
Culinary Institute
of America
Fats & Oils

Learning Objectives

- Understand the difference between fats and oils and how they are used in cooking.
- Recognize different types of common fats and oils and their uses in the kitchen.
- Describe how to clarify butter and render animal fats step by step.
- Explain how olive oil is made, from harvesting olives to bottling.
- Identify the different grades of olive oil and what makes them different.
- Understand what acidity means in olive oil and why it matters.
- Describe the good and bad flavors you might find in olive oil.
- Learn how to safely make infused oils using herbs, spices, and aromatics.

Fat vs. Oil

Fat:

- Solid at room temperature
- Often animal-based
- Rich, dense mouthfeel
- Used in baking, sautéing, and flavor building
- Typically lower smoke point

Oil:

- Liquid at room temperature
- Usually plant-based
- Light, clean mouthfeel
- Used in frying, dressings, and marinades
- Often higher smoke point

The smoke point of a fat or oil determines its appropriate use!

Functions of Fats and Oils

Prevents sticking: creates a barrier that helps food release cleanly from cooking surfaces.

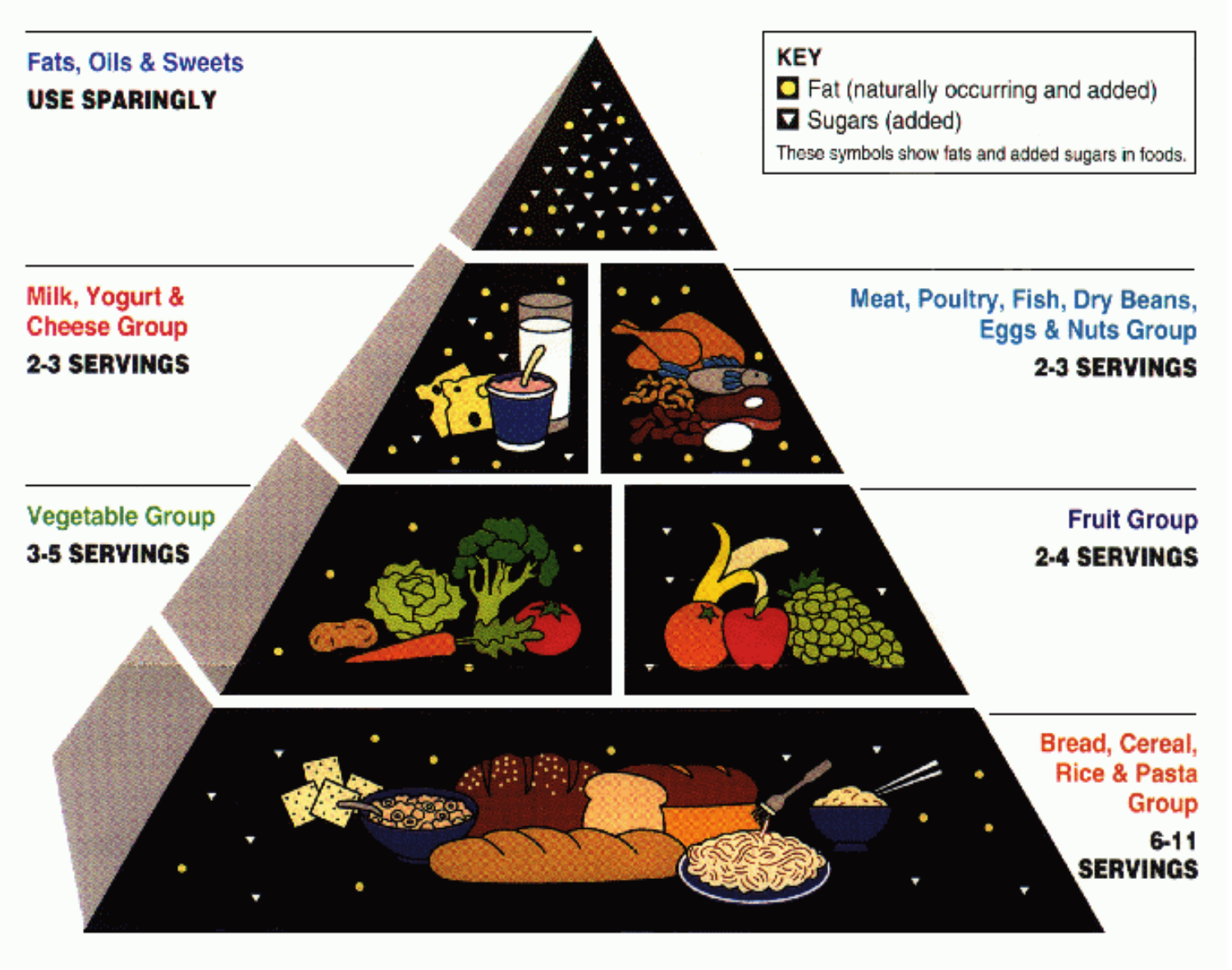
Enhances flavor: adds depth and rich flavor

Enhances texture & structure: aids in tenderness, flakiness, crispness, and moisture retention

Enables chemical reactions: contribute to leavening and emulsification in baked or sauced dishes

Supports heat transfer: act as insulators and transfer heat evenly when frying or sautéing

The Dietary Pyramid 1992-2025



Common Fats

Ghee (Clarified butter)

- Butter with water and milk solids removed
- Flavor: nutty
- Smoke point: 485°F
- Uses: searing, frying, roasting

Butter (Unsalted)

- Whole dairy fat with milk solids
- Flavor: rich
- Smoke point: 300°F
- Uses: baking, finishing sauces, low-heat sautéing

Clarifying Butter

Step 1: Cut & melt butter

- Cut unsalted butter into chunks and place in a saucepan
- Melt slowly over low heat without stirring

Step 2: Separate the layers

- As it melts, three layers will form:
  - Foam on top (milk proteins), clear yellow liquid in the middle (pure butterfat), milk solids at the bottom

Step 3: Skim the foam

- Gently skim the white foam from the surface using a spoon or ladle

Clarifying Butter

Step 4: Pour off the butterfat

- Carefully pour or ladle the clear yellow butterfat into a clean container, leaving the milk solids behind

Step 5: Strain (optional)

- For extra clarity, strain through cheesecloth or a fine mesh strainer

Step 6: Cool & store

- Let cool slightly, then store in a jar
- Keep refrigerated for up to 1 month or freeze for longer storage

Common Fats

Lard (Pork fat)

- Rendered pork fat
- Smoke point: 370°F
- Flavor: mild
- Uses: pastries, pan-frying

Duck fat

- Rendered duck fat
- Flavor: savory, smooth
- Smoke point: 375°F
- Uses: roasting, confit, sauteing

Bacon fat

- Rendered bacon fat
- Smoke point: 325°F
- Flavor: smoky, salty
- Uses: frying, sautéing

Common Fats

Tallow (Beef fat)

- Rendered beef fat
- Flavor: rich, clean
- Smoke point: 400°F
- Uses: deep frying, sautéing, roasting, frying

Shortening (Vegetable)

- Hydrogenated vegetable fat
- Smoke point: 370°F
- Flavor: neutral
- Uses: baking, deep frying, cookies, pastries

Rendering Fat

Step 1: Prep

- Trim and cut (or grind) fat and place in a heavy pan

Step 2: Heat & simmer

- Melt fat slowly over low heat
- Stir occasionally as it renders and solids begin to brown

Step 3: Strain & store

- When bubbling slows and cracklings are golden, strain the liquid fat
- Cool slightly, then store in jars and refrigerate or freeze

Common Oils

Avocado

- Flavor: neutral
- Smoke point: 520°F
- Uses: high-heat searing, grilling, stir-frying

Corn

- Flavor: mild
- Smoke point: 450°F
- Uses: frying, baking, sautéing

Peanut

- Flavor: mild, slightly nutty
- Smoke point: 450°F
- Uses: deep-frying

Common Oils

Grapeseed

- Flavor: mild, clean
- Smoke point: 420°F
- Uses: sautéing, frying, salad dressings

Canola

- Flavor: neutral
- Smoke point: 400°F
- Uses: baking, frying, sautéing

Vegetable

- A mix of plant oils
- Flavor: neutral
- Smoke point: 400°F
- Uses: frying, roasting, general cooking

Common Oils

Coconut

- Aroma: sweet, tropical
- Solid at room temp.
- Smoke point: 350°F
- Uses: baking, med-heat sautéing

Sesame

- Flavor: rich, nutty
- Smoke point: 350°F
- Uses: finishing oil, marinades, low-heat stir-frying

Olive (Extra-vigin)

- Flavor: distinctive, fruity
- Smoke point: 375°F
- Uses: dressings, drizzling, light sautéing

The History of Olive Oil

- First cultivated about 6,000 years ago in the Eastern Mediterranean
- Used in food, medicine, cosmetics, religion
- Traded by Phoenicians, Greeks, and Romans
- Symbol of peace, health, wealth
- Modern cultivation expanded in the Middle Ages and Renaissance
- Associated with Mediterranean identity due to high usage

Olive Oil Today

- Majorly popular over the last 20 years
- Major producers today: Spain, Italy, Greece, and Tunisia
- Staple in gourmet and home kitchens
- Valued for its rich flavor and versatility
- Celebrated for heart-healthy fats and antioxidants
- Featured in Mediterranean and global cuisines
- Viewed as a marker of quality, clean eating

Processing Olives into Olive Oil

Step 1: Harvesting

- Ripe olives picked by hand or machine

Step 2: Cleaning & sorting

- Washed and sorted to remove debris and damaged fruit

Step 3: Crushing

- Olives (with pits) crushed into paste to release oil

Step 4: Malaxing (Mixing)

- Paste is mixed slowly to combine oil droplets and boost yield for 20–45 minutes

Processing Olives into Olive Oil

Step 5: Separation (Extraction)

- Oil is extracted from the olive paste by pressing or centrifuge

Step 6: Filtering (Optional)

- Removes particles for clarity or left unfiltered for a rustic style

Step 7: Bottling & storage

- Stored in steel tanks, bottled in dark glass or metal to protect quality

Olive Oil Characteristics

Oils must meet certain chemical and sensory standards to be classified

Peroxide value:

- Measures oxidation and rancidity
- Lower values = better shelf life and taste

Free fatty acid (FFA) level:

- Indicates breakdown of fat molecules
- Lower = fresher, higher-quality oil
- Measured by **acidity level**

UV absorption:

- Detects early-stage oxidation and impurities

Sensory evaluation:

- Certified tasters score the oil for **positive and negative (defects) attributes**

Understanding Olive Oil Acidity

Acidity refers to the amount of free fatty acids in the oil

- Caused by the breakdown of triacylglycerols (fat molecules)
- Leads to release of diacylglycerol, monoacylglycerol, and glycerol
- Free fatty acids increase with poor handling, aging, or damage

Acidity increases as oil ages

- Not noticeable to taste until it reaches about 6%

Attributes of Olive Oil

Positive: desirable flavors, aromas, and characteristics indicative of high quality

- Fruitiness
- Grassiness
- Bitterness
- Pungency

Negative: often associated with poor storage or processing conditions

- Fusty (sweaty/swampy)
- Musty (moldy)
- Muddy (barnyard)
- Grubby (olive oil fly damage)
- Chemical (acetone)
- Petroleum

How is Olive Oil Graded?

There are four grades of edible olive oil:

1. **Extra-virgin olive oil**
   - Acidity < 0.8 grams per 100 grams (.08%)
   - No defects
   - Robust flavor

2. **Virgin olive oil**
   - Acidity < 2 grams per 100 grams (2%)
   - May have slight defects
   - Slightly less robust flavor

How is Olive Oil Graded?

3. **Pure olive oil**

- Blend of refined and virgin olive oil
- Acidity < 3.3 grams per 100 grams (3.3%)

4. **Pomace oil**

- Lower grade
- Extracted from the leftover olive pulp after other oils are produced
- Produces an odorless and tasteless oil

Infusing Oil

Step 1: Choose oil

- Use neutral or light oil (olive, grapeseed, canola)

Step 2: Pick flavorings

- Dried lends itself to a longer shelf life

Step 3: Prep ingredients

- Crush herbs/spices; slice garlic/zest
- Be sure to keep everything dry

Infusing Oil

Step 4: Heat gently

- Combine oil + flavorings
- Warm over low heat (120–150°F) for 20 to 30 minutes

Step 5: Cool & strain

- Discard the solids

Step 6: Bottle & store

- Use sterile container
- Use immediately or refrigerate and use within 1–2 weeks

Popular Oil Infusion Ingredients

- **Garlic:** rich, savory flavor
- **Chili peppers:** adds heat and depth
- **Rosemary:** earthy, piney aroma
- **Thyme:** subtle, minty freshness
- **Oregano:** bold, peppery warmth
- **Lemon zest:** bright, citrusy note
- **Black peppercorns:** subtle spice, warmth

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Any Questions?