Products (Gluten, Flour, Pasta, Cereals)

Gluten

- Gluten is a protein fraction of many grains. It provides a gummy quality that is necessary for bread baking.
- Gluten intolerance or Celiac sprue is an intestinal disease in which there the lining of the intestine becomes inflamed in the presence of gluten causing painful symptoms and malabsorption of almost all nutrients. When gluten is removed from the diet, symptoms in the majority of people improve, if not disappear.
- Gluten is found in wheat, rye, barley, kamut, spelt and triticale. Oats contain gluten only when processed with gluten-containing grains. Amaranth contains traces of gluten. These grains and their derivatives must be eliminated from the diet of a person with gluten intolerance.

Flour

Flour Processing

- Whole grain flours, as the name implies, are intact whole grain kernels ground into flour. Natural food processors use milling methods which preserve the integrity of the whole grain. The most common are stone grinding and the hammer mill.
- Refined flours are milled using methods which separate out the bran and the germ, leaving only the innermost starchy layer, the endosperm.
- Refined flours may also go through additional processing steps. The flour may be bleached using agents such as chlorine, dioxide, benzoyl peroxide, or acetone peroxide to make the flour whiter. This process destroys any vitamins that have survived the milling process. Dough conditioners, such as potassium bromate or potassium phosphate, are often added to reduce the need to knead the dough.
- Flours may also be enriched. Federal law requires that grains labeled as enriched must contain added iron, thiamin (Vitamin B1), riboflavin (B2), niacin (B3) and folic acid to replace losses during processing. However, enrichment only replaces 5 of the 22 known nutrients that are lost in the refining process.
- Watch for the words "whole grain" in the ingredient list of flour-based products to make sure that the flours used were in fact whole grain products.

Storage of flours

- Whole grain flours, like whole grains, contain some fats that can go rancid. They should be refrigerated in an airtight container and used within three months.
- Refined flours should be kept in an airtight container in a cool, dry, dark place to keep out moisture and insects. They should be used within six months.
- Flour can also be kept in the freezer in a plastic airtight bag or container for a longer period of time. However, gluten will deteriorate over time which is why fresh flours make the best breads.

Wheat flours

Flours made from wheat are the most common because wheat contains the most gluten. Gluten is necessary for baking bread because it contains strong expandable fibers that enable bread to rise high and maintain volume.

Types of wheat flours

- All-purpose flour is a blend of bread flour and pastry flour making it a good choice for general use
- Durum flour is ground from durum wheat, the hardest wheat grown. Semolina is refined durum flour. It is the flour commonly used for making pasta. The bran and germ have been removed by a sifting process, giving semolina pasta its characteristic light color.
- Gluten flour is made from hard wheat that has been treated to remove some of its starch and concentrate its protein. Gluten flour has between 40% to 80% gluten protein (bread flour has 10-13%; high-gluten bread flour has 12-14% gluten protein). Gluten flour is also know as vital wheat gluten and can be added in small amounts to boost the protein content of breads. It can also be used to make seitan.
- Graham flour, named for Sylvester Graham, an early crusader against commercial white bread, is coarse ground whole wheat flour. Used alone, it produces heavy, compact, dark bread.
- Unbleached white flour is refined wheat flour and is used in a variety of products. To enhance nutritional quality, substitute part of the white flour in a recipe with whole wheat flour.
- Whole wheat bread flour or hard whole wheat flour is milled from hard red spring or heard red winter wheat varieties and is best for making breads and rolls and other yeasted bread products.
- Whole wheat pastry flour is milled from soft wheat varieties. It is ideal for cookies, cakes, quick breads and pie crusts.
- White whole wheat flour is milled from white wheat, a new strain of wheat developed in Kansas using less tannin in the bran giving it a lighter color and milder flavor. White wheat is a hard wheat variety so it has comparable gluten to other bread flours but because of the lighter texture it also can be used in cookies and pastries to provide whole grain nutrition.

Key words to help remember wheat flours:
durum flour = pasta
gluten flour = gummy; high-protein
graham flour = coarse
unbleached white flour = refined; less nutritious
hard whole wheat flour = bread
soft whole wheat or pastry flour = cakes and pastries
all-purpose flour = baking

Other whole grain flours

Many of these non-wheat flours such as amaranth, barley, buckwheat, oats, rice, millet, rye, and triticale can be nicely used in baked goods, pancakes and other traditional flour products. Since these flours lack the significant amount of gluten found in wheat, any breads, cakes, and muffins made exclusively from these flours tend to be compact, with a dense, crumbly texture. To "lighten" them, you may combine these flours with whole wheat flour. In bread baking you could also add 5 - 10% gluten flour.

Specific non-wheat flours

- Amaranth flour has minute traces of gluten and combines well with other flours to make smooth textured breads, muffins, pancakes and cookies.
- Barley flour adds a nutty, malty flavor to breads or pancakes. It gives a cake-like texture to breads and can also be used as a thickener.
- Brown rice flour is nuttier and richer tasting than white rice flour and also more nutritious. It is used for making breads, cakes, muffins and noodles. Also try it for making your own crackers.
- Buckwheat flour is full-bodied and earthy flavored, the traditional flour of Russian blini, French Brittany crepes, Japanese soba noodles and buckwheat pancakes.
- Corn flour, more finely ground than cornmeal, is cream-colored, slightly sweet and gluten-free. It is not the same as cornstarch which is used as a thickener.
- Kamut flour adds a nutty flavor to breads and may be better tolerated by persons allergic to common wheat.
- Millet flour is gluten-free and slightly sweet making it a nice addition to cookies and pastries.
- Oat flour can be prepared at home from grinding rolled oats in a food processor or blender. If produced in a gluten-free facility, oat flour will have no gluten. Otherwise it may have traces of gluten. Either way, oat flour cannot hold its own in yeasted breads (use with other gluten-containing flours) but is very absorbent and provides body to baked goods.
- Potato flour is made from peeled and steamed potatoes that have been dried and ground. It is very fine and useful for thickening sauces and in gluten-free recipes.
- Rye flour produces a loaf with a full-bodied, bitter and slightly sour flavor. Its gluten content is lower than wheat and works best in conjunction with wheat. The gluten fibers are also more delicate so knead rye breads more gently to avoid breaking the gluten strands.
- Soy flour and Soya flour are richer in calcium and iron than wheat flour, gluten-free and high in protein. Soy flour is ground from raw soybeans; soya flour from lightly toasted soybeans. Both add a slightly sweet, pleasant flavor to breads and baked goods. Products with soy flour brown quickly.
- Spelt flour works well as a bread flour and has an excellent protein and fiber profile. Spelt gluten is high water soluble making it easy to digest. Spelt flour makes a good wheat substitute for some people who are allergic to wheat.

Pasta

Wheat pasta

- Wheat is the most common grain from which pasta is made. The variety of wheat used for pasta is called durum wheat. Durum wheat contains hard starchy granules which enable pasta to hold together, yet expand, while cooking in boiling water.
- The outer layers of the durum wheat kernels are usually removed leaving the starchy innermost layer, the endosperm. When ground into a flour this is called semolina flour. Most pasta is made from semolina flour; a refined flour from durum wheat.
- When the endosperm is not ground into flour, but cracked and left granular you have what is called couscous. Couscous is the cracked endosperm of refined durum wheat. It looks similar to a grain, and cooks up light and fluffy. It is used as a breakfast cereal, in pilafs, salads, puddings, casseroles, etc. A whole wheat version is sold in natural foods co-ops. The whole wheat version is the cracked whole durum wheat kernel.
- Israeli couscous, larger than and unrelated to couscous, is a 1950 Israeli invention that is actually just a pasta shape, extruded and dried like other pasta (similar to orzo).
- Although refined pastas are more common, whole wheat pastas are increasing in popularity due to their higher nutrient and fiber content and richer flavor and texture. Whole wheat pastas are made from whole durum wheat flour. Natural food co-ops commonly carry several kinds of whole wheat pastas.
- Pasta is available in a variety of fun shapes and sizes. Read package labels to learn cooking times and post cooking times for specific bulk pasta on or near the bins. For a fun picture glossary of pasta shapes, recipes and tips go to www.ilovepasta.org/

Noodles

In the US, according to the FDA, pasta sold as noodles must contain eggs. Thus, noodles are made from flour, typically semolina flour, with the addition of eggs.

Flavored pastas

Pasta, most often wheat pasta, is commonly flavored with one or more dehydrated vegetables and/or herbs. These include vegetables such as spinach, tomato, bell pepper, artichoke, beets, garlic, and herbs such as basil, rosemary, parsley, pepper, curry, and others. They impart their own unique flavor, a festive color and additional nutrients.

Other grain pastas

- Spelt pasta is chewy like whole wheat pasta with a slightly bitter flavor. Spelt pasta is a good alternative for some people who are allergic to wheat.
- Triticale pasta tastes similar to whole wheat pasta. Triticale is higher in protein than whole wheat pasta.
- Corn pasta and Rice pasta are both well suited for the wheat allergy or gluten sensitive person. Both corn and rice pasta must be cooked very carefully as they easily become mushy if overcooked.

- Quinoa - Corn pasta is a combination pasta that is lighter in texture although not as tender as corn or rice pasta. This combination would also work for the wheat allergic or gluten sensitive person.
- Quinoa - Whole wheat pasta and Amaranth - Whole wheat pasta are combinations that taste similar to whole wheat pasta, but have a slightly less grainy texture.
- Jerusalem artichoke pasta is a gluten-free alternative made from flour produced from this edible, knobby shaped tuber. Jerusalem artichokes are unrelated to globe artichokes and, unlike other tubers such as potatoes, they contain no starch.

Asian noodles

- Soba noodles: Soba, or buckwheat noodles, are a Japanese noodle made of 100% buckwheat flour or some combination of buckwheat and whole wheat flours. If you purchase the 100% buckwheat flour noodles expect them to be very fragile but very flavorful. There are also soba noodles made with the addition of Japanese wild yam or mugwort leaves.
- Udon noodles: Also a Japanese noodle, there are two types of udon noodles. The most common udon noodles are made with sifted whole wheat flour and sometimes a small amount of unbleached white flour. There is also udon noodles made with a combination of wheat and brown rice flours. Udon noodles are wider and thicker than soba.
- Ramen noodles: These noodles may be made of wheat, rice, or buckwheat. Unlike other Asian pastas, ramen noodles are extruded rather than cut. They are long folded thin noodles which have been pre-steamed to reduce their at-home preparation time. Ramen noodles are available prepackaged with instant soup mix. Within the past few years they have gained immense popularity as a tasty yet quick and easy food to prepare. Their accompanying soup mixes come in a variety of flavors. Natural foods versions of ramen noodle soup mixes do not contain artificial color, flavor or preservatives.
- Traditional Asian noodles, such as soba, udon and ramen are exempt from the FDA's noodle classification. They do not contain eggs.

Cereals

Hot cereals

Any of the grains can be eaten as a hot cereal, but various combinations of grains are sold in co-ops specifically to be made as a hot cereal. Some are sold prepackaged and others are sold in bulk.

Cold cereals

There are many cold cereals sold in natural foods co-ops. These cold cereals differ from the cold cereals in regular supermarkets in the following ways:

- The cereals are made from a greater variety of grains, and most of the grains will be whole grains.
- Natural, less refined, sweeteners will be used instead of sugar, corn syrup, high fructose corn syrup, etc.
- No chemical preservatives, flavorings or colorings will be found.

Rice Products

Mochi

- Mochi is made by pounding steamed sweet brown rice to form a compact slab and then allowing it to dry. It is found in squares in the refrigerator section of the co-op.
- Mochi is available plain or delicately seasoned with such things such as cinnamon and raisins, pizza, and sesame garlic.
- Mochi is simple to prepare and enjoyed by all ages. To prepare Mochi, cut it into pieces and bake it for just 10 minutes or until it puffs up. It bakes up with a crisp crust and chewy interior, and is eaten as a snack, as the grain portion of a meal, or as a dumpling in soup.
- Mochi is traditionally eaten in Japan during the first month of the year in celebration of the New Year.

Amasake

- Amasake is a cultured rice beverage. It is a sweet beverage made by introducing koji into cooked sweet rice and incubating it. Koji is the bacterial culture *Aspergillus oryzae*. The culturing process produces enzymes that break down proteins, carbohydrates, and fats into more readily digestible forms. This process is similar to malting barley for beer. Because amasake is a fermented food, it is readily digestible itself and it also aids digestion. It is thus an excellent food for people who are ill and the elderly. Amasake is creamy, thick and delicious. It is white or beige in color, and is sold as either a plain or flavored (almond, hazelnut, vanilla pecan, and others) beverage. It can be warmed or chilled and used as a beverage, blended with fruit to make delicious smoothies, or used as a sweet liquid in many recipes. A noticeable feature of baking with Amasake is the delicious moist texture it gives baked goods.

Mirin

- Mirin is a traditional Chinese cooking wine made from fermented sweet rice. Like amasake, it is naturally fermented from sweet brown rice and rice koji. It is used primarily as a seasoning in regular cooking, and imparts a mild sweetness and rounds out the flavor of many dishes. It is excellent in vinaigrettes, fish or vegetable dishes, sauces, dips, and barbecued dishes. Mirin can also be used for glazes or frostings, sauces, or other sweet toppings.

Rice Milk and Ice Cream

- Rice milk can vary in the amount of processing. Some are made simply with water, partially milled brown rice, safflower oil and salt. It comes in 4 flavors: Original, Vanilla, Carob, and Chocolate. The other rice milk is more refined. It is made with water, brown rice syrup, rice starch, oil salt, and is fortified with vitamins A, D, and calcium.
- Rice "ice-cream" is made from brown rice, combined with water, oil, and thickeners such as guar gum and carrageenan, is used to make frozen desserts similar to ice cream and ice

cream bars. This is a good alternative for the person eliminating dairy products from their diet.

Wheat products

- Seitan is a wheat product also known as gluten or wheat meat. Seitan is made from separating the gluten out of hard whole wheat flour. This is done by combining the flour and water into a dough and then, under running water, kneading out the starch and bran until only the gluten remains. The gluten is then cooked and seasoned (typically with tamari or shoyu and ginger) to become seitan.
- Seitan has a rich dynamic taste and lends itself to a variety of dishes ranging from cutlets to soups, salads and casseroles, although it is most often used as a meat analog. It is esteemed for its hearty meat-like texture and flavor. In fact, seitan is sometimes called mock chicken or mock duck.
- Seitan is a good source of protein and minerals, especially iron.

Review Questions

Fill in the blank – Complete the sentences and lists with the correct terms.

1) Whole grains are made up of 3 layers. The _____, or outermost layer, contains most of the fiber. The middle layer, or _____, contains most of the vitamins and minerals, while the _____, or innermost layer, contains mostly starch.

2) Name two (2) types of Japanese noodles sold in the co-ops.

1. _____
2. _____

3) Grains come in many forms. Name three (3) of the grains that are sold rolled or flattened.

1. _____
2. _____
3. _____

Matching – Pair the grain with its best description.

1)_____Buckwheat	a. small yellow round grain commonly recognized as bird seed
2)_____Corn	b. naturally contains a preservative which extends shelf life
3)_____Millet	c. cracked endosperm of durum wheat
4)_____Oats	d. similar to wheat, but those with wheat allergy may tolerate it
5)_____Spelt	e. known as kasha when roasted
6)_____Rye	f. wheat that has been steamed, dried and cracked
7)_____Couscous	g. second only to wheat in popularity for bread baking
8)_____Bulgur	h. the only grain that is a good source of vitamin A

Matching – Pair the rice with its best description.

1)_____Short grain brown rice	a. has a distinct aroma and flavor
2)_____Basmati rice	b. when cooked it is separate and fluffy
3)_____ Wild rice	c. rice with the bran and germ removed

4)____Sweet brown rice	d. extremely sticky when cooked; used to make Mochi
5)____White rice	e. when cooked it is moist and sticky
6)____Long grain brown rice	f. not a rice or grain, but a seed of an aquatic grass

MATCHING – Pair the type of flour with the words that best describe it.

1)____graham flour	a. refined; less nutritious
2)____soft whole wheat flour	b. best for bread
3)____durum flour	c. cakes and pastries
4)____hard whole wheat flour	d. used for pasta
5)____gluten flour	e. gummy; high protein
6)____unbleached white flour	f. coarsely ground

Section Three – Beans, Seeds and Nuts

Test Your Knowledge

True or False Beans are a good source of soluble fiber similar to that found in oat bran

True or False It's just a myth that beans can cause gas

True or False Hummus and falafel are both made with garbanzo beans

True or False Tempeh is made from soy milk

True or False When oil has separated out of peanut butter it means the product is spoiled

Beans

Along with grains, beans are the foundation of most natural foods diets. Beans provide a low fat source of protein and minerals in an amazing variety of choices.

Nutritional value and healthful properties

- Beans are excellent sources of protein, calcium and iron, and good sources of B vitamins especially thiamin, niacin and folic acid. The calcium content is particularly noteworthy because the larger beans like black beans, pinto and navy beans have as much calcium as cow's milk. With the exception of soybeans and garbanzos, beans have virtually no fat. The fat in garbanzos and soybeans is unsaturated which is the type of fat associated with health benefits.
- Beans are an excellent source of soluble fiber like the kind found in oats and barley. Medical studies show that increased intake of beans can lower cholesterol and help diabetics keep blood sugar levels normal.
- In Traditional Chinese medicine, beans are thought to strengthen the kidneys, especially aduki beans and beans shaped like a kidney. White beans are considered good for the liver.
- Beans are warming, body building foods and, since they are seeds, they contain the vitality of a living plant.

Basic cooking instructions for beans

- Beans can be one of the harder plant foods to digest. This is because they contain large amounts of a carbohydrate called raffinose. Most people's digestive systems simply allow raffinose sugars to pass through undigested (we lack the enzyme to digest them), but for some people the combination of these sugars and intestinal bacteria produces excessive gas. Fortunately, there are ways to cook beans to help eliminate the raffinose sugars before you eat them.
- Soaking beans and then discarding the soaking water is one way to remove the offending sugars. Soaking can be overnight or by the quick soak method. For quick soaking, bring beans and three times the volume of water to a boil, remove from heat, cover and let sit for an hour. Then drain the beans and cook according to instructions. *Refer to Beans brochure.*

- There is a product called Beano which contains an enzyme that digests raffinose. The bacterial enzyme in Beano is related to the one used to make miso and adding miso or fermented soy sauce at the end of cooking can also improve the digestibility of beans.
- Another method of reducing the amount of raffinose sugars in beans is by cooking the beans with a piece of kombu sea vegetable. Kombu contains enzymes which can make beans more digestible.
- Some canned beans are prepared with kombu but it is always a good idea to rinse canned beans before use.

Ways to Use Beans

- Cooked, dry beans are commonly used in soups and stews or by themselves as in baked beans and refried beans. Cooked beans can also be ground or pureed and used in burgers, loaves or spreads.
- Soybeans are converted into many different products which will be discussed later as will various foods made from garbanzo beans. Since beans are seeds, they can be sprouted.
- For more information about beans visit www.americanbean.org/index.htm

Types of beans

Aduki

- Small, maroon beans native to Japan, now also grown domestically.
- Easier to digest, less raffinose sugars, and considered healthful for the kidneys.
- Quick cooking, no soaking is needed, slightly sweet taste similar to kidney beans.
- Good mixed with small grains such as quinoa and millet in stews and casseroles.

Anasazi

- Anasazi comes from the Navaho word meaning "ancient ones."
- Popular in the Southwest because of their full flavor and ability to hold their shape.
- Maroon and white marbled color with similar size and shape as pinto bean.
- Can be used in place of pinto beans in Southwest and Tex-Mex dishes.

Black-eyed peas

- Native to Africa, also called cowpea
- Cream colored with distinctive black spot
- Used in Southern U.S. recipes such as "Hoppin' John," black-eyed peas with collard greens served to celebrate the New Year.
- Quick cooking bean does not require soaking and can also be eaten fresh.

Black turtle or black

- Native to Mexico and member of kidney bean family.
- Can replace pinto beans in any recipe.

- Longer cooking with a hardy, earthy, slightly smoky flavor

Fava

- One of the oldest legumes popular throughout Europe and South America.
- Also known as broad bean, these are large brown beans similar in shape to lima beans.
- Their outer skin is tough and bitter but may be removed after soaking.
- Some people have a genetic trait that inhibits the enzyme needed to digest fava beans and must avoid them.

Garbanzos or Chick Peas

- Tan, heart-shaped bean is one of the most nutritious of all legumes and is considered beneficial for the heart.
- Garbanzo beans have a longer cooking time than other beans and a distinctive nutty flavor.
- They are the used in many Middle Eastern dishes including hummus and falafel. Hummus is a paste usually made of pureed cooked garbanzos with sesame butter (also called tahini), lemon and garlic. It is popular as a dip or spread and comes in many variations such as hummus with vegetables and tomato basil hummus. Falafel is a small burger made of ground, cooked garbanzo beans mixed with parsley and spices and deep fried. It is usually served in pita bread.
- Garbanzo beans are also ground as a flour and used in many Indian dishes where it is also called besan.
- Garbanzo flour can be used as an egg substitute. Use 1 tablespoon flour plus 1 tablespoon oil to replace 1 egg.

Great Northern

- White bean that is a member of the kidney bean family.
- Most often used in soups and stews but also delicious pureed and seasoned for use as a sandwich spread or dip.

Kidney

- Red kidney-shaped beans.
- Hold their shape and color well. Good in salads; common bean for chili.

Lentils

- Disk shaped seeds of a pea-like plant that was originally cultivated in the "fertile crescent" between the Tigris and Euphrates rivers more than 8,000 years ago.
- Two common types, red and brown. Red lentils are actually orange in color and are very quick cooking. Brown lentils are mottled greenish brown and take about 45 minutes to 1 hour to cook. Both are low in raffinose sugars and do not require soaking.
- Lentils are often used as the basis for soups and are also used in vegetarian burgers and "meat" loaves.

Lima

- Also known as butter bean, the lima is named after the capital of Peru and is popular in South America.
- Currently the main legume crop in tropical Africa, it does not do well in cold climates.
- Available fresh as well as dried. Starchier than other beans. Lima beans and corn are the ingredients of succotash.

Mung

- Small round light green bean that is native to India but is also popular in Chinese cooking.
- Quick cooking, no need to soak.
- Sprouted for traditional bean sprouts and made into pasta which looks like and is referred to as cellophane noodles.
- Mung bean flour is widely used in India for breads and pastries.

Navy

- Small white bean that is also a member of the kidney family.
- Common ingredient in soups and baked beans.

Pinto

- Mottled pink bean that is also a member of the kidney family.
- Commonly used in Southwestern and Tex-Mex cooking.
- Pintos and soybeans are the most common cultivated bean in the U.S.

Red

- Still another member of the kidney family, red beans are basically small kidney beans and may be used in place of kidneys in any recipe.
- Most widely known as basis of traditional New Orleans dish "Red Beans and Rice."

Soybeans

- First historical record was in 2800 BC as one of the most important crops in China.
- Highest in protein but hardest to digest in whole bean form and longest to cook.
- Available as a dry bean and also roasted (soynuts) and fresh. Fresh soybeans are bright green and sold frozen as "sweet beans." A new variety, black soy beans, is available canned. Soybeans are widely used in a variety of soyfoods that will be described in the next section.

Split Peas

- Available yellow or green, split peas have less vitality since they cannot be used as seeds.
- Quick cooking and do not require soaking.

- Yellow split peas can be used as the basis of the Indian soup, dal. Green split peas are also commonly used in soups.

Soybean Products

Tofu

- Tofu, also known as bean curd, has been a staple protein food in parts of Asia for over 2,000 years.
- Tofu is made like cottage cheese except the solidifying agent is added to soymilk and the curds are pressed into blocks.
- Common solidifying agents are nigari (derived from evaporated seawater), magnesium chloride (a refined nigari) and calcium sulfate (naturally occurring mineral also known as gypsum). If calcium sulfate is used the calcium content of the tofu will be significantly higher.
- Tofu is produced with varying water contents to make an extra firm, firm or soft product. Silken tofu (Mori-Nu is one example) uses a completely different coagulant, gluconolactone, to give it a unique soft and silky texture. Firm tofu is best for stir fries, marinated grilled or baked tofu, or any recipe where the tofu needs to hold its shape. Soft and silken tofu works best for blended items like puddings and cream pies.
- Tofu is bland by itself but easily absorbs flavors from marinades and sauces. This trait makes tofu a very versatile food used in both sweet and savory dishes.
- Tofu can also be frozen and then thawed and drained. This process dramatically changes the texture of the tofu.

Tempeh

- Tempeh has been a favorite staple protein food in Indonesia for hundreds of years. It was introduced to the U.S. in the 1960s by William Shurtleff and Akiko Aoyagi, authors of The Book of Tofu and The Book of Tempeh.
- Tempeh is made by adding a culture, *Rhizosporus oligosporus*, to partially cooked soybeans and incubating them at 88° F. for 28 to 32 hours. The result is like blue cheese but with black veins and a mushroom-like aroma.
- Tempeh can be made from just soybeans or from soybeans plus grains, legumes or sea vegetables.
- Tempeh is a concentrated source or protein. Four ounces (half a package) contains 24 grams of protein, as much as in 3 eggs or 3 ounces of meat.
- Tempeh has a bitter taste if eaten raw so it must be cooked. Like tofu, tempeh absorbs flavors from marinades, and other foods very easily. Tempeh cubes are delicious in stir fries, simmered in barbecue sauce or in a sweet and sour sauce. It is denser than tofu and works well for marinating and grilling.
- Tempeh can also be used to make a tasty salad similar to chicken salad. After steaming for about 10 minutes, chop the tempeh and mix in mayonnaise, celery, onion and pickle relish (or follow a chicken salad recipe). This is great on sandwiches.

Miso

- Miso is a traditional Japanese fermented soyfood.
- Miso is made by combining koji, grain or soybeans cultured with *Aspergillus oryzae*, with cooked soybeans, salt and water and allowing it to ferment in wooden casks.
- Varying the koji and the proportions of ingredients creates a variety of different misos.
- Hatcho is made with just soybeans and is very dark and rich.
- Mugi or barley miso is made with soybeans and barley koji and is milder than hatcho.
- Kome is made with soybeans and rice koji and has the sweetest taste. Also known as red miso.
- Genmai or brown rice miso is miso made with soybeans and brown rice koji.
- Shiro is made with sweet rice and is the lightest and sweetest miso. Also known as white miso.
- Soba is made with soybeans and buckwheat koji and is a hardy miso good in winter dishes.
- Natto miso is a specialty condiment made with barley miso, ginger and a sweetener.
- Miso is high in sodium but a small amount is all that is needed to flavor broths, stews, marinades and sauces.

Soy Sauce, Shoyu and Tamari

- Soy sauce is made through a chemical process using hydrolyzed vegetable protein from soybeans and hydrochloric acid. After 24 hours, the acid is removed and the remaining product is mixed with caramel color, salt, corn syrup and water. A preservative is often added. Soy sauce tastes salty and bitter with a metallic aftertaste.
- Shoyu is a fermented product made from whole soy beans, salt, water and wheat koji. It is allowed to age for a year or two. Shoyu flavors can vary but the best have a full mellow flavor. The flavor can be lost during cooking so it best to add shoyu (and tamari) at the end of cooking.
- Tamari is a wheat free shoyu made with soybean koji instead of wheat koji.

Soy flour

- Soy flour has a yellow color and a strong flavor that can be mellowed with toasting. Toasted soy flour is called soya flour.
- Soy flour adds moisture and prevents fat absorption so it is good to add to items that are going to be deep-fried.

Soy milk

- Soy milk is made by cooking soybeans, grinding them and then separating out the insoluble fiber.
- Soy milk has the same amount of protein as cow milk but has less fat and less calcium. Some soy milks are fortified with calcium and vitamins.

- Soy milks are sold plain and flavored as a fresh product and also in aseptic cartons that have a one year shelf life.
- Soy milk is widely used as a beverage by people who are adverse to or allergic to cow milk. It can also be used in cooking and baking in place of cow milk.

Soy "ice cream"

- Soy ice creams vary widely. Some have a lot of chemical or synthetic ingredients and a small amount of highly processed soy isolates. Others are made from tofu or soy milk and other natural ingredients. These are the types that will be found in natural food co-ops.
- Soy ice creams are favored by people allergic or adverse to cow milk.

Soy cheeses

- Most soy cheeses sold at food co-ops are made from soy milk and tofu plus one or two milk derived chemicals (casein or calcium caseinate), lecithin and/or gums to hold them together. Most contain more sodium than dairy cheeses to prolong shelf life.
- Only a few brands are completely dairy free containing neither casein nor calcium caseinate.
- All types come in a variety of flavors from mozzarella to jalapeno. Some soy cheeses are fortified with various vitamins and minerals.
- Soy cheeses can be sliced or grated and melt well. They are a good alternative for people looking for a lower fat cheese product and for people who are allergic or adverse to dairy products.

Textured Vegetable Protein (TVP)

- Processed product resembling ground meat, TVP is made from the protein of the soybean with added nutrients, flavorings and colorings.

Sprouts

- Mung beans are the most commonly sprouted bean and are the bean in Chinese bean sprouts. Lentils are also easily sprouted and taste delicious. Any whole bean or whole grain can be sprouted and sprouted beans are more easily digested.
- Seeds are also used for sprouting. Common sprouted seeds are alfalfa, sunflower and radish.
- Learn more about sprouts and growing sprouts at www.primalseeds.org/sprouting.htm

Seeds and Nuts

The traditional dietary role of both seeds and nuts in America has been as snack foods or as an ingredient in snack desserts, such as candy, cookies, and cakes. But the role of seeds and nuts can do much to add texture, variety and nutritional balance to many meals. Seeds and nuts are actually very versatile foods. They can be ground into a meal and added to baked goods, chopped

and mixed into casseroles, tossed into salads, toasted and served in stir-fries or other vegetable dishes, put into veggie burgers or "meat" loaves.

Seeds

- Seeds come from the fruits of plants. They, like grains and beans, contain the embryo and food supply for creating a new plant so they can be sprouted.
- Nutritionally, seeds are an excellent protein, vitamin and mineral source. They are outstanding calcium sources, and are higher in iron than nuts. Seeds are high in unsaturated or, "good" fats, thus high in calories.
- Types of commonly consumed seeds include sesame seeds, sunflower seeds, pumpkin seeds, flax seeds and poppy seeds

Nuts

- Nuts are the dried fruits of trees. Some of the foods we call nuts, such as Brazil nuts, cashews and peanuts are really not nuts at all. Strictly speaking, Brazil nuts and cashews are really seeds found inside fruits, and peanuts are legumes, not nuts. But because these various nuts are used like nuts and correspond nutritionally more to nuts than fruits or beans they are included in the nut category.
- Nutritionally, nuts are an excellent source of protein. They, like seeds, are high in unsaturated fats, or "good" fats, thus making them high in calories. Most nuts are good sources of calcium, phosphorus, magnesium, potassium and contain some of the B-complex vitamins.
- Types of commonly consumed nuts include almonds, Brazil nuts, cashews, chestnuts, hazelnuts, macadamia, peanuts, pecans, pine nuts, and walnuts.

Nut and Seed Products

Nut and Seed Butters

- Nut or seed butters are nuts or seeds that have been ground into a thick paste. The most familiar is, of course, peanut butter. Almonds, cashews, pumpkin seeds, sunflower seeds, sesame seeds, and others also make delicious nut/seed butters.
- Most regular supermarkets only carry peanut butter, and the peanut butter they carry differs from the ones food co-ops carry. Regular supermarkets usually carry commercial peanut butters that have sugar, salt, oils, and various stabilizers added. The stabilizers are added to prevent the natural oil from separating and to maintain uniform spreadability. Because natural food co-ops sell peanut butter and other nut/seed butters without the stabilizers, the butters sold in jars at natural food co-ops will have the oil on top. If questioned about this, explain that this naturally occurs, and instruct consumer to empty jar contents into a bowl, stir well, and put back into the jar. They will not separate again unless they sit for a very long period of time. You may also suggest to the shopper that they either store the jar upside down or in the refrigerator to prevent separation.
- Nut butters can be used in a variety of ways besides the traditional use as a sandwich spread. They can be mixed with dried fruit, honey or other sweetener, nuts and/or various cold

cereals for great sweet treats. They can be used to make sauces and frostings. They can be added to cookies, pancakes, muffins, or other baked goods, and can even replace some of the butter, margarine or shortening in the recipe.

- When substituting nut butters for butter, margarine or shortening, keep in mind that nut butters are about 1/2 oil. You may need to use twice as much or may want to alter your recipe.

Sesame Butter and Tahini

- A common way to use sesame seeds is to grind them into tahini or sesame butter.
- Tahini is made by finely grinding hulled sesame seeds, while sesame butter is made by finely grinding unhulled sesame seeds. The seeds may be roasted or raw in either product.
- Tahini is lighter flavored than sesame butter, and used more often. Both products make excellent bases for salad dressings and sauces, are good as a spread on crackers or bread, or can be added to casseroles and baked goods.
- Tahini is a staple in Mideast and Oriental cookery. Sesame butter is a better source of calcium.

Nut Cheeses

- Relatively new in the natural foods market is almond cheese. Almond cheese is made similar to soy cheese except almond milk is used instead of soy milk. Besides almond milk, almond cheese contains oil, the milk derivative casein, a thickener, and various flavorings. Some brands are enriched with various vitamins and minerals.
- Because almond cheese does contain the milk derivative casein it may or may not work as a substitute for the person allergic or sensitive to dairy.

Nut Milks

- Nuts can also be made into a delicious beverage. Almond milk is readily available. To make a nut milk finely grind nuts, add twice as much water as nuts, add a sweetener if desired; and blend. The result is a refreshingly different "milk," a delicious beverage for cooking or baking or for someone eliminating dairy from his/her diet.
- It is worth noting that while nut milks are a healthy beverage it must not be assumed they have the same nutrient content as cow's milk. For example, nut milk does not have as much calcium or Vitamin D as cow's milk, but nut milks would have no cholesterol.

Review Questions

Matching – Pair the bean with its best description.

1)____Black	a. small, maroon
2)____Fava	b. tan, heart-shaped
3)____Aduki	c. also known as turtle bean
4)____Garbanzo	d. maroon and white marbled
5)____Lentil	e. round, green
6)____Navy	f. disc shaped
7)____Anasazi	g. large, brown
8)____Mung	h. small, white

Multiple Choice – Select the correct answer.

1. Which bean is not traditionally used as a flour?

a) Mung
b) Pinto
c) Garbanzo
d) Soybean

2. When describing tofu, all of the following are correct except:

a) It is also known as bean curd
b) It is available in extra firm, firm or soft forms
c) It is very flavorful by itself and should not be cooked with marinades or sauces
d) It can be used for a variety of dishes from stir-fries to dips to pies

3. Which of these products is not made from soybeans?

a) miso
b) tofu
c) seitan

d) tamari

4. Which of the following is true about seeds?

a) Only a few varieties can be sprouted

b) Seeds are too small to be a good source of nutrients

c) Seeds are the dried fruits of trees

d) Seeds are higher in iron than nuts

5. Sesame butter differs from tahini because

a) It is made from unhulled instead of hulled sesame seeds

b) Most people like it better

c) It is used for more products

d) It tastes different but looks the same

Section Four – Sweeteners, Thickeners, Oils and Condiments

Test Your Knowledge

True or False Sorghum is another name for molasses

True or False Agar is a seaweed alternative to gelatin

True or False Refined oils have more color and aroma

True or False Extra virgin olive oil is expeller pressed

True or False Umeboshi is the condiment typically served with sushi

Sweeteners

- The majority of people have a sweet tooth. But in the United States, the consumption of sweets is a dietary obsession. Americans eat approximately 125 pounds of refined sugar per person per year. The annual consumption of artificial sweeteners is 16 pounds per person.
- Although many believe the only problem with sugar is tooth decay and crowding out more nutritious foods, excessive sugar consumption isn't good for anyone. The relationship between sugar and other conditions such as headaches, hyperactivity and immunity is less clear but there's considerable evidence that sugar sensitivities can take numerous forms.

Natural, Less Refined Sweeteners

Co-ops offer a way to satisfy the desire for sweets in a more healthful way by providing unrefined or minimally refined sweeteners. There are three major benefits of using these sweeteners over refined sweeteners.

- They are not processed with the use of chemicals.
- They have a higher nutrient value. Because they are not refined or minimally refined their nutrient content is still intact.
- Most of them are more slowly absorbed into the bloodstream.

Even though these benefits exist, it is important to note that all sweeteners should be eaten in moderation. The human body is not designed to eat large amounts of sweet foods.

Types of Natural Sweeteners

Agave

- Agave is a sweetener extracted from the Blue Agave plant in Mexico. This is the same plant used to make tequila.

- Agave's sweet taste comes from fructose which is a simple sugar that is more easily digested and has a lower glycemic index than sucrose or glucose (dextrose). Learn more about the glycemic index in the Diet Choices section of this manual.
- Agave is sold as a syrup in both a cooked, mild tasting form and a raw form produced by using lower temperatures to extract the syrup leaving the natural enzymes of the plant intact.
- Agave has about 25% less sweetness than table sugar. Use agave like honey and other liquid sweeteners to flavor beverages and in cooking and baking.

Barley Malt

- Extracted from roasted, sprouted whole barley
- Medium brown liquid or powder
- Rich malt flavor, half as sweet as refined sugar
- Recommended for baking and often used as a sweetener in soy products

Brown Rice Syrup

- Brown rice slow cooked and fermented with natural enzymes
- Light brown liquid with a mild flavor
- About two-thirds as sweet as refined sugar

Date Sugar

- Dried, pulverized dates
- Medium brown, sugary, slightly chunky powder
- Sugary, mild date flavor
- About two-thirds as sweet as refined sugar

Fruit Juice Sweeteners

- Made from fruit that has been pressed into juice and then reduced to a thick liquid or dehydrated into a powder
- Usually derived from grapes, apples, peaches, pears, and pineapples
- Most have a gentle fruit flavor and are sweeter than refined sugar
- One product, Fruitsouce, is a combination of fruit juice and brown rice syrup

Fructose

- This is the name of the sugar (simple carbohydrate) molecule found naturally in fruits and honey.
- Beware of fructose as an ingredient since most fructose used in processing is made from refined corn and some is further refined into high fructose corn syrup. More about that ingredient in the Refined Sweetener Section.
- Fruit fructose is sold in a powdered form in many co-ops.

Honey

- Honey is made by honeybees who transform nectar from flowers into a food source to sustain the hive. Strict vegans avoid honey. Farmers with hives benefit both by having bees to cross pollinate crops and from the income from the excess honey.
- Color and flavor can vary according to the flower source; typically darker honey has a stronger flavor
- Natural honey is minimally processed to remove chunks of beeswax and make it pourable.
- Honey may contain botulism spores and should not be given to children less that one year old to protect against infant botulism.
- Store honey at room temperature to avoid crystallization. Place the container in warm water to clear crystallized honey.
- Honey is very versatile; use in baking or as a general sweetener.

Maple Syrup

- Maple syrup is made by boiling the thin liquid sap of sugar maple trees until syrup is formed. Typically 40 gallons of sap are needed to make 1 gallon of syrup
- The United States Department of Agriculture (USDA) assigns grades to the maple syrup sold in the U.S. These grades are: Grade A Light Amber, Grade A Medium Amber, Grade A Dark Amber, and Grade B. The grading of syrup sold in the United States is voluntary.
- Grade A Light Amber (or Fancy) is very light in color and has a faint, delicate maple flavor. It is usually made earlier in the season when the weather is colder. This grade is widely used for making maple candies.
- Grade A Medium Amber is darker and has an easily discernable maple flavor.
- Grade A Dark Amber is very dark and has a strong maple flavor. Some people like the stronger flavor but this grade and Grade B syrup are mostly used for cooking and baking.
- Grade B is extremely dark in color and has a very strong maple taste as well as hints of caramel.
- Maple syrup, with its distinctive flavor, is popular on breakfast items like pancakes and waffles. It is also used to add some sweetness and flavor to marinades and salad dressings and as a general sweetener for baked goods when maple flavor is desired.
- Maple syrup should be stored in the refrigerator after opening to ensure freshness.

Molasses

- Molasses is a by-product of the manufacture of sugar from sugar cane.
- There are three kinds. Light molasses is the residue from the first extraction of sugar and is the sweetest. Medium molasses is from the second extraction and is darker and less sweet. Blackstrap molasses is the final residue and is very dark and only slightly sweet with a distinctive flavor.
- Blackstrap molasses is a very good source of calcium and iron.

- "Unsulphured" molasses indicates that no sulphur was used in the extraction process.

Sorghum

- This natural sweetener is made from sweet sorghum, a grain related to millet and similar in appearance to corn.
- The juice is extracted from the plant and then boiled down into syrup.
- Sorghum has a flavor and texture similar to that of molasses.

Stevia

- Stevia is a perennial herb native to South America and traditionally used as a sweetener in beverages.
- The sweet flavor comes from glycosides (enzymes in the leaf cells) instead of carbohydrates thus stevia has no calories and passes through the digestive tract without being absorbed.
- It is about 30 times sweeter than sugar by weight. Just two drops of the liquid extract can sweeten one cup of beverage.
- Stevia powder is also available for baking or use as a flavor enhancer.

Sugar Cane Juice

- Sugar cane juice is extracted mechanically from the whole can and then dehydrated and made available in a crystallized form.
- Some products are clarified using calcium carbonate and have finer crystals while others are a darker color and the crystals are larger.
- Other cane juice products include muscovado and demerara sugars, both similar to brown sugar.
- Dehydrated cane juice products resemble refined sugar products and are easily substituted for them in recipes.

Refined Sweeteners

Corn Sweeteners

- Corn is the source of several prominent sweeteners in the US food supply.
- Corn syrup is made from the starch component of corn and is primarily dextrose (the simple sugar also known as glucose).
- During processing, refiners can add various enzymes or acids to produce varying levels of sweetness (percentage of dextrose) or convert the dextrose to maltose.
- Maltose or malt syrup is used in the production of beer and other alcohol beverages.
- High Fructose Corn Syrup (HFCS) is a relatively new product made by chemically (with enzymes) converting high dextrose corn syrup to 40-90% fructose.

- Our bodies easily convert naturally occurring fructose (in fruit) to glucose (dextrose). HFCS is controversial partly because it is unclear that our bodies have as efficient a way of converting this chemically produced fructose back into glucose.
- Many studies are finding that the increasing rates of diabetes and obesity in the US parallel the use of HFCS and may be related to problems with its metabolism.
- HFCS is further refined to produce crystalline fructose often called fructose on some product labels.

Sugar

- Sugar or sucrose is made from either sugar cane or sugar beets.
- White sugar is the most refined. There are many steps used in the refining process including filtration with some sugar cane refineries using bone ash as a filter. This has been a source of controversy for vegans and vegetarians as the bone ash is derived from animal bones.
- Brown sugar is refined white sugar with molasses added back in for coloring.
- Turbinado sugar is made the same as white sugar, but stops short of the final extraction process that removes the last of the molasses.

Sugar Alcohols

- Sugar alcohols are neither sugars nor alcohols. They are carbohydrates with a chemical structure that partially resembles sugar and partially resembles alcohol, but they don't contain ethanol as alcoholic beverages do.
- They are not fully absorbed and metabolized by the body, and thus contribute fewer calories than most sugars. Their calorie content ranges from 1.5 to 3 calories per gram compared to 4 calories per gram for sucrose or other sugars.
- The commonly used sugar alcohols include sorbitol, mannitol, xylitol, maltitol, maltitol syrup, lactitol, erythritol and isomalt.
- Most sugar alcohols are approximately half as sweet as sucrose; maltitol and xylitol are about as sweet as sucrose.
- Sugar alcohols occur naturally in a wide variety of fruits and vegetables, but are commercially produced from other carbohydrates such as sucrose, glucose, and starch.

Thickeners

Agar (also known as agar-agar)

- Agar is derived from smelly red seaweed. After harvesting, this seaweed is washed and sun-bleached, strained, and allowed to harden and dry. Through this process it is transformed into odorless light-weight translucent bars, shaved into fine flakes, or powdered.
- Agar is used as a jelling agent. You may remember it from your school days, as the growth medium used in petri dishes.
- Medicinally, agar can also act as a mild laxative by adding bulk. This seaweed is mostly indigestible complex carbohydrate that passes through the body unchanged. It bonds with toxic and radioactive pollutants and helps to expel them from the body.

- Agar is rich in iodine, calcium, iron, and other trace minerals.

Arrowroot

- Arrowroot is a starch made from the arrowroot plant.
- Arrowroot is easily digested and less processed than cornstarch. Because of this it has a greater nutrient content.
- Arrowroot may be substituted, measure for measure, for cornstarch in any recipe.

Cornstarch

- Cornstarch is widely used around the world and is made from corn through a series of mechanical processing steps.
- Cornstarch made from organically grown corn is also available.

Kudzu (also known as kuzu)

- Kudzu is a concentrated starch extracted from the deep roots of the kuzu vine. It is dried and sold in the form of white powder or chalky lumps.
- Kudzu may be used as a thickener like cornstarch and arrowroot in sauces, gravies, and stews; or used as a gelling agent like agar and gelatin.
- Kudzu has high iron content, plus fair amounts of calcium and phosphorus.

Xanthum Gum

- Xanthum gum is made by fermenting corn sugar with *Xanthomonas campestris*, a bacteria that converts the sugar molecules into longer chain starches (polysaccharides). The result is a product similar to cornstarch but more sturdy and stable.
- Xanthum gum is used in a variety of products to provide texture and fullness. Its use has increased with the rise of lower fat foods where it can replace fats and oils; and gluten-free baked goods where it replaces the structure that wheat gluten supplied.
- Xanthum gum is sold in packages usually with baking items

Oils

Vegetable oils are fats extracted from plants. Vegetable oils are extracted from grain (i.e. corn), beans (i.e. soy), seeds (i.e. rapeseed (canola oil), sesame, sunflower and safflower), fruit (i.e. olive) and nuts (i.e. peanut, coconut and palm kernel).

Importance of Fats And Oils in the Diet

- Americans eat significantly too much fat. The typical American diet has close to 45% of its calories coming from fat. Current studies recommend a diet closer to 30%; with some studies recommending 20% or lower.
- Some fat is absolutely necessary in a daily diet to ensure good health. Fat in the body functions in countless different ways. It is a necessary nutrient for providing energy, body

insulation, absorption of vitamins A, D, E and K, heart function, metabolism, healthy skin, satiety, etc. Every cell in the body needs some fat.

- There are also certain fats that have been shown to protect the body from heart disease and certain types of cancer.
- Of the 45 essential nutrients that must be supplied by diet, 2 are fatty acids, linoleic acid and alpha-linolenic acid.
- Linoleic acid is sometimes called Omega 6 and alpha-linolenic acid is called Omega 3. Omega 6 fatty acids are found in many vegetables oils, particularly polyunsaturated vegetable oils. Omega 3 fatty acids are found in fish oils but are also plentiful in some vegetable oils especially flax seed oil and walnut oil.

Chemical Structure and Properties

Fats differ from one another in both their chemical structure, which affects how our bodies use them, and in their physical properties which affect how we cook with them. In terms of chemical structure, fats can be either saturated or unsaturated. Fats found in food are often a combination of the various chemical structures. Unsaturated fats have at least one double bond or place where hydrogen molecules can come and go. This chemical structure makes them liquid at room temperature and more vulnerable to rancidity. Saturated fats have no double bonds and are solid at room temperature.

Polyunsaturated Fats and Oils

- Polyunsaturated fats have more than one double bond and are the most vulnerable to rancidity. Examples of mostly polyunsaturated oils are safflower oil, sunflower oil, sesame oil, soybean oil, walnut oil, and corn oil.
- Polyunsaturated oils have been shown to be protective against heart disease but have been implicated in increased rates of certain cancers because of their vulnerability to rancidity.
- When fats go rancid, oxidation has occurred. Oxidation produces toxic compounds called free radicals which appear to play a role in the development of some cancers.
- Preservatives added to oils act as antioxidants and in the natural foods industry, an antioxidant vitamin, vitamin E is often added to oils.

Monounsaturated Fats and Oils

- Monounsaturated fats have only one double bond and also are liquid at room temperature but either semi-congealed or solid when chilled. Examples of mostly monounsaturated oils are olive oil, canola oil and peanut oil.
- Monounsaturated oils have the best research record of heart disease prevention and many well-regarded researchers recommend the use of olive oil.
- More recently high-oleic sunflower and high-oleic safflower oil have entered the market. The addition of the monounsaturated fatty acid, oleic acid, provides these polyunsaturated oils with more monounsaturates. Olive oil is highest in oleic acid.

Saturated Fats

- Saturated fats have been most closely associated with heart and arterial disease. Saturated fats are fats which are solid at room temperature. Examples are butter, shortening, lard, coconut oil, palm kernel oil, margarine and hydrogenated oils. Hydrogenation will be discussed in the oil processing section.

Oil Processing

Conventionally processed oils undergo the following steps:

- Cleaning and Hulling - Mechanically cleaned, crushed.
- Flaking - Broken down into smaller particles by mechanical rollers.
- Solvent Extraction - Oil is dissolved out of the meal with a solvent such as hexane, benzene, ethyl ether, tetrachloride, or others.
- Distillation - Solvent is evaporated off at a temp of 300 F. Traces of solvent remain and are carcinogens. Significant amounts of protein, fiber, vitamins and minerals are lost by this point.
- Degumming - Oil is treated with phosphoric acid, then centrifuged. Phospholipids like lecithin, gums, protein, complex carbohydrates, chlorophyll, calcium, magnesium, iron and copper are removed.
- Refining - Oil is mixed with caustic soda (Drano). This removes free fatty acids. Phospholipids, protein, and minerals are further removed.
- Bleaching - Filters, activated charcoal and/or acid treated activated clays are used to remove the pigments chlorophyll and beta-carotene. Although this makes a clear attractive oil, toxic peroxides and altered fatty acids are formed.
- Deodorizing - Passage of steam through the heated oil in a vacuum chamber removes aromatic substances, as well as pungent odors and unpleasant tastes which were not present in the natural oil in the seed before the processing began. This takes place at extremely high temperatures of 464° - 518° F for 30-60 minutes. Here, also, the peroxides produced in the refining step are removed. Tocopherols, phytosterols and some pesticide residues and toxins are also removed. The removal of all those toxins, etc. sounds good, but because of the deodorization step's high temperatures many unnatural isomers similar to rubber and plastics are formed.

At this point some oils also go through:

- Winterization - This is done to oils that are naturally high in waxes. Here harmless particles are removed by chilling and then filtered to prevent the oil from getting cloudy when in the refrigerator.
- Preservatives - BHA, BHT, propyl gallant, TBHQ, citric acid and methyl silicone are common preservatives added. These replace the natural antioxidants, B-carotene and vitamin E which were taken out of the oil in the refining processes.
- Defoamer - Methyl silicone is added.
- Hydrogenation - Hydrogenation is a chemical process in which unsaturated liquid oil is transformed into a solid. The process became widely used to produce a butter alternative that could hold at room temperature without becoming rancid and an oil product that could

withstand repeated high temperatures. Partially hydrogenated vegetable oil in shortening and margarine became prevalent in products like crackers, cookies and fried foods. Because trans fats are artificial they were avoided by the natural foods industry and because they are not digested as easily as natural fats they were suspected as harmful for a long time. Enough research has now confirmed the connection of trans fats with heart disease and they are rapidly disappearing from the food supply.

Natural Oil Processing

- Cleaning and Hulling - Mechanically cleaned, crushed.
- Cooking - Cooked for 2 hours at an average temperature of 120° F.
- Expeller Pressing - Here the crushed seeds are pressed in an expeller press - similar to a kitchen meat grinder, and it pushes the seed against a metal press head. The expeller press crushes and creates friction which produces heat. It is both the heat and the pressure that forces the oil to squeeze out of the seed. This process takes just minutes, and is done at a low temperature.
- Filtered, bottled, and sold

At least one of the natural food companies that market oil (Spectrum) has come up with an oil processing method that falls between the typical mass market refining process and the pure unrefined oil processing. The basic difference between their refined processing and conventional processing is that no solvent extraction takes place, lower temperatures are used and no preservatives are added. There is still a significant amount of nutrient and flavor loss because of the high temperatures but these naturally refined oils work well for high heat cooking and frying.

"Cold-pressed" and Extra Virgin oils

- The term "cold-pressed" has helped sell millions of bottles of vegetable oil over the past 30 years. Unfortunately, "cold-pressed" has no legal definition, so companies can used the term on their oil no matter how the oil was extracted or at what temperature. "Cold-pressed" may be found on the labels of oils that are chemically extracted, bleached, deodorized, etc.
- The first pressing of olives, typically found in small mills in Mediterranean countries such as Spain, Italy and Greece, yields oil that is truly cold pressed, coming out at approximately 90° F. Olives can be pressed in this manner because their flesh is so soft.
- Seeds, grains, beans are too hard to be pressed without the use of either higher heat and/or chemicals. So, the first pressing of olives should rightfully be the only oil that is called cold-pressed. This is the oil termed extra virgin.
- Further pressings of the olive mash then require heat or chemicals for extraction.

Storage of Oils

- Oils can become rancid when exposed to heat, light, and air. Because of this, it is important to store them in a tightly closed container, in a cool, dark place such as the refrigerator.

- Monounsaturated oils such as olive oil will become cloudy and harden somewhat when refrigerated. This is nothing to worry about, and the oil will return to liquid if let sit outside the refrigerator for a few minutes before use.

Flavored oils

Some of the co-ops also carry flavored oils such as oil flavored with garlic. There is also a line of various ethnic flavored oils including Caribbean, Southwestern, Thai, Asian, and Mediterranean. For example, the Thai flavored oil has peanut, garlic, ginger and hot peppers added to it.

Prepared Condiments

Ketchup

- The main difference between the ketchups sold at the food co-ops compared to conventional ones is the type of sweetener used in them.
- Conventional ketchups are sweetened with one or more highly refined sweeteners such as sugar, corn syrup, or high fructose corn syrup.
- The majority of the ketchups sold at co-ops are sweetened with natural sweeteners such as honey, maple syrup, fruit juice concentrates or others.
- There also is unsweetened ketchup, as well as some made with organic tomato products.

Mustard

- There are a variety of mustards offered at co-ops.
- As with other products many of them are made with organic products such as organic mustard seeds and organic vinegar, and made with unrefined products such as whole mustard seeds.
- Many co-ops offer a variety of different flavored mustards such as "Mustard with tamari and wasabi," "Mustard with garlic and horseradish," "Garlic pesto mustard," and others.

Mayonnaise

- Mayonnaise typically contains eggs, oil, vinegar or lemon juice, a sweetener, and salt or other seasonings. The types of mayonnaise sold at natural foods co-ops differ from conventional ones in the following ways:
- They contain organically produced oils.
- They do not contain chemical preservatives. Conventional brands usually contain a chemical preservative such as EDTA.
- They use natural sweeteners such as honey or brown rice syrup instead of high fructose corn syrup.
- Nayonnaise is a tofu mayonnaise. It is made without the use of eggs.

Vinegar

- Many of the vinegars sold at co-ops are raw, naturally processed vinegars. Whether using grapes for red wine and balsamic vinegar, apples for apple cider vinegar, or grains for various grain vinegars, they are traditionally made.
- Traditional methods include mechanical pressing of the fruit or grain, and then a slow fermentation process in vats. This natural fermentation occurs without the addition of alcohol or additives to speed up the process, and without pasteurization.
- Some are lightly filtered through cotton to remove large particles, but many are completely unfiltered. This explains why some of the vinegars have a cloudy appearance and floating particles called "mother," a living mixture of bacteria and enzymes. This cloudy appearance is perfectly normal.

Wasabi

- Wasabi, also known as Japanese horseradish or Japanese mustard, is a condiment that has a pungent flavor with a sinus-clearing effect.
- Although not related to horseradish, it is often called the Japanese horseradish because its kick is as potent as that of horseradish.
- Wasabi is a root, but is usually sold in powdered form in small tins in the macrobiotic section of the co-ops. Wasabi powder is mixed with water to form a smooth paste.
- Traditionally it is used as the perfect condiment for raw fish dishes such as sushi, and with red-fleshed and oily fish, but wasabi also adds a lift to dipping sauces, soups, Asian noodle salads, and nori rolls.

Umeboshi

- Umeboshi, a macrobiotic condiment also known as the salt plum or a pickled plum, is a fruit resembling an apricot that is fermented in salt with the herb beefsteak leaf (shiso) for up to a year.
- Umeboshi is sold as whole plums, in paste form and as vinegar.
- Umeboshi is salty in taste and may replace the salt in salad dressings, spreads, seasonings and sauces, or it may be cooked with grains, beans, and vegetables.
- Those following a macrobiotic diet typically use umeboshi in rice balls, with plain rice, or lightly rubbed on corn on the cob. Umeboshi may be substituted for salt, miso, tamari, or shoyu in many recipes.
- Umeboshi has remarkable health properties. Traditional Japanese claim that it can replace just about everything in your medicine cabinet. High in citric acid, umeboshi eliminates lactic acid from the body, which contributes to fatigue, colds, flu, viruses, diseases and chronic illnesses. Umeboshi alkalizes the digestive system, helps strengthen blood quality, and relieves indigestion due to overeating, alcohol overindulgence, or morning sickness. Umeboshi is also useful as a headache remedy for headaches with an expansive (rather than contractive) nature such as headaches due to travel, overexertion or too many sweets.

Gomasio

- Gomasio, also known as roasted sesame seed salt, is a blend of dry roasted sesame seeds ground with sea salt.
- It is the most popular of the macrobiotic condiments and is used to add flavor to salads, vegetables, pastas and grains.
- Some gomasio is flavored with additional ingredients such as garlic or kelp.

Sea Vegetables

Nutritional Value

Sea vegetables are one of the richest sources of nutrients. Ounce for ounce they contain higher amounts of minerals and vitamins than any other type of food. Sea vegetables supply all the minerals needed for human health including significant amounts of calcium, iodine, phosphorus, sodium, and iron. Sea vegetables are also a very good source of vitamins A, C, E and B vitamins. In fact, sea vegetables are one of the only vegetable sources of vitamin B12.

Types of Sea Vegetables

Agar (See "Thickeners")

Arame

- Arame looks like black blades of grass and has a mild and sweet taste. This makes it a good choice for newcomers to sea vegetables.
- It is best sautéed or stir-fried by itself or mixed with other vegetables. It is not a good choice for soups.
- Japan is the only significant producer of Arame where it is also used medicinally for treatment of the spleen, pancreas, female disorders and high blood pressure.

Dulse

- Dulse is maroon to purple colored soft leaves that turn green when cooked.
- It grows in the temperate to frigid zones of the Atlantic and Pacific but not in Japan. In Alaska, dulse is used as an inexpensive chewing tobacco.
- Dulse is often an immediate favorite for sea vegetable novices. It has a mild, smoky flavor and can be eaten right out of the bag as a snack. One fun way to use dulse is pan-fry is until crisp and use it on a DLT sandwich.

Hijiki (Hiziki)

- Hijiki is long black thin curls of sea grass. It remains black when cooked and expands to more than four times its size after soaking.
- Soaking and long cooking are best for preparing hijiki to soften it. Then it is a fine addition to vegetable side dishes.

- Hijiki is one of the most mineral-rich foods. It is an especially good source of calcium and a good source of iron. It is often recommended during pregnancy.

Kelp

- Kelp is the largest of sea vegetables. The brown plants grow all over the world and are widely used in a variety of forms.
- The kelp family includes arame, kombu and wakame but these are packaged and sold separately under their own names.
- Kelp is usually sold in powder or in tablets. The powder may be used to replace salt. It is also used commercially as a thickener and an emulsifier.
- Kelp is high in iodine and is used medicinally for high blood pressure and disorders of the circulatory and nervous systems.

Kombu

- Kombu, as mentioned before, is a member of the kelp family.
- Kombu comes in brown strips and is often cooked with beans to tenderize them and make them easier to digest. It can also be cooked alone in soups or stews.
- Kombu is high in calcium, iodine, Vitamins A and C.

Nori

- Most people encounter nori in vegetarian sushi called nori rolls. Sushi nori is sold as large sheets ready to wrap around cooked rice and condiments.
- Nori is also known as laver. The green pieces become almost black and crisper when cooked. It can be crumbled into soups, vegetables or grains.
- Nori contains more vitamin A than carrots and it is high in protein.

Wakame

- Wakame has a sweet flavor and rich green color. It is a favorite for miso soups.
- Wakame from US coastal waters is called alaria and is tougher than the Japanese harvested wakame.
- Wakame is high in protein. Alaria is a particularly good source of vitamin B12.

Herbs and Spices

- Herbs are flowering plants above ground that do not become woody and persistent like trees.
- Spices are any pungent or aromatic substances of vegetable origin.
- People like buying herbs and spices at a co-op because they can buy as much or as little as they need. Bulk spices and herbs are also fresher then the little bottles in conventional grocery stores.
- A good source of information about herbs and spices is www.frontiercoop.com

Definitions

Wildcrafted

Some of the herbs at the co-ops are wildcrafted. This means they were picked in the wild as opposed to being cultivated.

Organic

Organic herbs and spices are grown using organic farming methods.

Irradiation

- Conventional herbs, spices and seasonings undergo irradiation as a means of extending shelf life. Irradiation is a process that uses chemical byproducts (cobalt-60 and cesium-137) of the nuclear power industry to destroy bacteria.
- The foods do not become radioactive but the process of irradiation destroys some nutrients and produces additional compounds called Unique Radiolytic Products (URPs). The long term effect of URPs on the body is not known.
- Co-op herbs, spices and seasonings are not irradiated.

Medicinal, culinary

- Herbs and spices can be classified as medicinal or culinary.
- Examples of culinary herbs include basil, oregano, cumin and dill.
- Examples of medicinal herbs include burdock, raspberry leaf, chamomile and peppermint.
- Some spices such as cayenne (red pepper) have medicinal properties.
- It is best to refer shoppers to an in-store reference on medicinal herbs and spices and let them use their own judgment as to which herb or spice may be best for their needs.

Review Questions

Multiple Choice – Select the best answer

1. Which of the following describes stevia?

a) Strong, malt flavor

b) Final residue of sugar cane extraction

c) Perennial herb with very sweet leaves

d) Dehydrated sugar cane juice

2. Which of these products is not made from corn?

a) Commercial Fructose

b) High Fructose Corn Syrup

c) Muscovado Sugar

d) Cornstarch

3. Monounsaturated oils such as olive oil

a) contain oleic acid

b) are clear liquids even when refrigerated

c) are the most harmful to heart health

d) contain Omega-3 fatty acids

4. Oils can become rancid if exposed to

a) heat, light, loud noises

b) heat, air, rotten eggs

c) heat, light, air

d) light, air, cold

5. Which sea vegetable is cooked with beans to make them more digestible?

a) hijiki

b) kombu

c) wakame

d) nori

MATCHING – Pair the food with its best description.

1)____Wasabi a. a salty macrobiotic condiment

2)____Gomasio b. known as a Japanese horseradish; sold in powdered form

3)____Umeboshi c. roasted sesame seed salt

4)____Barley Malt d. a thickener that looks and acts like cornstarch

5)____Arrowroot e. a mild, syrup-like grain based sweetener

Section Five – Dairy Products, Eggs, Meat and Poultry, Fish and Seafood, Produce

Test Your Knowledge

True or False Cows producing certified organic milk must be fed certified organic feed

True or False Kefir is a cheese made from goat milk

True or False Egg color is not an indicator of nutrient content

True or False Natural meats and organic meats have the same standards

True or False Shiitake mushrooms can be eaten either raw or cooked

Dairy Products

General Issues

Bovine Growth Hormone or Bovine Somatotropin

- BGH, rBGH, rBST and BST are all names for a synthetically produced growth hormone for cows. The "r" stands for recombinant, a scientific designation for genetically engineered products. It is manufactured by one company, Monsanto, and sold under the trade name Posilac. Monsanto estimates that about 10% of cows in the US are given BGH. It is banned in Europe.
- The use of BGH increases infections and thus cows given the hormone require more antibiotics. This practice is of concern since residues of the antibiotics may pass into the milk and into people consuming the milk. The ongoing presence of antibiotic residues in people and in cows eventually decreases the ability for the antibiotics to be effective against bacteria.
- Although the US Food and Drug Administration (FDA) ruled that milk from cows given BGH was safe for humans, some researchers are concerned with BGH's effect on immune factors that protect the body from diseases such as cancer and diabetes.
- FDA rules do not require labels for milk and milk products from cows given BGH but dairy product labels may state that they do not contain BGH.
- Organic dairy products do not contain BGH.
- Learn more about BGH at www.sustainabletable.org/issues/hormones

Organic Dairy Products

There are five ways that organic dairy products are different from conventional:

- Cows are fed organically grown feed from land which has not been treated with pesticides, herbicides or synthetic fertilizers for at least 3 years. Organic farms use a system of crop rotation that promotes fertility, biological diversity and a healthy environment.

- Cows are not given antibiotics. Herd health is promoted through clean bedding, sanitary facilities, natural medicines, room to move and clean air and water. If antibiotics are required to save a cow's life, the cow is withdrawn from the organic herd.
- Cows are not given growth hormones to chemically alter their growth or milk production patterns.
- Cows are treated humanely, including open pasturing, free stalls and clean, comfortable bedding.
- Organic milk may not be blended or otherwise come in contact with non-organic milk. All organic dairy processing must be entirely separate from non-organic products and must be done on clean equipment.

Milk, Yogurt and Kefir

Raw Milk

- Raw milk is milk that has not been pasteurized.
- Pasteurization is the process of heating fresh milk to 160° F for 15 seconds to kill both disease-causing and spoilage microorganisms.
- It has been used in the US since the early 1900s and its use dramatically reduced death and disease from contaminated milk and enabled milk to be shipped and stored for longer periods of time.
- Some people believe that milk is less healthy and more difficult to digest when potentially beneficial bacteria are destroyed during pasteurization.
- It is against federal law enforced by the FDA to sell raw milk packaged for consumer use across state lines (interstate commerce). But each state regulates the sale of raw milk within the state (intrastate), and some states allow it to be sold. For a list of current state regulations go to www.realmilk.com/happening.html

Unhomogenized Milk

- Some milk is unhomogenized. Homogenization is the process which breaks up fat particles or cream and disperses them uniformly throughout the milk.
- In unhomogenized milk the cream rises to the top. Some cooks prefer using unhomogenized milk because it is curdles less easily than homogenized milk.

Acidophilus milk

- Acidophilus milk is sterilized low fat milk that has had a live bacteria culture, *Lactobacillus acidophilus* added to it. Acidophilus has many beneficial properties including the production of natural antibiotics and its ability to inhibit the growth of toxin-producing microorganisms.
- The acidophilus culture makes the milk more digestible especially for people who have trouble digesting the sugar in milk, lactose. Lactose intolerance will be discussed in more detail later in this session.

Lactose-free milk

- This is another product that is tailored to lactose intolerant individuals. This is milk which has had lactase, the lactose-digesting enzyme, added to it so that no lactose remains.

Goat milk

- Locally produced goat and sheep milk are available at most natural foods co-ops.
- Goat milk has more iron and protein than cow milk and the fat particles are smaller making it easier to digest.

Yogurt

- Yogurt is a very popular dairy food because it is an excellent source of natural bacteria cultures that aid in digestion.
- Yogurts at natural foods co-ops are different from other yogurts because they contain natural sweeteners, flavors and colors instead of artificial ones.
- They are also more likely to contain several types of healthy bacteria whereas conventional brands may be so highly processed that no active cultures remain.
- Some brands are made from organic milk.

Kefir

- Kefir is a cultured milk product similar to yogurt but containing different strains of bacteria cultures. It differs also because it is sold as a beverage usually in quarts.
- Kefir cultures are also sold so that consumers can make their own kefir.

Cheese

Animal rennet, microbial enzymes

- Most commercial cheese is made using a coagulant called rennet which is derived from the stomach tissues of an animal, usually a cow.
- Vegetarians and others who avoid consuming animal products appreciate many of the co-ops cheeses that use a microbial enzyme as the coagulant instead of rennet.
- Microbial enzymes are produced through a fermentation process in a laboratory, using vegetable and mineral sources.

Raw milk, pasteurized and unpasteurized cheese

- Cheeses at a natural foods co-op are made from either raw milk, unpasteurized or pasteurized milk.
- All milk to make cheese arrives as raw milk.
- Pasteurization is the most extensive processing milk can undergo before becoming cheese. During pasteurization, milk is heated to a very high temperature for a specified amount of time. Pasteurization destroys both harmful microorganisms, and good bacteria, or flora. Flora is responsible for many of the flavor and ripening characteristics of cheese so pasteurized cheeses can be bland and uninteresting.

- Cheeses made with raw milk are only heated enough to make cheese. This process retains the beneficial flora but can also retain harmful bacteria so all raw milk cheese must be held 60 days and then be inspected prior to sale. The presence of any harmful bacteria would be evident during the holding period and the cheese would not be released for sale.
- Cheeses that are made from milk which has been partially pasteurized are called unpasteurized cheeses. The heating process does not meet pasteurization specifications but is hot enough to kill any harmful bacteria. It does not kill all of the flora so these cheeses tend to have more flavor than pasteurized cheese.

Goat and sheep milk cheese

- Goat milk cheese or chèvre, has a distinctive flavor and is easier to digest than cow's milk cheese because the butterfat globules are smaller. It is similar in calories, protein and fat to cow milk cheese but is lower in sodium and cholesterol.
- Sheep milk cheese is relatively new in this country but some well known European cheeses have traditionally been made with sheep milk. Pecorino romano and feta are traditional sheep milk cheeses.

Butter

Unsalted, salted

- Butter is made from fresh or sweet cream (as opposed to sour cream) and may be either unsalted or lightly salted.
- Salt is added for flavor and as a preservative.

Cultured

- Some organic unsalted butter is made using a traditional European method in which a live culture is incubated into the cream during churning to increase flavor.

Eggs

Terms and Issues

Fertile, non-fertile

- Fertile eggs are from farms that keep both hens and roosters. Fertile eggs typically have a tiny brown speck in the egg white.
- Non-fertile or sterile eggs are from farms where only hens are kept.
- Fertile eggs contain reproductive hormones and may also contain higher levels of some nutrients.

Free range

- The USDA defines and regulates the use of this term only for poultry products and not for eggs.

- Some farms may use this term to indicate that the hens are not restrained in a coop but are permitted to move about. This practice is considered more humane and healthier than conventional egg farms where thousands of chickens may be kept in one building and must be given preventive doses of antibiotics to prevent disease resulting from such close quarters.

Organic

- Organic eggs are from farms where the chickens are fed organically grown feed and are not given any antibiotics or hormones.
- Organic chicken farms are free range to prevent the need for antibiotics.

White, brown

- The color of eggs is an indicator of chicken variety not of any increased levels of nutrients

Nutrition

- Egg whites contain most of the protein while egg yolks contain most of the fat as well as beneficial compounds such as lecithin and biotin which both aid in the digestion of the egg.
- The protein content of eggs is considered the most complete. Protein is made up of amino acids and the combination of amino acids in eggs is used as the standard by which the protein quality of other foods is measured.
- Eggs are often avoided by health conscious individuals because of their fat and cholesterol content. However, research on egg consumption and heart disease has not shown an increase in heart disease in people who consume eggs. Cholesterol in food does not seem to raise blood cholesterol as much as saturated fat and hydrogenated oils. Eggs contain some saturated fat but they also contain lecithin and other natural compounds which help the body digest fat.

Meat and Poultry

Terms and Issues

Natural

- Meat sold at a natural food co-op is usually either natural or organic. The term natural on meat labels can be confusing since the US Department of Agriculture (USDA) allows the term if the meat is only minimally processed and has not had any artificial ingredients (color, flavor, preservatives, etc) added to it.
- However the term natural on meats at a natural food market often has a more specific meaning and includes how the animals were raised. It may be on the label of meat from animals that are not given any hormones or antibiotics and have more outdoor pasture time than industrial farmed animals in addition to being only minimally processed with no added artificial or synthetic ingredients.

Free range

- As mentioned above, the USDA has defined "free range" or "free roaming" for poultry products but not for eggs.
- For other meat products carrying the "free range" label, there is no standard definition.
- The USDA requires only that birds have been given access to the outdoors for an unspecified period each day, and considers a minimum of five minutes of open-air access each day to be adequate for approved use of the free range claim on a poultry product.

Organic

- Meats certified as organic are produced on certified organic farms which have met the extensive requirements listed in the Definitions section.
- These include the use of organic feed, no hormones or antibiotics and the animals must have access to the outdoors.

Grain-fed, Grass-fed

- Grain-fed cattle are fed grain right before slaughter and the fat on the meat is creamy white.
- Grass-fed cattle continue to graze right up until slaughter and the fat on their meat is darker or more yellow from the beta carotene in the grass.

Antibiotics

- There is growing concern over evidence that antibiotic use in animal feeds is causing antibiotics to lose effectiveness in fighting disease.
- A major source of antibiotic overuse is in livestock production, as up to 70 percent of the antibiotics used in America are routinely given to healthy chickens, pigs and cattle to prevent outbreaks of illness in large scale industrial farms.
- Many of the antibiotics administered to animals are also used for treating human bacterial infections and those bacteria are becoming resistant to the antibiotics.

Hormones

- Federal regulations do not allow growth hormones to be given to poultry or hogs. The words “no added hormones” on poultry or pork products are simply misleading marketing.
- The use of growth hormones in dairy and beef cows is very controversial with concerns extending to the earlier onset of puberty in children who regularly consume hormone-laden milk and meat products.
- Organic standards do not allow the use of hormones. Some beef producers, even if they are not certified organic, choose not to use hormones and will state this on their label.

Storage and Handling

Storage

- Fresh meat should be refrigerated immediately after purchase.

- Ground meats and organ meats should be used within 24 hours and other meats within 2 days. Otherwise meats should be kept frozen.

Safe Handling

- Utensils such as knives and cutting boards used for meats should not be used for other foods until they have been thoroughly cleaned. This is to avoid the transmission of harmful bacteria that can be present in the meat or introduced during packaging.
- Since meats can harbor some of the deadliest bacteria, always cook meat thoroughly using a meat thermometer to verify that proper temperatures have been achieved. Learn more about safe cooking methods at www.fsis.usda.gov.

Fish and Seafood

Terms and Issues

Dolphin-Safe

- There are several logos that designate tuna as dolphin-safe. The most highly regarded is the program administered by Earth Island Institute (www.earthisland.org/dolphinSafeTuna).
- Under this program, Earth Island Institute monitors tuna companies around the world to ensure the tuna is caught by methods that do not harm dolphins and protect the marine ecosystem. Their standards are adhered to by more than 90% of the world's tuna companies.
- In order for tuna to be considered "Dolphin Safe," it must meet the following standards:
  1. No intentional chasing, netting or encirclement of dolphins during an entire tuna fishing trip;
  2. No use of drift gill nets to catch tuna;
  3. No accidental killing or serious injury to any dolphins during net sets;
  4. No mixing of dolphin-safe and dolphin-deadly tuna in individual boat wells (for accidental kill of dolphins), or in processing or storage facilities; and
  5. Each trip in the Eastern Tropical Pacific Ocean (ETP) by vessels 400 gross tons and above must have an independent observer on board attesting to the compliance with points (1) through (4) above.

Aquaculture

- Aquaculture or fish farming is growing as a way to meet the demands for fish in the food supply without further depleting the populations of wild fish.
- In the US 80% of fish and seafood for human consumption is imported and about half of that is farmed. Across the world 210 species are cultivated through aquaculture. In the US, 19 species are farmed.
- Economic development and environment oversight of aquaculture in the US is provided through federal regulation by the National Oceanic and Atmospheric Administration, an agency within the Department of Commerce. Learn more at www.nmfs.noaa.gov/aquaculture

Labeling

- The US requires that all fish and seafood be labeled with its country of origin and method of production (i.e. wild or farmed).
- There are currently no USDA standards for certifying fish and seafood. Other countries including Canada, England and Australia do have standards for organic fish. These often apply only to farmed fish because the feed and environment can be controlled.

Food Safety

- Some types of fish may contain undesirable levels of environmental contaminants like mercury, polychlorinated biphenyls (PCBs) and dioxins.
- Federal and state advisories are issued to offer guidance for safe consumption of fish. These are available at http://epa.gov/waterscience/fish
- Independent organizations also offer assistance. The Monterey Bay Aquarium Seafood Watch program (www.mbayaq.org/cr/seafoodwatch.asp) offers regional guides for consumers and tips for retailers. Seafood Choices Alliance (www.seafoodchoices.org) offers directories of smart choices of products, restaurants and suppliers.

Produce

Organic Produce

Vegetables and fruits are grown using either organic farming methods as described earlier or by conventional methods with chemical fertilizers and pesticides. Seasonally available locally grown organic produce is desirable since it will be the freshest and have the least shipping and handling costs.

Specific Items

Leafy greens

- Leafy greens are a good source of many nutrients including vitamins A and C, calcium, iron and fiber. Leafy greens are also a good source of cancer-fighting carotenoids like beta carotene.
- Greens fall into two basic categories: salad and cooking. Salad greens are more fragile and include all of the lettuces and tender greens including arugula, escarole, endive and watercress.
- Greens that taste better cooked are thicker and heavier and include beet greens, chard, collards, kale, mustard, and turnip greens. Cooking greens may be used raw when they are very young or baby greens. Mature cooking greens are best prepared by steaming or stir frying.

Squashes

- Squashes are classified as either summer or winter varieties.

- Summer squash includes zucchini, sunburst and yellow crookneck varieties. Summer squashes have skin and seeds that are soft and easily eaten raw or cooked.
- Summer squash is a good source of vitamin C.
- Winter squashes include acorn, butternut, buttercup, hubbard, turban and spaghetti squash. Winter squashes have tough skin and seeds that are removed before cooking.
- The seeds may be roasted and seasoned like pumpkin seeds but are not edible raw. Winter squash may be baked, steamed or added to stir-fries. It can be pureed after cooking and added to thicken soup or served as a side dish.
- Spaghetti squash gets its name because after cooking, the flesh can be lifted out with a fork and resembles strands of spaghetti. Serve with spaghetti sauce for a fun meal.
- Deep yellow winter squashes such as acorn and butternut are excellent sources of vitamin A in the form of beta carotene (beta carotene is converted to vitamin A in the body). Even though they have a creamy texture, winter squashes have no fat.

Mushrooms

- Button or white mushrooms, *Agaricus bisporus,* are the most common type and are available year round. Their flavor is mild and they can be eaten fresh or cooked.
- Nutritional values for mushrooms refer to this type of mushroom.
- Button mushrooms are good sources of the trace minerals selenium and chromium.
- Crimini mushrooms are also known as Golden Italian and Italian Brown.
- Crimini mushrooms have a rich, meaty flavor. They can be eaten raw or cooked in any recipe in place of button mushrooms.
- Enoki mushrooms have tiny heads and long stems. They are crisp with a mild, almost fruity, flavor. They can be eaten fresh in salads or cooked in soups or stir-fries.
- Oyster mushrooms look and taste similar to their name. They have a soft texture that becomes more delicate when cooked. They are not usually eaten fresh.
- Shiitake mushrooms are sold either fresh or dried. Fresh shiitake are round and tan with a slightly pointed cap. They are succulent and meaty.
- The ones with the most aroma also have the most flavor. Shiitake are eaten fresh or used in many dishes including soups and stir-fries. Dried shiitake can be soaked in water before cooking. The water can be used as a stock for sauce.
- Japanese medicine has identified many healing properties for shiitake mushrooms. Many of the uses now being substantiated by western medical researchers include treatment of high blood pressure, high cholesterol, stomach ulcers, diabetes and gallstones.
- Portabello mushrooms are very large, firm and meaty. They lend themselves well to grilling; in fact, some restaurants feature an entree of grilled portabello.

Daikon

- This long white root vegetable is also known as the Japanese radish. It is slightly hotter than small red radishes and is a popular addition to macrobiotic meals.

Fennel

- Also known as anise, fennel has a fist-like bulb and long feathery leaves. The bulb can be eaten raw in salads or cooked. The leaves are usually used as a garnish.

Leeks and Shallots

- Leeks are a mild flavored member of the onion and lily family, and look like giant green onions. However, only the white part of the leek is used. Leeks are popular in soups, stir-fries, and sauces.
- Small golden onions, shallots are called "the queen of the sauce onions." They are well-known to French cooks for their aroma and flavor which is closer to garlic than onion.

Review Questions

Fill in the Blank – Choose the correct term from the following list: Homogenization, Pasteurization, Goat Milk, Lactose-free Milk, Acidophilus Milk

1) _____ is the process in which milk is heated to very high temperatures destroying both harmful and good bacteria.

2) _____ is sterilized low-fat milk that has had a live bacteria culture, *Lactobacillus acidophilus*, added to it.

3) _____ has a digestive enzyme added to it for those individuals unable to digest milk sugar or lactose.

4) _____ is the process which breaks up the fat particles of the cream and disperses them evenly throughout the milk.

5) _____ has more iron and protein in it and the fat particles are smaller making it easier to digest.

Multiple Choice – Select the best answer.

1. Organic dairy or eggs are from farms where all of the following are true except:

a) The animals are fed organically grown feed

b) The eggs are always fertile

c) The animals are not given antibiotics or hormones

d) The animals are permitted to move about in open pastures

2. The term "free range" is defined and regulated for which product?

a) Eggs

b) Pork

c) Beef

d) Chicken

3. Which product might contain added hormones?

a) Ham

b) Beef Roast

c) Chicken Breast

d) Organic Milk

4. Which vegetable is also known as the Japanese radish?

a) Shiitake

b) Daikon

c) Fennel

d) Shallot

5. Which of the following is not a salad green?

a) Portabello

b) Arugula

c) Watercress

d) Escarole

Section Six – Nutrients, Functional Foods and Food Supplements, Diet Choices, Food Allergies

Test Your Knowledge

True or False Color and flavor components of fruits and vegetables offer health benefits

True or False Omega 3 fats are the most common in our food supply

True or False Oat bran and wheat bran contain the same type of fiber

True or False The Glycemic Index rates foods by how quickly they convert to blood sugar

True or False A true food allergy is defined by immune system involvement

Nutrients, Functional Foods and Food Supplements

Definitions

Nutrients

- Nutrients are the known substances in foods that are essential for the body to function. They provide energy, building blocks for body parts, and components that regulate necessary chemical processes in the body. The body either can't make these nutrients or can't make them fast enough to meet its needs.
- Categories of nutrients include protein, carbohydrates, fats, vitamins, minerals and water. To learn more about the nutrients go to www.nutrition.gov
- In the United States, specific requirements for each of these nutrients by age and gender are determined and updated on a regular basis by teams of scientists at the national Institute of Medicine Food and Nutrition Board. For more information about these requirements and the process used to determine them go to www.iom.edu/CMS/3708.aspx

Functional foods

- Functional foods are foods that contain components that provide additional benefit beyond that of nutrients. These bioactive components can potentially enhance health when eaten on a regular basis as part of a varied diet. The simplest examples of functional foods are fruits and vegetables. These offer life essential vitamins and minerals, but also contain an array of phytochemicals (plant chemicals) that may fight certain diseases.
- Perhaps the most amazing thing about phytochemicals is that they are the parts of the plants that provide color, flavor and odor, properties that living things either are attracted to or repelled by. Not surprisingly, organically grown fruits and vegetables develop higher levels of these substances because non-chemical farming methods encourage these internal pest control measures by the plant itself.
- The colorant properties of specific phytochemicals are isolated for use as natural coloring for foods and in developing new varieties of vegetables such as red carrots and purple cauliflower.

- Sometimes specific vitamins and minerals that share properties with phytochemicals are included in lists of functional foods. This is often true for the antioxidant nutrients, the vitamin A precursor beta-carotene, vitamins C and E, and the minerals selenium, copper and zinc.
- Read more about functional foods in the American Dietetic Association's Position Paper on Functional Foods at www.eatright.org/nutrition and from the International Food Information Council at http://ific.org/nutrition/functional/index.cfm

Food supplements

- Food supplement is a term for food components sold separately or added to foods to provide specific health benefits. One example is oat bran which is found in most whole oat products but is also added to some products and sold separately because of research that shows that the consumption of oat bran can help reduce harmful types of blood cholesterol.
- Food supplements should not be confused with dietary supplements although they may be sold in the same area of your store. Dietary supplements have their own definition and set of regulations under a separate labeling law than food items. You can learn more about these regulations at www.cfsan.fda.gov/~dms/supplmnt.html The Natural Foods Training Manual does not cover dietary supplements.
- It is important to remember that all the nutrients and healthy components in food work best together, or synergistically. Research indicates that isolated healthy food components added to foods, drinks or supplements may not present the same disease prevention benefits as a natural whole foods diet consumed over time. Find out more about the role food plays in health and healing at www.med.umich.edu/umim/index.htm

Functional Food Components

Carotenoids

- Carotenoids such as alpha and beta carotene, zeaxanthin, lutein and lycopene function as antioxidants in the body. As their name implies, antioxidants prevent oxidation, the process that destroys fatty acids in cell membranes causing premature (aging) or abnormal destruction (cancer) of cells.
- Many things can promote oxidation including environmental pollutants such as smoke as well as stress, poor diet and lack of sleep. Increasing the consumption of antioxidants, particularly from foods rather that individual nutrient supplements appears to slow or prevent the oxidation process.
- Carotenoids provide color to plants and are found primarily in dark green vegetables and deep red, yellow and orange fruits and vegetables such as tomatoes, melons, citrus fruits and squashes.
- Lutein and zeaxanthin are prevalent in leafy greens, corn, eggs and citrus and appear to play a role in maintaining healthy vision. Lycopene, found in tomato products and watermelon is a carotenoid that maintains prostrate health.

Fiber

- Fiber is only found in plants, but more and more foods are being fortified with what scientists call "functional fibers" such as maltodextrins, polydextrose, beta glucans, inulin, and cellulose. These isolated fiber components may not confer all the same benefits of total or complete fiber from natural whole foods.
- Some benefits of fiber-rich diets include reduced risk of heart disease and cancer, and maintenance of a healthy digestive tract and blood glucose levels. Clinical trials show that soluble fiber rich in beta glucans and found in foods like oats and barley, lowers cholesterol by binding it in the intestine.

Flavonoids

- Flavonoids provide color to plants and are found in a variety of foods including tea, grapes, grains and beans.
- Their potential health benefits include overall disease protection from enhanced cellular antioxidant defenses; roles in heart and urinary tract health; and maintenance of brain function.

Isothiocyanates

- Cruciferous vegetables like cauliflower, broccoli, cabbage, collards, kale, and Brussels sprouts are rich in these phytochemicals.
- Research is showing that these isothiocyanates fight cancer by enhancing cellular antioxidant and detoxification capabilities.

Omega-3 Fatty Acids

- Essential fatty acids are the types of fats that our bodies cannot make and we must get from food. There are two distinct types: Omega-6 and Omega-3. Humans don't require a lot of fat (20-30% of calories or about 60 grams per 2000 calories) but it's best to consume equal amounts of omega-3 and omega-6 fats.
- Omega-6 fatty acids are more dominant in the food supply, found in soybean and corn oil as well as in whole grains.
- Omega-3 fatty acids are less common and are available in both plant and animal forms. Docosahexaenoic acid (DHA) and eicosapentaenoic acid (EPA) are the more concentrated forms of omega-3s and are found in fish oils. Best sources are cold, deep water fish like salmon, mackerel, sardines, anchovies, tuna, whitefish, cod and halibut.
- Alpha linolenic acid (ALA) is the plant source of omega-3 fatty acids and our bodies must convert it to DHA or EPA. Best sources are walnuts, ground flax seeds, omega-3 fortified eggs, soybeans and canola oil.
- Omega-3 fats have been shown to reduce heart disease risk, and help maintain mental and visual function.

Phytosterols

- Phytosterols are plant compounds that lower cholesterol by trapping it in the gut. An increasing number of foods are being fortified with phytosterols; examples include margarines, yogurt, orange juice, and rice milk.
- Natural sources include corn, soy, and wheat. However, for persons who need to lower their cholesterol and want a safe, more natural alternative to drugs, the phytosterol levels found in fortified foods may be more effective than those attainable from natural sources.

Probiotics and Prebiotics

- Probiotics such as *Lactobacillus* and *Bifidobacterium* are bacteria that can play a helping role in our intestinal tract.
- These bacteria occur naturally or are used intentionally in fermented foods like miso, tempeh, kim chee, sauerkraut, yogurt and kefir. They can also be added to foods.
- Human population research suggests diets rich in fermented foods may lower cholesterol and cancer risk. Clinical trials show probiotics maintain gut function and health by preventing overgrowth of harmful intestinal bacteria. Because good immunity depends on a healthy gut, probiotics also aid our immune defenses.
- Prebiotics such as inulin, polydextrose, and fructo-oligosaccharides (FOS) are carbohydrates in food that our body cannot digest or absorb. Food sources include whole grains, some fruits, onions, garlic, leeks, honey, and fortified foods and beverages. As they pass through our digestive tract probiotics feed on them. Therefore, prebiotics are the foods that keep beneficial probiotic populations adequate and healthy. This is turn may improve intestinal health and nutrient absorption.

Soy Protein

- Soy protein found in natural soy foods is shown in clinical trials to reduce cholesterol and risk of heart disease. Because soy has other healthy components like isoflavones and lignans, it's advisable to include whole soy foods in your diet over foods supplemented with soy protein. These other soy components may contribute to bone health and immune function, as well as menopausal health for women.

Sulfides and Thiols

- These phytochemicals are found in pungent vegetables like onions, garlic, leeks and scallions.
- Their potential health benefits include detoxification of undesirable compounds, antiviral activity and improved heart and immune system function.

Food Supplements

Acidophilus

- Acidophilus, as mentioned before, is a live friendly bacteria that is beneficial to humans. The digestive tract contains certain bacteria that are beneficial to the body. These bacteria aid in

the digestion of food and are necessary in the production of certain vitamins. These bacteria are responsible for maintaining a normal flora in the digestive tract, and also prevent the growth of pathogens.

- Although beneficial bacteria naturally occur in the intestines of humans, they can be altered or destroyed by various things such as antibiotics, oral contraceptives, aspirin, poor diet, sugar, yeast and stress, a bout of diarrhea or gastroenteritis. Adding acidophilus and other beneficial bacteria to the diet is good ways to help reestablish beneficial bacteria in the intestines after the natural flora have been destroyed.
- Acidophilus is naturally found in fermented dairy products such as yogurt, buttermilk or kefir.
- Supplemental acidophilus products come in liquid, powdered, tablet or capsule form. Most of the acidophilus products are found in a refrigerated section of the store.

Bee Pollen

- Bee pollen is a yellow pellet-like material produced by flowering plants that is gathered by bees. It is found in the refrigerated section of the co-op, and also sometimes sold in capsules.
- Bee pollen contains vitamins, amino acids, minerals and enzymes. Proponents believe that it contains every substance needed to maintain life.
- Sprinkle bee pollen on cereals or other foods but do not heat or cook since heat would destroy vitamins and enzymes.

Spirulina

- Spirulina is a blue-green algae that is cultivated in freshwater ponds and sold as a powder and in capsule or tablet form.
- Because it is a single cell organism, spirulina contains a full complement of amino acids and is a good source of many vitamins and minerals including vitamin B12.

Flax Seed, Flaxseed Oil

- Flax seeds are small, shiny, oval-shaped, brown seeds. They have been part of human diet for over 5000 years.
- Flaxseeds are sold in both whole seed and ground form and used in many ways including in cereals, as an egg substitute, or an ingredient in baked goods.
- They need to be stored in a refrigerated section of the store to protect their high oil content from oxidation.
- As previously mentioned, flax seed oil is one of the best vegetable sources of Omega 3 fatty acids. It is also naturally high in beta-carotene and vitamin E.

Lecithin

- Lecithin has a function in every bodily system and plays a role in the absorption and metabolism of fats and fat-soluble vitamins.
- Supplemental lecithin usually comes from soybeans. It is yellow in color and in liquid form has the consistency of oil.

- Liquid lecithin is usually found in either the baking section or the oil section of the co-op. It can also come in the form of granules or capsules, which might be found in the supplement section. Lecithin is purchased for a variety of reasons from medicinal to baking or cooking.

Nutritional Yeast and Brewer's Yeast

- Nutritional yeast is sometimes confused with brewer's yeast. They are two distinctly different products.
- Nutritional yeast is grown by introducing cultures of yeast to a sugar medium, usually molasses. It is a pale yellow color and has a distinct but pleasant flavor and aroma. Nutritional yeast textures ranges from flakes to fine powder, and is found in the bulk food section of the co-ops. Nutritional yeast is used by adding it to baked goods, casseroles, beverages, and snacks. It is great as a seasoning on popcorn.
- Brewer's yeast, on the other hand, is a product left over from the beer brewing process. It, too, is pale yellow in color but has a characteristic bitter hops flavor. It is not sold in bulk but rather as a food supplement as a fine powder, in capsules or mixed with other vitamin and mineral supplements.
- Both yeasts are a good source of B vitamins. Some types of nutritional yeast are grown on a B-12 enriched medium, and if so this would make it a reliable source of B-12; a significant factor for the vegetarian eliminating all animal products.
- Both yeasts are also a source of the mineral chromium which helps the body regulate blood sugar.

Oat Bran

- Oat bran is the digestible outer covering of whole oats.
- It contains soluble fiber, the type of fiber that has been shown to significantly lower blood cholesterol levels.
- Oat bran is easily incorporated into many foods - muffins, pancakes, quick breads and cookies. It can also be cooked and eaten as a hot cereal.

Wheat Bran

- Wheat bran is the outer layer of the wheat kernel. It resembles sawdust in taste and texture, and is usually found in the bulk grain section of the coop. Sometimes it is sold prepackaged as well.
- Wheat bran contains some protein, vitamins and minerals, but mainly is recognized for its fiber content which is typically why it is purchased. This fiber, an insoluble fiber, helps move food waste through the intestinal tract.
- Add wheat bran to bread, baked goods, cereals and casseroles.

Wheat Germ

- Wheat germ is the center, or middle layer, of the whole wheat berry. This is the part of the grain that would germinate the new plant.

- It is packed with nutrients- many vitamins (it is the best food source of vitamin E), and minerals, some protein and oil.
- Because it contains oil it must be refrigerated in an airtight container to prevent rancidity. It should be stored in a refrigerated section of the store, or on the shelf only if vacuum-packaged. Vacuum packaging eliminates oxidation of the oil, or spoilage.
- Wheat germ is added all kinds of recipes including pancakes, breads, cereals, cookies, casseroles, and breading for fish or poultry.

Wheat Grass

- Wheat grass, is the young grass of the wheat plant. It is typically found in the produce section of the store and looks like grass.
- This grass is usually purchased for juicing. It is also sometimes sold as a powder or in tablets and found in the supplement section. Wheat grass is a natural source of vitamins, minerals, amino acids, chlorophyll and enzymes.
- Wheat grass is nutritionally similar to deep green vegetables such as spinach or broccoli, but is much more concentrated.
- Wheat grass is a staple of living foods or raw foods diets. It is also the basis for some juice fast regimens.

Diet Choices

Vegetarian diets

Introduction

- Individuals choose to eliminate some or all animal products from their diets for a variety of reasons including health, ethical, spiritual and ecological.
- Health benefits for vegetarians include lower heart attack and cancer risk and lower rates of high blood pressure and diabetes.
- Some individuals choose to avoid animal products because they believe that animals as living things have certain rights one of which is to not be raised inhumanely and then slaughtered for food especially when humans have sufficient non-animal sources of food. Persons who choose vegetarian diets for ethical reasons are usually opposed to wearing fur, animal testing and factory farms. The recent book, Diet for a New America by John Robbins, heir to the Baskin-Robbins fortune, extensively outlined the ethical arguments for vegetarian diets.
- Buddhism and Hinduism have a long history of vegetarianism and have many followers who are vegetarian. The concepts of reincarnation, karma and nonviolence lend themselves easily to vegetarian practices. Westerners who embrace these concepts are often vegetarian. The Seventh-Day Adventist religion also promotes a vegetarian diet.
- Ecological reasons are based on the fact that the production of meat requires a great deal more cropland, water and fossil fuel than does the production of plant foods. Also, grains that are used to feed livestock could feed a lot more people as grain than as meat.
- A reliable resource for information about vegetarian diets is the Vegetarian Resource Group (www.vrg.org)

Types of Vegetarian Diets

- Lacto-ovo vegetarians eat dairy and eggs but no meat, poultry or fish
- Lacto vegetarians eat dairy but no eggs, meat, poultry or fish
- Vegans eat no animal products including honey

Nutrition

Any diet choice can be healthy or unhealthy depending on individual food choices. Vegetarian diets, particularly vegan diets may require more attention to some nutrients in order to maintain an adequate intake.

Protein

- Protein does not necessarily require more attention but has been the source of some controversy for vegetarians and vegans.
- One of the first books to spark an interest in vegetarian diets in this country was Diet for a Small Planet, written in 1970 by Frances Moore Lappe. In it, she described a theory of combining the building blocks of protein, amino acids, to make vegetable sources of protein the same quality as animal sources. The notion of protein combining really took hold partly because diets around the world are made up of the combinations of staple foods that were described such as corn tortillas and beans, lentils and rice, and peanuts and millet.
- Combining grains with nuts and seeds, grains with beans or nuts and seeds with beans is a good way to ensure variety but is not necessary to meet protein needs. The biological reality is that the body stores individual amino acids for up to eight hours and combines them as needed for various metabolic functions. By eating a variety of foods each day, an individual easily obtains sufficient protein and does not need to worry about eating a specific combination of foods at any given meal.

Iron

- Plant sources include leafy greens, beans, sea vegetables and cooking foods in an iron skillet.

Vitamin B12

- Plant sources are sea vegetables, nutritional yeast grown with vitamin B12 and products fortified with B12 such as soy milk and vegetarian burgers.

Calcium

- Plant sources include leafy greens, broccoli, tofu (made with calcium sulfate), cooked dry beans, almonds, and sesame seeds.

Macrobiotic diet

Introduction

- Macrobiotics is a word attributed to Hippocrates from the Greek macro bios, "long life." Early classical writings used it to refer to individuals and groups who were healthy and lived

long lives. The term was reintroduced to identify a philosophy of living developed by the Japanese scholar, Sakurazawa Nyoiti (later known as George Ohsawa) who brought his ideas to Europe and the US in the early part of the 20th century.

- One of his students, Michio Kushi, is widely accepted as the current leader of the international macrobiotic community. Michio Kushi and his wife Aveline founded the Kushi Institute (www.macrobiotics.org) which provides extensive educational and experiential opportunities to explore macrobiotics.
- Michio Kushi defines macrobiotics as "the way of health, happiness, and peace through biological and spiritual evolution and the universal means to practice and harmonize with the Order of the Universe in daily life, including the selection, preparation, and manner of cooking and eating, as well as the orientation of consciousness toward infinite spiritual realization."
- Macrobiotic diet principles apply this philosophy to food choices.
- Individuals are drawn to the macrobiotic diet because it emphasizes locally grown organic foods and because the diet is just one facet of a way of living that emphasizes harmony, gratitude and happiness.

Principles (from Food and Healing by Annemarie Colbin)

- Ecology: Eating naturally cultivated, unsprayed, locally grown foods.
- Economy of Life: No waste. Eating whole foods, avoiding partial, refined, and processed foodstuffs, which would include such purportedly "wholesome" products as wheat germ, bran, and vitamin pills.
- The Yin and Yang Principle: Also known as the Unifying Principle. The concept that antagonistic forces complement and unify each other.
- An Art of Living: We need to be responsible for our own life and health, which is always changing, so we must always be ready to change and adapt. Flexibility is the key.
- Appreciation: Gratitude is the root of freedom and happiness.
- Faith: In the wisdom of nature, the balance of opposites, this manifests itself as universal justice, and in the love that embraces everything without exclusions.
- Do-O-Raku, or Tao, the Order of Nature: The enjoyment of life. Anything we do is a game. It does not matter if we fail or succeed.

Foods

- Whole grains (50-60% of total daily food) and beans (primarily soy products, 5-10 % of total) are the protein base
- Vegetables (in season, primarily roots, leafy greens, squashes and cabbage) are 20-25% and fruits (in season) are 5% of the total volume
- Sea vegetables, nuts and seeds represent 2-4%.
- Other common foods include salty condiments like gomasio (sesame seeds and sea salt) and umeboshi (plums pickled in brine), unrefined sesame oil and corn oil.
- Fish are used occasionally
- Preferred sweeteners are barley malt, rice syrup and maple syrup.
- Some foods are strictly avoided. These include meat, poultry and eggs; dairy products; coffee and stimulating herbs such as mint; nightshade family vegetables (tomatoes, potatoes,

eggplant, peppers); sugar, honey and corn syrup; and all artificially colored, artificially sweetened, chemically preserved, or chemically treated foods.

Ayurvedic diet

Introduction

- Ayurveda is the traditional system of medicine in India and the role of food and diet is strongly emphasized.
- Individuals choose the Ayurvedic way of eating primarily to explore potential physical, spiritual and/or emotional health benefits.

Principles

- All existence is an interplay of vibrations according to ayurvedic sages who have classified these vibrations into five elements: akasha or ether, air, fire water and earth. The human body, composed of these elements is also nourished and maintained by them.
- In the body the five elements assume the form of three doshas or humors which are the physiological components of the five elements. Ether and air combine to create Vata, air and fire combine to create Pitta and water and earth combine to produce the dosha Kapha.
- The three doshas produce various temperaments and physical types depending on their proportion in the individual. Some people are clearly of one type whereas others exhibit a combination of types. Vata individuals are wind-dominated, Pitta are bile-dominated and Kapha are mucus-dominated.
- Foods and spices have attributes that either subdue or increase the dominating dosha. In general, ayurveda advises eating foods which subdue or maintain the dominating dosha.

Foods

- In ayurveda, foods are classified into six tastes--sweet, sour, salty, bitter, pungent and astringent. Ayurvedic healers recommend that all of these six tastes be included at every meal. Each taste lends balance so including some of each can minimize cravings and enhance digestion. In general the standard American diet has too much sweet, sour and salty tastes and lacks bitter, pungent and astringent foods. Chutneys and spice mixes are ways to include a variety of tastes.
- Foods are also categorized as heavy or light, dry or unctuous/liquid and warm or cool (temperature). Different qualities balance different doshas. A balanced main meal should contain some foods of each physical type with varying proportions based on individual constitution needs, the season and the climate.
- A third ayurvedic classification of foods is by the effect they have on the non-physical aspects of the person - mind, heart and spirit. Sattvic foods (fresh, seasonal fruits and vegetables, whole grains, nuts, seeds, honey and mung beans) promote clear thinking and emotional balance, rajasic foods (fried and overly spiced foods) are more stimulating and can disturb aspects of the mind, heart or senses, and tamasic foods (heavily processed, old or stale; also meats and liquor) lead to lethargy and are considered a barrier to spiritual growth.

Food Combining

Introduction

This way of eating first became well-known in the early 20th century when it was called Natural Hygiene. Some of its followers then were Herbert Shelton (its founder) and Sylvester Graham (for whom the graham cracker is named). More recently, it was made popular by a best-selling book called *Fit for Life*.

Principles

- The basic principle of food combining is that the enzymes needed for food digestion function best when attention is paid to the way foods are combined when eaten. Specifically fruits should be eaten alone, fruits and vegetables should not be eaten together nor should protein and starches.
- Food combining diets are not necessarily vegetarian although fresh food is emphasized.
- Although many people attest to high energy levels and improved health by following food combining principles, the scientific community disputes the theory that proteins and starches cannot be digested at the same time citing foods like legumes and whole grains which each contain appreciable amounts of both protein and starch within an individual food and are diet staples around the world.

Low Carbohydrate and Low Sugar diets

Introduction

- Low carbohydrate diets first became popular in the 1970s with the first book by Dr. Robert Atkins, *Diet Revolution*. Other low carbohydrate and low sugar approaches to diet include the *South Beach Diet, Sugar Busters*, and the *Zone Diet.*

Principles

- The Atkins diet, as it became known, restricts dietary carbohydrates of all kinds (sugars and starches) in order to produce ketosis, a metabolic state that facilitates fat burning. Consuming less carbohydrate foods also reduces insulin production and some research indicates that excess insulin production in itself contributes to obesity.
- Low carbohydrate and low sugar diets consider the glycemic index or load of particular foods.
- The glycemic index (GI) is a numerical ranking of foods based on their rate of conversion to glucose in the body. Pure glucose is the reference point and has a GI of 100.
- Foods with more protein and fiber have the lowest GI values. An apple or a serving of brown rice would have a lower GI than apple juice or refined white rice. The complete database is found at www.glycemicindex.com
- One limitation of the GI is that is does not take into account the total amount of glucose potential (usually the amount of carbohydrate) in a serving of that food. To correct for this Walter Willett a well known nutrition researcher at Harvard developed the Glycemic Load (GL) value. The GL is determined by multiplying the GI by the amount of carbohydrate in

the food and dividing that number by 100. For example a medium apple has a GI of 40 and 15 grams of carbohydrate so the GL would be 40 x 15 / 100 or 6.

- The GL might also be calculated using a revised carbohydrate value called net carbohydrate. Net carbs is the total carbohydrate in a food minus fiber and sugar alcohol.
- This is one reason many foods such as packaged smoothies will use erythritol or other sugar alcohols as sweeteners and add extra fiber such as inulin and cellulose. These can help the food get labeled as "low carb" to satisfy the demand by individuals following a low carb or low sugar diet.

Food Allergies

Introduction

- Individuals may discover that they cannot tolerate a particular food at any time in their lives. Food cooperatives are excellent resources for the person with food allergies because they carry so many alternative products.
- A true food allergy is characterized by immune system involvement. This means that the immune system sees the food allergen as a harmful invader and mobilizes to attack and get rid of the offending substance. When this occurs one or more of the body's systems will respond and these responses are the symptoms that occur. Respiratory symptoms might include difficulty breathing, sneezing or wheezing; skin symptoms would be hives or eczema; digestive symptoms could include diarrhea, cramping or nausea; and cardiovascular symptoms could include anaphylactic shock, the most severe and potentially fatal reaction. An excellent food allergy resource is www.foodallergy.org
- Food labeling laws now require that the eight major food allergens (wheat, milk, eggs, soy, peanuts, tree nuts, fish, seafood) be clearly identified in the ingredient list.

Lactose Intolerance

- Not a food allergy because the immune system is not involved.
- Lactose intolerance occurs when the body is unable to produce the enzyme lactase which is necessary to digest lactose, the sugar in milk. Undigested lactose ferments in the intestine producing gas, bloating and diarrhea. Sometimes small amounts of lactase are produced and these individuals may be able to tolerate some dairy products but not others.
- The co-ops carry lactose-free milk and other products. Many with lactose intolerance can digest yogurt and other cultured milk products because the lactose is digested by the bacteria in the food.
- Products made from milk that has been cooked like ice cream and hard cheeses are also often tolerated because the lactose is broken down in the cooking process.

Gluten Sensitivity

- Gluten sensitivity or celiac sprue is a malabsorption syndrome in which the intestinal walls become inflamed in the presence of gluten, a protein component of wheat and some other

grains. The inflammation can cause bleeding, pain and poor absorption of nutrients leading to weight loss and other health problems. Learn more at www.celiac.org

- Persons with gluten sensitivity must avoid all sources of gluten. This includes wheat, rye, barley, spelt, kamut and products made from any of these foods including flours, pasta and ingredients such as malt flavoring and wheat starch. Oats are often processed in the same facilities that handle wheat so look for specific gluten-free oat products.
- There are many gluten-free products available at the co-ops including cookies, cereals, pasta and baking mixes.

Common Allergenic Foods

Wheat

- Many people are allergic to wheat. Almost all baked goods, pasta, cereals, and gravies contain wheat or wheat products. Seitan (wheat-meat), bran and wheat germ, bulgur (used in Middle Eastern tabouli) and couscous are all forms of wheat or wheat derivatives.
- Ingredients that indicate the presence of wheat in baked goods include: all-purpose flour, wheat gluten, bread flour, cake flour, enriched flour, pastry flour, phosphated flour, white flour, semolina, bran, bread crumbs, farina, food starch, modified food starch, malt and wheat germ.

Wheat Alternatives

- Most people diagnosed with a wheat allergy have reactions to common wheat or *Triticum sativum*. These people often find they can tolerate spelt (*Triticum turgidum*). Breads, flours and pastas made from spelt and kamut are readily available at co-ops.
- Many other wheat alternatives are also available. Corn tortillas, rye crackers, rice cakes and mochi are good substitutes for wheat crackers. Ready-made, wheat-free cereals include cream of rice, cream of rye, cream of buckwheat, puffed rice, puffed millet, puffed corn, rice flakes, corn flakes, rye flakes, brown rice crispies and wheat-free granola. Corn germ can replace wheat germ and oat bran replaces wheat bran. Cooked amaranth, barley, buckwheat, polenta, millet, oats or rye can replace cracked wheat or couscous in salads or in main dishes, and can also be used as hot cereals. Rice, corn, lentils, quinoa, buckwheat or mung bean pasta can be substituted for wheat pasta.

Milk

- Milk allergies are a reaction to the proteins in milk–casein and whey. People with a dairy allergy must avoid foods with casein or whey or both.
- Common symptoms often involve the respiratory system or the skin.

Milk alternatives

- Co-ops offer a number of refrigerated, frozen and packaged grocery products that are dairy-free, including salad dressings, condiments, soy yogurt and cheese, soy, rice or nut-based beverages and frozen desserts.

- Since milk and dairy products are considered an important source of calcium individuals with a milk allergy look to alternative sources such as products with added calcium such as soy milk, juices and cereals. Other good sources of calcium include cooked, dry beans, baked beans, refried beans, tofu made with calcium sulfate, kale, collard and turnip greens, broccoli, rutabaga, almonds and sesame seeds.

Peanuts and Nuts

- Allergies to peanuts and nuts are often associated with the most severe allergic reactions and require strict avoidance.
- Always clearly label any nut items especially when sampling items for customers. Read product labels to check for specific nuts, peanuts, peanut butter or peanut oil.

Nut-free substitutes

- For peanut butter replacement try sesame butter (made from whole sesame seeds), tahini (made from hulled sesame seeds), or nut butters made from acceptable nuts.

Egg

- Eggs are used in a wide range of foods for a variety of reasons from helping baked goods rise to emulsifying salad dressings.
- Because eggs are not always an obvious ingredient in foods individuals who are allergic to eggs learn to be careful label readers.

Egg Substitutes

- Many co-ops contain an egg replacement product made from arrowroot, baking powder, tapioca and potato starch. It is found in the baking section.
- A popular, nutritious homemade substitute is flaxseed. Mix 1 part ground flaxseed with 3 parts cold water. Boil for three minutes then cool and store in the refrigerator. For 1 beaten egg, substitute 1 tablespoon of the flaxseed mixture.
- Garbanzo flour can also be used as an egg substitute. Use 1 tablespoon flour plus 1 tablespoon oil to replace 1 egg.

Review Questions

Multiple Choice – Select the best answer.

1. What do salmon and walnuts have in common?

a) They are both good sources of calcium

b) They are rarely the source of food allergies

c) They both contain high levels of soluble fiber

d) They are both good sources of Omega 3 fatty acids

2. Which of the following foods is not a good source of probiotics?

a) Yogurt

b) Oat bran

c) Miso

d) Kefir

3. You are having dinner with some vegans. Which food would they not eat?

a) Barbecue seitan

b) Tempeh salad

c) Kefir

d) Tofu quiche

4. Which meal best represents the standard macrobiotic diet?

a) Macaroni and cheese, broccoli, blueberry crisp

b) Miso soup, mushroom and cheese omelet, pineapple muffins

c) Miso soup, barley and mushrooms, aduki beans, sweet potatoes

d) Chicken Caesar salad, breadsticks

5. Individuals with gluten sensitivity would need to avoid which food item?

a) Malted milk candies

b) Plain rice

c) Popcorn

d) Flaxseed oil

Case Studies – Answer these questions as if you were talking to a shopper. Give as many ideas as you can think of.

Case Study #1

Peter has chosen to become a lacto vegetarian. He says he eats a lot of grains and beans but is wondering if there are any meat-like substitutes that he could also include in his diet. He is interested in substitutes that would work well in things like chili, casseroles, or to bring to a barbecue. He also likes to bake and wonders what he can replace eggs with.

1) What is a lacto-vegetarian?

2) What are some meat-like substitutes that you could recommend?

3) What egg replacements would you recommend?

Case study #2

Charlie has been diagnosed with a wheat allergy. He is overwhelmed trying to figure out what he could possibly eat if he cannot include wheat in his diet. He has come to the co-op looking for some assistance. How would you respond to his list of questions?

1) Are there wheat-free breads available? If so, what are they?

2) What types of pasta would you recommend?

3) What types of cereal can I substitute for my usual "Cream of Wheat" in the morning?

4) I snack on crackers at work. Any ideas of what I can snack on now?

Case study #3

Elena discovered that when she eliminated dairy from her diet her indigestion and chronic colds disappeared, along with the dark circles under her eyes. She is happy to be feeling better but is concerned with how to put together a balanced diet without dairy products. How would you help her with the following questions.

1) What other types of milks are there?

2) Do these other milks contain a similar amount of calcium and vitamin D as cow's milk?

3) What are other sources of calcium?

4) My favorite food is cheese. Is there any cheese I can eat?

5) One of the main reasons I eat yogurt is because of the beneficial bacterial cultures it contains. What non-dairy foods have beneficial cultures?

Resources

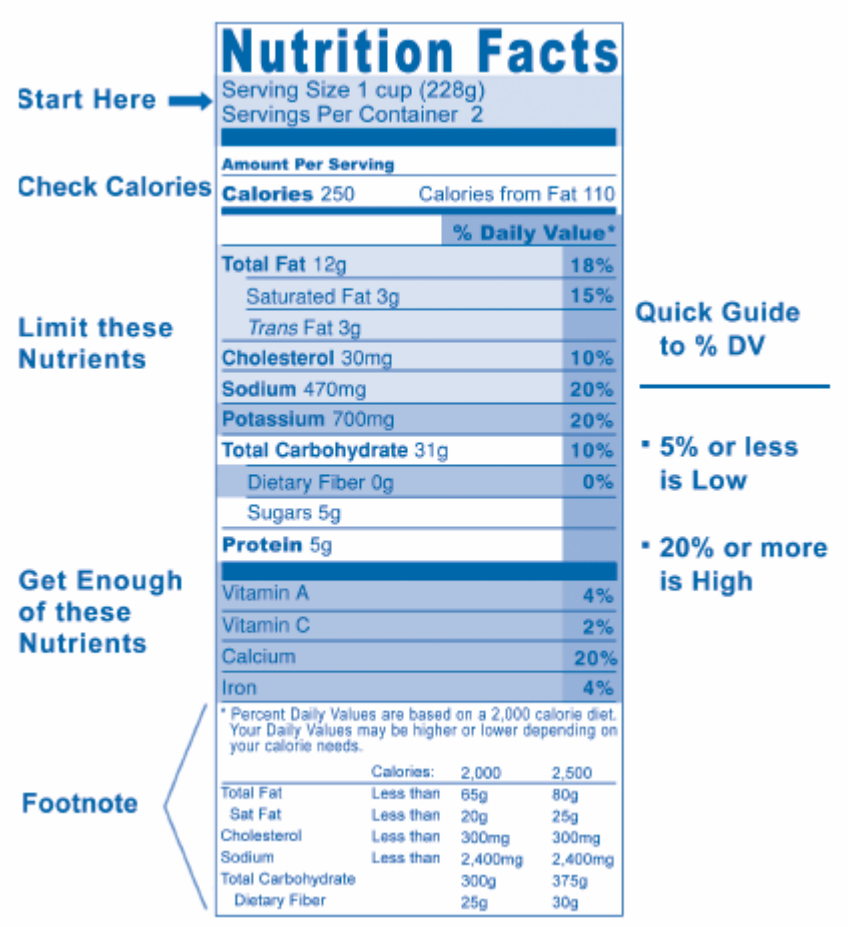
Food Labels

Introduction

Both the Ingredient List and the Nutrition Facts label are excellent sources of information about food. All packaged products and any product making a health claim must have a Nutrition Facts label. All packaged and prepared foods must have an ingredient list. Ingredients are listed in order by weight and must identify the 8 major allergens, wheat, eggs, milk, soy, peanuts, tree nuts, fish and seafood.

Nutrition Facts Label

Here is a simple explanation of how to use the Nutrition Facts label. More information can be found at www.cfsan.fda.gov/~dms/foodlab.html



In-Store References

NCGA Food Brochures

These co-op brochures have been an integral part of the Natural Foods Training Program since the beginning. Much of the information is shared and they are ideal to use as supplemental material for the manual. Current topics are Beans, Fish and Seafood, Flour, Food Allergy Solutions, Food Safety, Functional Foods, Grains, Meat and Poultry, Oils, Organic Foods, Rice, Soyfoods and Sweeteners. Order brochures on the NCGA website at www.ncga.coop/product.

Better Eating for Life

This excellent shopper nutrition education program was developed by Hanover Co-op and is also available on the NCGA member website. It's a great resource for helping shoppers apply important nutrition principles.

Health Notes

Many co-ops offer this online resource to their customers. Health Notes has a comprehensive and well indexed food guide.

Web Resources

Here is a summary of the websites referenced throughout the Natural Foods Training Manual.

Section One

Sustainable Table – Information about Genetic Engineering
www.sustainabletable.org/issues/ge
USDA National Organic Program labeling guidelines
http://www.ams.usda.gov/NOP/FactSheets/LabelingE.html
The Consumers Union Guide to Environmental Labels
www.eco-labels.org
Certified Humane Label
www.certifiedhumane.org
Certified Vegan Label
www.vegan.org
Certified Fair Trade Label
www.transfairusa.org
Food Alliance Certified Label
www.foodalliance.org

Section Two

Whole Grains Council
www.wholegrainscouncil.org/
National Pasta Association
http://www.ilovepasta.org/

Section Three

US Dry Bean Council
www.americanbean.org/index.htm
Primal Seeds
www.primalseeds.org/sprouting.htm

Section Four

Frontier Natural Products Co-op
www.frontiercoop.com

Section Five

Sustainable Table – Information about Artificial Hormones
www.sustainabletable.org/issues/hormones
Campaign for Real Milk
www.realmilk.com/happening.html
USDA Food Safety and Inspection Service
www.fsis.usda.gov
Earth Island Institute
www.earthisland.org/dolphinSafeTuna
US National Oceanic and Atmospheric Administration
www.nmfs.noaa.gov/aquaculture/
US Environmental Protection Agency Fish Advisories
http://epa.gov/waterscience/fish/
Monterey Bay Aquarium Seafood Watch Program
www.mbayaq.org/cr/seafoodwatch.asp
Seafood Choices Alliance
www.seafoodchoices.org

Section Six

US Government Nutrition Websites
www.nutrition.gov
US Institute of Medicine Nutrient Requirements
www.iom.edu/CMS/3708.aspx
American Dietetic Association Food and Nutrition Information
www.eatright.org/nutrition
International Food Information Council
http://ific.org/nutrition/functional/index.cfm
US FDA Center for Food Safety and Applied Nutrition
www.cfsan.fda.gov/~dms/supplmnt.html
University of Michigan Integrative Medicine Program
www.med.umich.edu/umim/index.htm
Vegetarian Resource Group

www.vrg.org
The Kushi Institute
www.macrobiotics.org
The Glycemic Index Database
www.glycemicindex.com
Food Allergy and Anaphylaxis Network
www.foodallergy.org
Celiac Disease Foundation
www.celiac.org

Print Resources

These books served as general reference for the Natural Foods Training Manual. Additional print resources can be found on several of the NCGA Food Brochures.

Food and Healing by Annemarie Colbin

Meals that Heal: A Nutraceutical Approach to Diet and Health by Lisa Turner

The New Whole Foods Encyclopedia by Rebecca Wood

Answers to 'Test Your Knowledge' and 'Review Questions'

Section One

Test Your Knowledge

False
True
False
True
False

Review Questions

Multiple Choice: 1 c, 2 b, 3 b, 4 d, 5 b

Section Two

Test Your Knowledge

False
True
False
True
True

Review Questions

Fill in the Blank
1. bran, germ, endosperm
2. Soba, Udon or Ramen
3. Oats, Barley, Rye, Wheat

Matching
Grains: 1 e, 2 h, 3 a, 4 b, 5 d, 6 g, 7 c, 8 f
Rice: 1 e, 2 a, 3 f, 4 d, 5 c, 6 b
Flour: 1 f, 2 c, 3 d, 4 b, 5 e, 6 a

Section Three

Test Your Knowledge

True
False
True

False
False

Review Questions

Matching: 1 c, 2 g, 3 a, 4 b, 5 f, 6 h, 7 d, 8 e

Multiple Choice: 1 b, 2 c, 3 c, 4 d, 5 a

Section Four

Test Your Knowledge

False
True
False
True
False

Review Questions

Multiple Choice: 1 c, 2 c, 3 a, 4 c, 5 b

Matching: 1 b, 2 c, 3 a, 4 e, 5 d

Section Five

Test Your Knowledge

True
False
True
False
True

Review Questions

Fill in the Blank: 1. Pasteurization, 2. Acidophilus milk, 3. Lactose-free milk, 4. Homogenization 5. Goat milk

Multiple Choice: 1 b, 2 d, 3 b, 4 b, 5 a

Section Six

Test Your Knowledge

True

False
False
True
True

Review Questions

Multiple Choice: 1 d, 2 b, 3 c, 4 c, 5 a

Case Study #1
1) What is a lacto-vegetarian?
A lacto-vegetarian is someone who excludes meat, poultry, fish, and eggs but includes dairy products.

2) What are some meat-like substitutes that you could recommend?
Meat-like substitutes include tofu, tempeh, seitan, textured vegetable protein. *(Should be able to list two of the four.)*

3) What egg replacements would you recommend?
Egg replacements include 1 T. blended flax seed mixture, pre-packaged egg replacer, 1 Tbs. lecithin, 1 T. garbanzo bean flour plus 1T. oil. *(Should be able to list at least one.)*

Case Study #2
1) Are there wheat-free breads available? If so, what are they?
Yes. They include Rice bread, Millet bread, Rice/Almond bread, Spelt bread, and some of the Rye breads are wheat-free. *(There may be additional kinds in your store. Should be able to name at least one type of wheat-free bread).*

2) What types of pasta would you recommend?
Recommended pasta might include Rice pasta, Corn pasta, Spelt pasta, Quinoa-Corn combination pasta. *(There may be additional kinds in your store. Should be able to name at least two kinds of wheat-free pasta.)*

3) What types of cereal can I substitute for my usual "Cream of Wheat" in the morning?
Many whole grains such as amaranth, barley, buckwheat, millet, oats, quinoa and rye nicely cook into breakfast cereals individually or in combination with each other. Rolled grains such as oats, rye, barley may be a good place to begin. There are various packaged hot cereals including a cream of rice cereal which are more similar to his usual "Cream of wheat" in texture. Some of the cold cereals are also wheat-free. Show Charlie where to find the ingredient label. *(Should be able to name at least two alternatives.)*

4) I snack on crackers all day long at work. Any ideas of what I can snack on now?
There are various wheat-free crackers. Other ideas are rice cakes, rice puffs, spelt pretzels, corn chips, corn puffs, popcorn. *(Should be able to name at least 2 snacks.)*

Case Study #3
1) What other types of milks are there?
Other types of milks include soymilk, almond milk, and rice milk and oat milk. *(Should be able to name at least two.)*

2) Do these other milks contain a similar amount of calcium and vitamin D that cows milk has?
They inherently do not contain a similar amount of calcium and vitamin D as cow's milk, although some of these milks are fortified with calcium and vitamin D making them more similar to cows milk.

3) What are other sources of calcium?
Other sources of calcium include green leafy vegetables, tofu made with calcium sulfate, dried beans, almonds, and sesame seeds. *(Should be able to name two sources.)*

4) My favorite food is cheese. Is there any cheese I can eat?
There are soy-based and almond-based cheeses available. There are some soy cheeses that are completely dairy-free. The others, contain casein which is a milk derivative. This may or may not work for the person allergic to dairy. *(Should know that some soy cheeses are ok and that the others have a milk product.)*

5) One of the main reasons I eat yogurt is because of the beneficial bacterial cultures it contains. What non-dairy foods have beneficial cultures?
Amasake, miso, shoyu, tamari, mirin, vinegar, sauerkraut. *(Should be able to name at least two.)*