

## Fat Replacers

- As a food component, besides providing energy reserves, fat also protect the body from environmental extremes, helps maintain the body temperature, carries fat-soluble nutrients and is a part of all cell membranes.
- Fat act as a precursor for flavor development and stabilize flavor.
- Fat contributes to creaminess, appearance, palatability, texture and lubricity of foods and increases the feeling of satiety during meals.
- Fat provides 9 kcal/g. The recommended limit for total fat intake is not more than 30% of daily energy intake, in which saturated fats no more than 10% and monounsaturated and polyunsaturated fats accounting for at least two-third of daily energy intake.
- High intake of total dietary fat is associated with increased risk for obesity, some types of cancers, possibly gallbladder disease, high blood cholesterol and increased risk of coronary heart disease.
- Fat replacers, also called fat substitutes, are substances that take the place of all or some of the fat in a food and yet give the food a taste, texture and mouth feel similar to the original full-fat food.
- On chemical basis fat replacers are divided into three categories:
  - Fat-based fat substitutes
  - Carbohydrates-based fat substitutes
  - Protein-based fat substitutes

### Fat-based fat replacer

- (e.g., caprenin, benefat, olean) are made of fat molecules that are modified so that they cannot be absorbed (olean) or can be partially absorbed (caprenin, benefat) in the intestine.
- **Olestra**, now marketed under the name of olean is the best known of these products.
- Olestra is made of 6-8 fatty acids bound to a sucrose molecule.
- Normal fat have only three fatty acids. Adding the extra fatty acids makes the olestra molecules too large to be absorbed, so it simply passes through the intestine and is eliminated as waste. In this way, it adds no calories to food.
- Other fat based fat replacer, such as **caprenin** and **benefat** are partially absorbed by the body and contain about five calories per gram.
- Emulsifiers are also be used as fat replacers. They contain the same number of calories per gram as fat, but fewer grams of emulsifiers are needed to achieve the same taste, texture and mouth feel as fat.

## Carbohydrate based fat replacer

- Include guar gum, polydextrose, gum Arabic, xanthan gum, carrageenan (an extract from seaweed), dried plum paste, modified food starches, oat fiber and wheat fiber.
- Carbohydrate-based fat replacer has the creaminess of fat. They absorb water, add volume, thicken and stabilize foods.
- They are used in baked goods, frozen desserts, yoghurts, cheeses, salad dressing, sauces and spreads.
- Because fat contains nine calories per gram and carbohydrates contain only four calories per gram, every gram of fat replaced with a gram of a carbohydrate-based fat substitute reduces the calorie content of the food by five calories as well as reducing the fat content.
- Carbohydrate-based fat replacers cannot be used in frying.

## Protein-based fat replacer

- Protein-based fat replacer e.g. simplexes are made from milk protein and/or egg protein.
- These proteins are heated and then whirled violently in blenders to produce very tiny particles in a process called **microparticulation**.
- These microparticles give protein-based fat replacers the same mouth feel as fats.
- Like carbohydrate-based substitutes, protein provides four calories per gram so they reduce the calorie content of food by five calories per gram of fat replaced.
- Protein-based fat replacers are used in butter, cheese, frozen dairy desserts, mayonnaise, soups, salad dressing etc.
- They do not work well in baked goods and can't be used for frying.