H.E. 3-208

COOPERATIVE EXTENSION SERVICE
UNIVERSITY OF KENTUCKY • COLLEGE OF AGRICULTURE

FAT REPLACERS

Sandra Bastin, M.N.S., R.D.
State Extension Specialist, Food and Nutrition

Today's consumers are becoming increasingly aware of the health risks associated with a high fat diet. As a result, more and more consumers are making it their goal to reduce overall dietary fat in their diets. The health risks are no longer challenged. According to the Surgeon General's Report on Nutrition and Health, diets high in fat increase our risk for obesity, some types of cancer, and possibly gallbladder disease. Enough research has established strong evidence linking saturated fat intake with high blood cholesterol and an increased risk for coronary heart disease.

Other government reports* promote reducing fat intake to 30% or less of total calories. The American Heart Association, the National Cancer Institute, and the American Diabetes Association also recommend that we consume less fat. People who are extremely overweight or who have extremely high serum cholesterol may need to reduce their dietary fat intake to less than 30%. However, it may not be appropriate for children under the age of two to limit their fat intake to 30%.

About two-thirds of American adults consume low- or reduced-fat foods and beverages. However, their low-fat food options are often limited, and sometimes they must sacrifice taste and texture in order to meet their dietary goals. These people want food ingredients that can replace the fat in their favorite foods. As a result of this new consumer demand, the food industry has started offering new low-fat food choices. These ingredients are known as fat replacers. These new lower fat foods and fat replacers may help Americans reduce their overall fat consumption even more.

A Closer Look at Fats

Fat is the body's most concentrated energy source. Our bodies need fat for normal growth and development as well as for the supply of essential fatty acids and fat-soluble vitamins A, D, E, and K. Even though the body does require a certain amount of fat, most Americans consume much more than they need.

**The National Academy of Science's Diet and Health Report, Healthy People 2000: National Health Promotion and Disease Objectives and the Dietary Guidelines for Americans issued jointly by the U.S. Department of Agriculture and the U.S. Health and Human Services.*

Fatty acids are either saturated, monounsaturated, or polyunsaturated. These can be characterized by their origin. Saturated fats are found mainly in foods of animal origin. These include whole milk, butter, and cheese. Some vegetable products such as coconut and palm oil also are mainly saturated fat. Monounsaturated fats are found mostly in plants but also in animal sources. Olive, peanut, and canola oil are high in monounsaturated fat. Most margarine and hydrogenated vegetable shortenings are also high in monounsaturated fatty acids. Polyunsaturated fats are found primarily in plants and fish. Corn, soybean, and safflower oils contain high amounts of polyunsaturated fats.

Fats in our meals help make us feel full. They add flavor to food and give it a smooth, creamy texture. Fat also provides structure, opaqueness, tenderness, and other qualities to foods. Without fat our food would be dry, flavorless, and gummy. Frozen dessert products would be icy or watery.

Fat Replacers

With fat replacers, food manufacturers can create foods and beverages that are lower in fat and calories while maintaining the desirable qualities of fat. The fat replacers in use today, or those awaiting approval by FDA, are either carbohydrate-, protein-, or fat-based.

Many trademarks and registered names are used to market these products. Below is a list of fat replacers as they appear on ingredient labels and a description of how they are used in foods.

Carbohydrate-Based Fat Replacers or Bulking Agents

Fat is not easily left out of food. Some carbohydrate-based fat replacers are used as bulking agents to replace some of the volume lost when fat is omitted. Bulking agents are simply fillers that give structure and satiety (help make us feel full) to foods and beverages. A texture modifier changes the texture of a product to be more like fat. An emulsifier is used to prevent the separation of oil from water.

Cellulose can replace some or all of the fat in dairy products, sauces, frozen desserts, and salad dressings. Finely ground microparticles of cellulose disperse throughout the food to provide a noncaloric network with

the smoothness and flow properties similar to fat.

Fiber-based products, such as guar gum, locust bean, xanthum gum, gum arabic, pectins, and carrageenan have virtually no calories. They provide a thickening or gelling effect and promote a creamy texture within the food. Gums can be used in reduced-calorie and fat-free salad dressings. They can also be used to reduce the fat content in formulated foods such as processed meats and desserts.

Dextrins can replace all or some of the fat in such products as salad dressings, puddings, spreads, dairy foods, and frozen desserts. They provide four calories per gram of food. Most dextrins are derived from tapioca.

Maltodextrins can be used as a fat replacer, texture modifier, or bulking agent in dairy products, salad dressings, spreads, sauces, baked goods, frostings, fillings, processed meat, and frozen desserts. Providing four calories per gram of food, most maltodextrins are derived from corn, potato, tapioca, and wheat starches.

Modified Food Starch is a reduced-calorie fat replacer, supplying one to four calories per gram of food. The ingredient is manufactured as a fine powder. When liquid is added, a slurry is made and sheared to form a smooth, cream-like substance that has similar properties to shortening. Modified food starch can also be used as a bulking agent and texture modifier. It is used in combination with emulsifiers, proteins, gums, and other food starches to make dairy products, salad dressings, sauces, baked goods, fillings, frostings, condiments, processed meats, and frozen desserts.

Polydextrose is a reduced-calorie fat replacer, supplying one calorie per gram of food. It can also be used as a bulking agent. Polydextrose contains minor amounts of sorbitol and citric acid and is used in baked goods, chewing gums, confections, salad dressings, gelatins, puddings, and frozen dairy desserts.

Protein-Based Fat Replacers

Microparticulated protein is a reduced-calorie fat replacer, supplying one to two calories per gram. It is made from the whey in milk or egg protein and is manufactured similarly to modified food starch. It is found in dairy products, margarine, salad dressings, mayonnaise-containing products, soups, sauces, and baked goods. Simplesse is an example.

Other protein-based fat replacers use a different process of formation or derive their protein from another source such as corn. Some blends of protein and carbohydrate fat replacers are used in baked goods and frozen desserts.

Fat-Based Fat Replacers

Caprenin has the characteristics of cocoa butter and is used in many confections, including candy bars. It provides five calories per gram of food.

Mono- and diglyceride emulsifiers can be used with water to replace all or part of the shortening content in cake mixes, cookies, icings, and many vegetable dairy products. Emulsifiers, like fat, provide nine calories per gram of food; however, less is used and thus the product contains less fat and calories.

New products being developed use a combination of fat and oil. Many of these products will contribute no calories, no cholesterol, and no fat. They look, taste, and feel like fat but are metabolized like a carbohydrate. Because they are stable when heated they will be used in high-temperature products such as chips, snack foods, and baked goods as well as for frying.

Over the next few years we can look forward to thousands of new products in the supermarket that use fat replacers. With more food options and variety, our efforts to eat healthier, lower-fat diets will be made easier.

Educational programs of the Kentucky Cooperative Extension Service serve all people regardless of race, color, age, sex, religion, disability, or national origin. Issued in furtherance of Cooperative Extension work, Acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture, C. Oran Little, Director of Cooperative Extension Service, University of Kentucky College of Agriculture, Lexington, and Kentucky State University, Frankfort.
Issued 10-93; Last Printed 9-95, 4000 copies; 17000 copies to date