Fats summary

***There are 2 types of fats:***

Invisible and visible

Invisible fats: are found naturally in food like in meat, fish, eggs, dairy products.

Visible fats: are added from outside sources (shortening, ghee, butter, oils)

wh***y are fats necessary?***

Because from a nutritional view they carry fat soluble vitamins and other nutrients

Over consumption may lead to obesity and some types of cancer.

***The function of fats in food:***

1. To give flavor
2. Tenderizes the gluten in flour
3. Good medium for heat transfer
4. Adds color
5. Adds texture (flaky, crusty, creamy, crispy)
6. Crystallization is regulated by fat:
7. The fat in ice cream helps to control crystal formation.

Milk and other dairy products are examples.

Fat provides moisture to the dish:

The fat content of meat contributes to its moistness.

Fat is a major component of salad dressing emulsions:

For example, mayonnaise is an Emulsion.

***What is emulsion?***

Is a mixture of two things that would normally not mix.

• The emulsifying agent's role: Is a substance that connects two things.

Oil and water, or oil and oil, are immiscible liquids, and vinegar [which don't go together]

***Emulsions:*** Can be present in meals naturally, such as: Fat is spread in the watery portion of the food, such as e.g., milk, cream, and egg yolk. In a fat, such as butter, water is distributed.

 ***It is possible to prepare:***

In the same way that fat is disseminated in water when creating salad, fat is dispersed in water, dressings, sauces, gravies, desserts, and cream soups. Water is distributed throughout fats such as margarine, mayonnaise.

***Types of prepared emulsions:***

1.Temporary emulsion: Separates like water and oil when left standing; must be shaken before use.

2. Emulsion that is permanent:

When standing, it does not separate. It necessitates the use of a stabilizer, which is another name for

(emulsifier): The egg yolk is the key stabilizer in mayonnaise. The main stabilizer is lecithin (phosphatidylcholine). In egg yolks, it acts as an emulsifier.

***Properties of fat:***

1.It is water insoluble.

2. At room temperature, solid vs. liquid

3. The smoking point

4. Point of flashback

5. Flexibility

6. Flavoring

***Factors that affect the melting point of fats (solids vs liquid):***

Saturation Level as the saturation level rises, the melting point rises as well.

E.g. Saturated fatty acids (SFAs): These fats have a high percentage of SFAs (saturated fatty acids).

Are solid at room temperature

Have a melting point that is higher.

 Fats with a high proportion of MUFAs and PUFAs

At normal temperature, they're liquid.

Have a melting point that is lower

Fats with a Trans vs. Cis configuration have a greater melting point than those with a Cis configuration:

The amount of trans fatty acids in a fat:

As the amount of Trans FAs in a fat increases, the melting point of that fat decreases. that fat levels rise

Trans fatty acids are found at substantially higher concentrations in plant oils that have been hydrogenated (solid at room temperature)

Saturated FAs (SFAs) chain length: [LONG (14Cs) vs SHORT (8 Cs) chains]: As the number of C atoms in SFAs increases, the melting point decreases.

increase in points (need more energy to melt). e.g.

 Butter vs. shortening: The melting point of shortening is higher than that of butter.

because: LCSFAs make up a large portion of shortening (long). Butter has a high percentage of SCSFAs (short)

***smoke point:***

The temperature at which smoke appears on the surface of heated fat. The smoke point is a term used to describe the temperature at which smoke appears on the surface of heated fat.

When a frying fat or oil is heated, it begins to: Break it down into (glycerol & free fatty acids) The glycerol is subsequently broken down further to produce acrolein, which is a protein. a blueish smoke component The presence of acrolein is what causes the smoke to be thick. irritates the eyes and throat to a great extent. The smoke point also denotes the start of flavor and aroma, depletion of nutrients.

As a result, the smoke point is an important factor to consider when choosing a frying fat because:

Because deep frying is done at such a high temperature, it is necessary to use a fat with a high smoke point for this technique. Oils having a higher smoke point can endure higher temperatures. temperatures that are higher.

Oils are refined to raise their smoke point. Butter, for example, has a smoke point of 127 degrees Celsius. Refined soybean oil and other refined oils have a smoke point. 232 °C for oils. Oils with a high smoke point are ideal for deep fat cooking. sautéing and frying.

***Flash point:***

The point at which combustion occurs. It is considerably above the temperature of the smoke point.

***Plasticity of fats:***

The ability to be molded or sculpted, which solid fats have because they include both solid crystals and liquid oil.

***Flavor of fats:***

Some fats have a unique flavor, such as butter, olive oil, sirej, and tahineh, while others, such as vegetable oils, are bland. Corn, soy, sunflower, and other similar crops

Flavorful fats are usually pricier.

***3 types of fat:***

***Natural:*** Butter is made from salted and unsalted milk and contains [80 percent fat, 18 percent water, and 2% protein]. Water is spread throughout the fat (which acts as an emulsifier).

 The color of butter is determined by the diet of the cows. If the feed is green grass, the color of the butter will be darker yellowish by nature: The more pigment in the butter, the greener the grass. So, in order to maintain a consistent color of butter throughout the year, During the coloring process, carotene is introduced as a coloring agent.

Ghee is a type of clarified butter that originated in South Asia and is widely used in South Asian cuisine (Indian, Bangladeshi, Pakistani, Nepali) cuisine Is usually made by melting butter and letting it to cool components to be separated according to density. Water dries up Some solids float to the top of the water and are skimmed away. The remaining milk solids settle to the bottom and are left. When the butter fat (which would otherwise be on top) is removed It gushed forth.

***Processed:*** Shortening is created using two procedures to produce solid vegetable oil, such as shortening. The process of hydrogenation OR Re-esterification.

*Hydrogenation:* In the presence of a nickel catalyst (to speed up the rxn.) H gas is bubbled through the oil. Some double bonds have been broken, and H is present. The end result is: Increased saturation and melting point as well as additional Trans FAs Both saturated and trans fatty acids are harmful to your health effects.

*Re- Esterification:* Is utilized to reduce Trans FA content of processed fat oil by up to 50% while also increasing saturation). The glycerol backbone is broken apart, allowing FAs to be released. Re-esterified (repositioned): put into new positions: either back on the same glycerol (Intra-esterification) or onto (another) glycerol (inter-esterification) Is it true that re-esterified fats are healthier? More research is needed.

***Refined:*** Chemical Refining: to counteract harsh tastes, crude oil can be refined further.

Bleaching is the process of eliminating color pigments.

Deodorizing is the process of removing odors.

RBD appears on the labels (refined, bleached, deodorized)

The smoke points of refined oils are substantially higher than those of unrefined oils.

What are winterized oils?

Oils that have been cooled to refrigerator temperature and then filtered to eliminate TAGs that precipitate at this temperature.

Oils that have been winterized Are employed for:

Salad dressing that should be kept in the refrigerator in liquid form.

This is more appealing to customers.

Types of oils and their uses:

***Soybean oil*** is prone to oxidation due to its high content of alpha linolenic acid, an Omega 3 fatty acid with an 18-carbon chain and three double bonds in the cis configuration. That is why it hasn't been widely adopted.

***Low-linolenic-acid soybean oil***: Low-linolenic-acid soybeans are created by plant breeding: The traditional procedure involves ‘sexually crossing' two closely related plants. The goal is to create a single new and better plant variety that combines the beneficial qualities of both parent plants while excluding their undesirable traits Inserting desired genes or deactivating unwanted genes are examples of genetic alteration.

***Canola oil***: is derived from canola plants rather than rapeseed ones. Natural crossbreeding from the rapeseed plant gave rise to the canola plant. Erucic acid is abundant in rapeseeds (MUFA omega-9 fatty acid) When ingested in excessive numbers, erucic acid is harmful to humans. Erucic acid levels in the canola plant are quite low.

Is it labeled (GRAS) by the FDA as generally regarded as safe? Is extremely low in saturated fat (just 7%, the lowest of any vegetable oil). Has a high percentage of MUFAs (58 percent oleic acid) Is a healthy and secure oil option?

Is utilized in the production of:

Dressings for salads

Butter and margarine

Preservatives and shortenings

In the commercial frying industry

***Cotton seed oil is*** used in salad dressings because it has a neutral flavor.

For baking purposes, the butter was replaced with shortening.

***Flaxseed oil*** is high in Omega-3 fatty acids (alpha-linolenic acid [ALA], essential FA)

The smoking point is low.

***Sunflower oil*** is a type of vegetable oil that comes from the sunflower

It has a pleasant flavor and is commonly used in cooking.

***Safflower oil:*** Safflower oil is a type of oil that comes from

Is the richest in polyunsaturated fatty acids (PUFAs) (about 78 percent) Is a bit costlier. Its flavor isn't consistent.

***Corn oil*** has a naturally sweet flavor and is mostly utilized in the production of margarine.

***Peanut oil:***  Is high in monounsaturated fatty acids (MUFAs)Has a strong flammability. Has a high level of oxidative stability. It has a robust taste. Snack food producers prefer it because of its versatility flavor.

***Extra virgin olive oil (EVOO)***

 The Mediterranean region makes extensive use of this term.

Because of its health benefits, it is gaining popularity in the United States and Northern Europe.

It contains around 92 percent MUFAs, primarily Oleic acid [Omega 9 FA].

Because it is low in PUFAs, it is resistant to oxidation.