



Flaxseed:

Agriculture to Health

Leader's Guide

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Goal

To help North Dakota families develop eating patterns based on food produced in the Northern Plains that promotes health and may prevent chronic disease. Increased focus on consuming foods produced in the Dakotas has the potential to promote agriculture and economic development. The specific goal of this lesson is to promote the health benefits of incorporating flaxseed into the diet.

Objectives

Participant's will:

1. Define the Dakota Diet Concept.
2. Identify flaxseed varieties and products.
3. Identify health benefits of flaxseed.
4. Identify suggested daily amounts.
5. Identify proportions to substitute flaxseed into recipes.

Audience

Adults



North Dakota State University
Fargo, North Dakota 58105

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Before the Lesson

- Read through the leader's guide and handout.
- Select activities that meet the interests and needs of the group. Also consider available time, meeting space and equipment.
- Obtain copies of the handout and evaluation forms (Pre- and Post-Lesson) for each member.
- Decide whether visual aids included with the packet will be used to make overhead transparencies or small posters.
- Check with agricultural commodity groups related to flaxseed production to determine whether flaxseed samples, recipes, or educational brochures may be donated.
- <http://www.ameriflax.com>
Click on "Producer Information";
Click on "Related Companies"

Leader's Packet

- Leader's guide
- Visual Aids (PowerPoint slides; overhead transparencies or posters).
- Member "fact" sheet – "Flaxseed: Agriculture to Health" (FN-596)
- Evaluation forms (Pre- and Post-Lesson)

Introduction of the Lesson

Have members recall experiences about growing flaxseed or using flaxseed for cooking or other purposes.

Pre-Lesson Evaluation Form

Read through the “Pre-Lesson Evaluation” form together. Have participants complete the “Pre-Lesson Evaluation” form. The form attempts to determine how frequently some flaxseed products are consumed.

Meeting Format

Using the overhead transparencies or posters, discuss the lesson objectives, definitions, and concepts related to using flaxseed to promote health and prevent disease.

Meeting Activities

Obtain recipe booklets, use the NDSU brochure or download recipes from Ameriflax, a branch of the North Dakota Oilseed Council: <http://www.ameriflax.com>

Have participants select a recipe from the booklet and discuss some of the following:

- Amount of flaxseed in the recipe
- Access issues for purchasing flaxseed (Is flaxseed available in local grocery or health food stores? Whole or ground? Is whole flaxseed or ground more convenient?)
- Methods to incorporate flaxseed into daily food intake (stir into juice or yogurt; sprinkle on cereal or toast; incorporate into a bakery product or other recipe)

Post-Lesson Evaluation Form

Have participants complete the Post-Lesson Evaluation” form. This form attempts to identify flaxseed products that participants plan to eat as a result of learning about the health benefits of flaxseed in this lesson.

Award flaxseed cookbook or ground flaxseed as a door-prize (if available).

Return pre-and post-lesson evaluation forms to the local Extension office.

Background Information

Do people in North Dakota need to be concerned with promoting health and preventing chronic disease?

Cardiovascular disease is the leading cause of death for North Dakotans, causing 139 deaths for every 100,000 people in 1998 (ND 2001 State Health profile, DHHS, CDC). About 24 percent of North Dakotans indicated that they had been told by a health professional that their blood pressure was elevated (2001 BRFSS, CDC). About 30 percent of adults in North Dakotans report having a health professional tell them that their blood cholesterol is high (2001 BRFSS, CDC).

Cancer, the second leading cause of death in North Dakota, accounted for 23 percent of deaths in 1997.

The prevalence of **diabetes** in North Dakota for adults has increased from 3.6 percent in 1994 to 6.1 percent in 2002 (BRFSS, CDC). For those age 55 or greater, 11 percent of the populations report they have been told they have diabetes (2001 BRFSS, CDC).


About 77 percent of the North Dakota population report that they **did not eat an average of five servings of fruits and vegetables each day** (2000 BRFSS, CDC). And about 23 percent of North Dakota adults report **not participating in any physical activity during the previous month** compared to 26 percent of adults nationwide (2001 BRFSS, CDC). From self-reported data, **41 percent of the adult population of North Dakota is overweight** (BMI* \geq 25 but <30) and **20.4 percent is obese** (BMI \geq 30).

*BMI = Body Mass Index which relates weight (in kg) to height (in meters squared)

Overhead #1: Objectives

Objectives

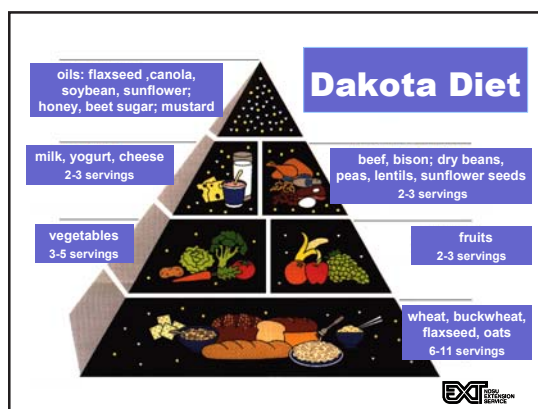
- Define Dakota Diet Concept
- Identify flaxseed varieties and products
- Identify health benefits of flaxseed
- Identify suggested daily amounts
- Identify proportions to substitute flaxseed into recipes



Talking Points

The basis for the Dakota Diet concept is that foods produced in the Dakotas and Northern Plains, when consumed within the framework of the Food Guide Pyramid, can promote health and reduce the risk of chronic disease. The goal of this lesson is to find recipes and develop menus to help make flaxseed part of a daily eating pattern so that North Dakotans can enjoy potential health benefits of flaxseed. This eating pattern may also benefit economic development of agricultural markets on the Northern Plains and across the nation.

Overhead #2: Dakota Diet Food Guide Pyramid



Talking Points

The Dakota Diet concept was introduced at the Governor's Healthy North Dakota Summit in Bismarck during August 2002 by Dr. Gerald Combs,


the Director of the USDA ARS Human Nutrition Research Center in Grand Forks.

The health benefits of flaxseed have been promoted for more than 15 years by the Flax Institute of the United States, NDSU, and other groups.

Overhead #3: Flaxseed Varieties

Flaxseed Varieties

- **Flaxseed available as:**
 - yellow seeds
 - brown seeds
- **Same nutritional value**
- **North Dakota produced 96% of nation's flaxseed (2002)**



Talking points

There are yellow or brown-seeded varieties of flaxseed. The nutritional composition of these varieties is the same.

North Dakota produced 96 percent of the flaxseed in the United States (2002 data).


Commercial and Industrial Uses:

- Flaxseed feed for farm animals and pets.
- Linseed oil for paints, coatings, linoleum
- Fiber in the plant stem for linen (used in clothing and paper)

Overhead # 4: Flaxseed Products and Storage

Flaxseed: Products and Storage

- **Whole flaxseed**
 - Keep in cool, dry storage (0-80 deg F)
 - For several years
- **Ground flaxseed**
 - Grind at home in coffee grinder or food processor
 - Purchase pre-ground
 - Store in refrigerator or freezer for several months
- **Flaxseed Oil**
 - Cold pressed without solvents
 - Store up to 4 months in refrigerator



Talking Points

Whole flaxseed can be kept for several years when stored in cool (0-80°F), dry conditions.


Flaxseed can be ground at home in a coffee grinder or food processor. Ground flaxseed may be available for purchase in some areas. Once flaxseed is ground it needs to be kept either in the refrigerator or freezer. Cold temperatures will eliminate the development of a rancid odor (due to the high fat content) during a reasonable storage time.

Flaxseed oil can be purchased in health food stores. Flaxseed has a high content of polyunsaturated fat, which is prone to oxidation and possible off-flavor. The storage life is limited, even when refrigerated. Check the expiration date on the bottle before purchase.

Overhead # 5: Flaxseed: Components Providing Health Benefits

Flaxseed: Components Providing Health Benefits

- **Omega 3 fatty acids**
 - Total Fat - 40% by weight of flaxseed
 - Omega 3 fat
 - A type of polyunsaturated fat
 - Found in high concentration in flaxseed
 - Greater than 50% of total fat
- **Dietary fiber**
 - Dietary fiber - 28% by weight of flaxseed



Talking Points

The two components of flaxseed that contribute the most to health benefits are omega 3 fatty acids and dietary fiber, especially lignan.

The total fat content of flaxseed is approximately 40 percent by weight. Flaxseed is one of the richest sources of plant-based omega 3 fatty acids. The omega 3's are more than half of the fat. In the United States, we tend to get more of another family of polyunsaturated fatty acids: omega 6's. This imbalance in polyunsaturated fatty acid intake (more omega 6 than omega 3's) has been suggested to play a role in chronic disease risk.

The dietary fiber content of flaxseed is approximately 28 percent by weight. Most people need more fiber to reduce the risk of chronic disease.

Overhead #6: Flaxseed: Heart Disease

Flaxseed: Heart Disease

- **Dietary fiber associated with:**
 - Reduction of “bad cholesterol” (LDL)
- **Omega 3 fatty acids associated with:**
 - Reduced blood pressure
 - Reduced stroke risk
 - Increased time for blood to clot

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Talking Points

Consumption of flaxseed is associated with a reduction in total cholesterol, including LDL-cholesterol (the “bad cholesterol”).

Intake of omega 3 fatty acids is associated with lowering of blood pressure, reduced stroke risk , and increased time for blood to clot (due to reduced ability of platelets to stick together). All of these variables are associated with a reduction in the risk of developing heart disease.

Overhead #7: Flaxseed: Anti-inflammatory Effect

Flaxseed: Anti-inflammatory Effects

- **Omega 3 fatty acids**
 - Metabolized to substances
 - Exert an anti-inflammatory response
- **May benefit inflammatory and auto-immune diseases**
 - Ex: Rheumatoid arthritis

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Talking Points

Omega 3 fatty acids can be metabolized to substances that can exert an anti-inflammatory response.

Some diseases cause damage to the body by prompting an inflammatory response. Rheumatoid arthritis is an example of an autoimmune disease. With this autoimmune disease a person’s immune system attacks their own body (rather than a foreign substance) causing an inflammatory response in the body’s joints. The inflammation over a period of time produces permanent damage to the joints. Omega 3’s can be metabolized to substances that reduce the inflammatory response and reduce that damage.

Overhead #8: Flaxseed: Natural Laxative Effect

Flaxseed: Natural Laxative Effect

- **Dietary fiber in flaxseed**
- **Promotes natural laxative effect**

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Talking Points

Dietary fiber represents 28 percent by weight of flaxseed. The type of fiber that promotes a laxative effect holds or binds water and increases fecal weight and volume. Bowel movements are thus increased in frequency and amount. The type of fiber that promotes a laxative effect represents three-quarters of the fiber in flaxseed.

Overhead # 9: Flaxseed: Celiac Disease

Flaxseed: Celiac Disease

- **Flaxseed does not contain gluten**
- **Safe for individuals with Celiac Disease**




Talking Points

Flaxseed does not contain gluten, which is the offending substance for people with Celiac Disease. Celiac Disease is a chronic intestinal malabsorption disorder caused by intolerance to gluten.

Overhead #11: Flaxseed: Menopausal Symptoms

Flaxseed: Menopausal Symptoms

- Plant lignan: a type of dietary fiber
- Metabolized to phyto-estrogens
 - structurally similar to estrogen
- Helps reduce mild menopausal symptoms, such as hot flashes




Talking Points

Flaxseed contains plant lignans, a type of dietary fiber. They are metabolized by gut bacteria to a phyto-estrogen. A phyto-estrogen, meaning plant-based estrogen, has a structure similar to estrogen. Phyto-estrogens help alleviate some menopausal symptoms such as hot flashes.

Overhead #10: Flaxseed: Blood Glucose Effect

Flaxseed: Blood Glucose Effect

- **Fiber in flaxseed:**
 - Reduces blood sugar response to carbohydrate (about 4-5 Tbsp flaxseed/day)
 - Healthy individuals
 - Human data needed for diabetics / pre-diabetics




Talking Points

When tested in healthy adults, flaxseed was found to reduce the blood glucose response to carbohydrate. Human clinical data are needed to determine whether better control of blood glucose will be found in people with diabetes/prediabetics when fed flaxseed.

Overhead #12: Lignans: Plant Sources of Phyto-estrogens

Lignans:
Plant Sources of Phyto-estrogens

	Plant Lignan (secoisolaric/resinol)
Flaxseed	3699.0 mcg/g
Soybeans	2.73
Walnuts	1.63
Blackberry	37.1
Oatmeal	0.1
Broccoli	4.14
Green tea	24.6
Black tea	15.9
Instant coffee	7.16




Talking Points

Flaxseed has a very high concentration of lignan compared to other plant foods. Soybeans are a source of another type of phyto-estrogen called isoflavones.

Overhead #13: Flaxseed: Suggested Daily Amounts

Flaxseed: Suggested Daily Amounts

- **Ground Flaxseed**
 - Suggest 4 Tbsp (1/4 c)
 - Raw flaxseed
 - Sprinkle onto cereal
 - stir into juice or other foods
 - Incorporate into bakery products
- **Flaxseed Oil**
 - Suggest 1 Tbsp
 - Source of omega 3 fatty acids (~8 g)
 - Does not contain dietary fiber (lignan and other types) unless added back



Talking Points

A suggested safe and effective daily intake of ground flaxseed is about 4 tablespoons (1/4 cup) or about 36 grams. Some research studies have safely used up to 50 grams per day. Raw flaxseed can be sprinkled onto cereal or stirred into juice or other foods. Flaxseed can also be incorporated into bakery products.

Caution for Pregnancy and Lactation: No data is available from human studies of flaxseed supplementation during pregnancy or lactation but researchers suggest caution in daily supplementation with ground flaxseed to the diet for pregnant and lactating women. Animal experiments suggest that phyto-estrogens produced from lignans, when fed at high levels, may influence the developing fetus or young infant. Flaxseed oil (without lignans) would not have this limitation.


The suggested amount of flaxseed oil is 1 tablespoon per day. One tablespoon of flaxseed oil has approximately 14 grams total fat, containing about 8 grams of omega 3.

The Recommended Adequate Intake (DRI, 2002) for the type of omega-3 fat found in flaxseed (alpha-linolenic) is 1.6 g/day for men and 1.1 g/day for women. These figures are based on usual intakes found in the United States. No optimal level and no upper limit (UL) is given.

Overhead #14: Flaxseed: Recipe Substitutions

Flaxseed: Recipe Substitutions

- **Flour substitutions**
 - Many recipes may substitute 1/4 up to 1/3 of the flour with ground flaxseed
 - Ex: Muffins for 2 c whole wheat flour:
1 1/2 c whole wheat flour and 1/2 c ground flaxseed
- **Fat**
 - Reduce or eliminate fat in recipe to compensate for fat in flaxseed
 - Ex: Reduce fat by 2-3 Tbsp in recipe when substituting 1/2 c ground flaxseed



Talking Points

Many recipes allow substitution of 1/4 to 1/3 of the flour with ground flaxseed. For example, in a muffin recipe calling for 2 cups whole wheat flour, an acceptable product can be made using 1 1/2 cups whole wheat flour and 1/2 cup ground flaxseed.

To compensate for high fat content in ground flaxseed:

- reduce the fat in bakery products by 2-3 tablespoons for every 1/2 cup ground flaxseed used.
- Or eliminate the fat in the bakery product

The following information is used to determine the values used for substitutions:

- 1 tablespoon ground flaxseed weighs approximately 12 grams with 5 grams of fat.
- 1/2 cup ground flaxseed is equivalent to 8 tablespoons
- 1 tablespoon of fat weighs about 14 grams
- 8 tablespoons ground flaxseed x 5 grams fat (each) = 40 grams of fat (equals approximately 3 tablespoons fat)

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