



HOME ECONOMICS

## Virginia Cooperative Extension Service

VIRGINIA TECH AND VIRGINIA STATE • VIRGINIA'S LAND GRANT UNIVERSITIES

Publication 348-908

# Fat in Your Diet

Reprinted April 1987

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Most food fats are triglycerides. A triglyceride is three fatty acids attached to a molecule of glycerol. Fatty acids are made of the chemicals carbon, hydrogen, and oxygen. The carbons form the central structure. Most fatty acids contain an even number of carbons, usually 8 to 18. The terms saturated and unsaturated refer to the structure of a fatty acid.

Each carbon can be joined to four elements with single bonds. In other words, the carbon is like a person with four hands. Each carbon within the chain holds hands with two hydrogens and with two other carbons. The end carbon shares one bond or hand with the next carbon and three bonds (or hands) with three hydrogens. Fatty acids of this type are called saturated because each carbon is holding hands or sharing bonds with four other elements.

Unsaturated fatty acids contain double bonds. This means that carbon shares two bonds (or two hands) with one element. Oleic is a fatty acid that has one double bond. When a fatty acid contains two or more double bonds, it is called polyunsaturated. The most common is linoleic.

The body can make saturated fatty acids and some unsaturated fatty acids. The unsaturated fatty acids that the body cannot make are called essential fatty acids. These essential fatty acids are polyunsaturated. Because the body cannot manufacture essential fatty acids, they must be provided by the diet.

Few foods contain only saturated fatty acids. Corn oil contains some saturated fatty acids. Likewise, so does beef fat. The terms "animal fat" and "vegetable fat" do not tell whether the fat contains unsaturated or saturated fatty acids. As a matter of fact, the kind of fatty acids can be changed quite a bit in some animals depending on the kinds of fat in the animal feed.

Food containing unsaturated fatty acids are mostly salad oils and cooking oils such as soybean, corn, and cottonseed. Although coconut oil is from a vegetable source, about 90 percent of its fatty acids are saturated. Olive oil which contains over 80 percent oleic acid (one unsaturated bond) is a poor source of polyunsaturated fat. Cocoa butter in chocolate also is mostly saturated. Buying a vegetable oil is no guarantee that it is a prime source of polyunsaturated fatty acid.

## Hydrogenation

Hydrogenation is the addition of hydrogen to fats containing unsaturated fatty acids. Remember, unsaturated means that a carbon is sharing two bonds. Since hydrogen can join at the double bonds, hydrogenation reduces the number of double bonds in unsaturated fatty acids. The process of hydrogenation changes a liquid oil to a firm plastic fat such as margarine.

Margarines are made by hydrogenating different kinds of vegetable oils. Since hydrogenation changes the polyunsaturated fatty acid content to mono unsaturated (one double bond) or saturated fatty acids, polyunsaturated vegetable oils are added to some of the hydrogenated margarines in order to increase the content of polyunsaturated fatty acids. These special margarines are softer than regular margarines.

The shape in which margarine is purchased (sticks or tubs) does not make the difference in the amount of polyunsaturated fatty acids. The difference will be stated on the label. Ingredients in a food are listed in decreasing order of the amount present in the food. The ingredient listed first is present in the largest amount by weight. The margarines highest in polyunsaturates have the first ingredient listed as pure vegetable oil. The next ingredient will be hydrogenated vegetable oil. If the reverse is listed, the margarine is not as high in polyunsaturates.

## Solid Fats and Liquid Fats

The predominating fats influence how liquid or how solid the characteristic fat will be. Solid fats contain mostly saturated fatty acids. Liquid fats usually contain a high proportion of unsaturated fatty acids.

Short chain fatty acids also make fats soft. For example, the four carbon fatty acid, butyric acid, gives some of the softness to butter. Fatty acids of eight to twelve carbons give coconut oil its softness in cream substitutes.

## Fat in Food

Energy is furnished by fat, carbohydrate, and protein in the diet. Weight for weight, fat contains more than twice as many calories as carbohydrate and protein. Most foods contain mixtures



of protein, fat, or carbohydrate. When fat is present, the food will likely be a more concentrated source of calories.

Vegetable oil is 100 percent fat. Butter and margarine are 80 percent fat because they contain 20 percent water and milk solids. Other concentrated fats are lard, shortening, and bacon fat or fat back. About 40 percent of the fat in the American diet comes from purchased fats such as margarine, shortening, salad and cooking oils.

The Food for Fitness Guide (The Basic Four) for adults is basically a low calorie, low fat food pattern. It averages about 1200 calories of which about 35 percent (400 calories, 45 grams) are from fat. This is in line with the lower amounts of fat that are being recommended.

Foods that contain fat are whole milk, cheese, ice cream, eggs, meat, and nuts. These foods are valuable sources of many vitamins and minerals in the diet. About 35 percent of the fat in American diets is from meats; about 15 percent is from dairy products other than butter; and about 10 percent comes from nuts and cereals.

Some fats carry some of the fat soluble vitamins. Butter carries vitamins A and D with it. In the United States margarine is fortified with Vitamin A. Vegetable oils and margarines made from them contain Vitamin E. Margarines contain less Vitamin E than the oils from which they are made. Vitamin E is in the margarines in proportion to the amount in the oil but much may be lost during processing.

### Tips To Limit Fat In The Diet

Get a list of foods and their fat content. Use the information to guide your food choices.

1. When making stews and soup broths from meat or poultry, refrigerate after cooking. The cool temperature will make the fat hard so it can easily be removed from the top.
2. Poultry and fish have lower fat contents than meat. These are low calorie choices in the meat group if recipes are not fried or do not have extra high calorie items in the recipe. Trim fat from meat or chicken to lower the fat content.  
Dried beans and peas are low calorie choices from the meat group — if recipes don't add extra fat and sugar such as some recipes for baked beans.
3. Avoid gravies, sauces and creamed dishes on meats and vegetables.
  - remove fat from drippings and serve the remaining liquid
  - use marinades with a citrus base
  - use herbs and spices instead of fat
4. Limit luncheon meats, sausages, bacon, hot dogs because of their high fat content.

### Whole Milk

1. The caloric content of milk varies depending on the fat content. A cup of whole milk or reconstituted evaporated milk has about 9

grams fat and 150 calories; 2% milk has about 5 grams of fat and 120 calories; while fluid skim milk and buttermilk contain little fat and about 100 calories.

2. Although some frozen desserts have lower fat content than others, caloric values are about the same for all of them. When fat content is lowered, sugar content is usually increased in frozen desserts.
3. Fat content of milk based recipes (e.g., creamed soups and sauces, custards, and white sauces) usually can be reduced by using 2% or skim milk in the recipes.
4. Sour cream toppings can be made from cottage cheese by blenderizing with about a tablespoon of lemon juice.
5. Sour Cream and Cream Cheese Dips — Substitute low fat cottage cheese, add seasoning and prepare in a blender. Instead of serving chip type dippers, serve raw bite size fruits and vegetables.
6. When recipes call for whipped cream or commercially made dessert topping, substitute skim milk. The secret to successfully whipping skim milk is to chill the milk, the mixing bowl, and the beaters before beating. Secondly, a stabilizer such as gelatin is needed to keep the whipped skim milk from collapsing (about a teaspoon of gelatin per cup of milk).

### Fruits & Vegetables

Except for avocados and olives, fruits and vegetables contain little fat.

1. Season with herbs and spices instead of fat.
2. Instead of vegetable oil or mayonnaise on salads, devise a low calorie dressing using a base of tomato juice, lemon juice, or vinegar. Or serve raw vegetables as the salad.
3. Use fruits for desserts instead of pies, cakes, cream puffs, and flaky pastry.
4. Devise low calorie toppings for baked potatoes to replace sour cream, butter, or margarine.

### Fat in the Body

Fat traveling in the blood comes from several sources — from food, from body storage, and from liver production. Triglycerides and fatty acids in the blood can be used for energy in the cell.

Extra fat in the body is stored as triglycerides in highly specialized cells for fat storage. These are called adipose cells. Fat is the body's chief storage form of energy. The fat storage cells are especially found around connective tissue and under the skin.

Fat is also used to insulate the body for temperature changes in the climate and to protect vital organs and the skeleton from bumps.

Scientists are busy studying the cause of atherosclerosis and heart disease and the role of fat. Many current recommendations limit the



amount of fat and cholesterol in the diet. Polyunsaturated fatty acids can lower plasma cholesterol and may lower chances for the development of atherosclerosis. The way the body uses fat will be influenced by the food eaten during the entire lifetime, the activities of body hormones, exercise, stresses, emotional reactions to tensions and pressures, and heredity.

Several general statements can be made about

the amount of fat in the diet. First, the caloric intake should maintain one's desirable weight. Second, the opinions of the proportion of the necessary amount of dietary fat vary. Recommendations range from about 25 to 45 percent of the food calories as fat. Third, a variety of fats needs to be included in the diet for providing essential fatty acids, fat soluble vitamins, and phospholipids.

## Total Fat, Saturated Fat, and Unsaturated Fatty Acid Content of Food

	Household Measure	Total fat grams	Saturated grams	Fatty Acids	
				oleic grams	Unsaturated linoleic grams
<b>MILK, FLUID</b>					
Whole, 3.5% fat	1 cup	9	5	3	trace
Nonfat, skim	1 cup	trace	—	—	—
Partly skimmed, 2%	1 cup	5	3	2	trace
Buttermilk	1 cup	trace	—	—	—
<b>CHEESE</b>					
Cheddar or Swiss	1 oz.	9	5	3	trace
Cottage					
Creamed	1 cup	10	6	3	trace
Uncreamed	1 cup	1	trace	trace	trace
Pasteurized Processed	1 oz.	9	5	3	trace
<b>CREAM</b>					
Half and Half	1 tbsp.	2	1	1	trace
Sour	1 tbsp.	2	1	1	trace
Whipped topping	1 tbsp.	1	trace	trace	trace
Whipping, unwhipped					
Light	1 tbsp.	5	3	2	trace
Heavy	1 tbsp.	6	3	2	trace
<b>ICE CREAM</b>					
10% fat	1 cup	14	8	5	trace
16% fat	1 cup	24	13	8	1
Ice milk	1 cup	7	4	2	trace
<b>EGGS (Large)</b>					
Whole	1	6	2	3	trace
White	1	trace	—	—	—
Yolk	1	5.5	1.7	2.7	.6
<b>MEAT*</b>					
Bacon	2 slices	8	3	4	1
Beef, braised	3 oz.	16	8	7	trace
Hamburger, lean	3 oz.	10	5	4	trace
Hamburger, reg.	3 oz.	17	8	8	trace
Chicken, broiled	3 oz. flesh	3	1	1	1
Heart, beef	3 oz.	5	—	—	—
Lamb, roasted	3 oz.	16	9	6	trace
Liver, beef, fried	2 oz.	6	—	—	—
Ham, roasted	3 oz.	19	7	8	2
Pork chop, lean & fat	2.3 oz.	21	8	9	2
Veal, roast	3 oz.	14	7	6	trace

	Household Measure	Total fat grams	Saturated grams	Fatty Acids	
				Unsaturated oleic grams	linoleic grams
<b>FISH</b>					
Haddock, breaded fried	3 oz.	5	1	3	trace
Tuna, drained	3 oz.	7	2	1	1
<b>MATURE DRY BEANS AND NUTS*</b>					
Great Northern, navy or lima beans etc., cooked	1 cup	1	—	—	—
Peanuts, roasted	1 cup	72	16	31	21
Peanut Butter	1 tbsp.	8	2	4	2
<b>AVOCADOS**</b>	1	37	7	17	5
<b>FATS***</b>					
Butter	1 tbsp.	12	6	4	trace
Lard	1 tbsp.	13	5	6	1
Margarine regular	1 tbsp.	12	2	6	3
whipped	1 tbsp.	11	2	4	4
<b>OILS, salad or cooking</b>					
Corn	1 tbsp.	14	1	4	7
Coconut	1 tbsp.	14	11	1	trace
Cottonseed	1 tbsp.	14	4	3	7
Olive	1 tbsp.	14	2	11	1
Peanut	1 tbsp.	14	3	7	4
Safflower	1 tbsp.	14	1	2	10
Soybean	1 tbsp.	14	2	4	4
Sunflower	1 tbsp.	14	1	2	10

\*Variation depending on amount of fat in meat and the amount used in food preparation.

\*\*Fruits, vegetables, and grain products contribute little fat to the diet.

\*\*\*Fats and oils are used in salad dressing and food preparation. Margarines will vary in fat content depending on the oil source used.

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