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A Guide to Cooking with Fats and Oils

Many types of fats and oils can be used for food preparation and cooking. Choosing the right fat or oil depends on the intended use and how much heat it can withstand.

Common Household Cooking Techniques Using Fats and Oils

Various cooking techniques use different temperatures as well as amounts of oil to achieve the desired texture and flavor. The fat or oil used needs to be able to withstand the cooking temperature without reaching its smoke point. The smoke point is the temperature where the fat or oil begins to break down and smoke. Exceeding a smoke point can cause an oil to lose nutrients, alter its flavor, or even produce toxic byproducts.[1,2] Here are some examples of temperatures used with different cooking methods.[3,4]

Oven roasting or baking:

- Food is cooked by the surrounding heated air in the oven.
- Low to high heat (300-400°F or 148-204°C)

Sautéing:

- Food is cooked quickly with a small amount of fat or oil.
- Medium to high heat (350-400°F or 176-204°C)

Pan frying:

- Like sautéing, but foods are cooked for a longer length of time using more fat or oil.
- Medium to high heat (325-400°F or 162-204°C)

Deep fat frying:

- Foods are cooked quickly by fully immersing them in pre-heated fats or oils
- High heat (350-375°F or 176-190°C)

Pan searing:

- Uses a very small amount of fat over high heat to quickly cook and seal only the outer layer of foods.
- High heat (400-450°F or 204-232°C)

Broiling:

- Direct oven heating from a heating source above the food. Temperature is generally not adjustable, but the distance of food from the heat source can be.
- High to very high heat (500-550°F or 260-287°C)

Stir-frying:

- Like sauteing, but foods are cooked very quickly with a small amount of fat over very high heat. Food is kept constantly moving during the cooking process.
- Very high heat (at least 500°F or 260°C)

Oil Temperatures and Smoke Points

To help determine which oils are best for each cooking method, we have divided the oils based on smoke point temperatures. These are just guidelines. Fats and oils intended for cooking should have their smoke point, maximum cooking heat level, or intended use listed on the bottle. Use those details to determine how and when the fat or oil should be used.

- **No heat oils:** Those with smoke points of 300°F (148°C) or less. Used for salad dressings, garnishes, drizzling, dips, etc.
- **Low-heat oils:** Those with smoke points of 300-320°F (148-160°C). Used for gentle sautéing or low-heat baking.
- **Medium-heat oils:** Those with smoke points of 320-350°F (107-177°C). Used for sautéing, pan frying, or higher-heat baking.
- **High-heat oils:** Those with smoke points of 350-450°F (177-232°C). Used for deep fat frying or pan searing.
- **Very high-heat oils:** Those with smoke points of 450°F (232°C) or more. Used for deep fat frying, pan searing, broiling, or stir-frying.

Make sure that the chosen fat or oil has a smoke point well above the expected maximum heat of the cooking process. It is also important to know that many things can impact the smoke point of a particular oil,including:[5,6]

- **Oil quality:** The quality of a fat or oil differs by its source, brand, additives, processing, etc.
- **Age of the oil:** Smoke points decrease as oils age. Older oils have lower smoke points than when they were first purchased.

Tip

Smoke points for a fat or oil can vary depending on the quality, source ingredients, refining, and more. It is important to use the information on the label to determine the smoke point, heat level, or best uses.

- **Level of refinement:** More refined generally means a higher smoke point.
- **The cooking process:** The longer an oil is exposed to heat, the lower the smoke point becomes.
- **Food particles:** Food particles that drop off into the oil when cooking can speed up the breakdown of the oil and lower the smoke point. Smoke points decrease as more food is cooked in the oil. Filtering out particles while cooking can help.
- **Breakdown of oil with use:** Avoid reusing oils that have been previously heated. There is no way of knowing how much breakdown has occurred and how that will affect the oil's smoke point.

Image courtesy of 123RF

Guide to Preferred Cooking Oils

The following table lists preferred cooking oils, smoke point ranges, maximum cooking heat, and other notes. Remember, following the label on the fat or oil is more specific and should be used over the information provided here.

Fats and Oils	Smoke Point[6–10]	Maximum Cooking Heat	Notes
Avocado oil, unrefined/virgin	375-400°F (190-204°C)	High	
Avocado oil, refined	450-520°F (232-270°C)	High to very high	
Butter	250-350°F (120-176°C)	Medium	
Butter, clarified (ghee)	450-485°F (232-251°C)	High to very high	Ghee is butter in which the milk solids (including most of the lactose) are removed.[11] Some people who are sensitive to dairy may not be sensitive to ghee.
Coconut oil, unrefined/virgin	280-350°F (137-176°C)	Medium	Coconut oil is solid at room temperature. If it is sold as a liquid, it has been blended with another oil or specially processed.
Coconut oil, refined	365-450°F (185-232°C)	Medium to high	Coconut oil is solid at room temperature. If it is sold as a liquid, it has been blended with another oil or specially processed.
Duck fat	375°F (190°C)	High	
Lard (pork, bacon fat)	361-401°F (182-205°C)	Medium to high	Source should be pasture-raised, sustainably raised, and organic.
Macadamia nut oil, unrefined/virgin	380-440°F (190-226°C)	Medium to high	
Olive oil, extra-virgin	320-406°F (160-207°C)	Low to medium	Olive oil will lose its flavor if heated too high.
Olive oil, light/refined	460-468°F (237-242°C)	High	
Peanut oil, unrefined	320-350°F (160-176°C)	Medium	Easily damaged; prone to rancidity.
Peanut oil, refined	450-460°F (232-237°C)	High	Easily damaged; prone to rancidity.
Rice bran oil, unrefined	400-460°F (204-237°C)	High	
Rice bran oil, refined	490°F (254°C)	High to very high	
Sesame oil, unrefined	350-410°F (176-210°C)	Medium to high	Sesame oil has a high antioxidant content.
Sesame oil, refined	410-445°F (210-229°C)	High	Sesame oil has a high antioxidant content.
Tallow (beef fat)	400°F (204°C)	High	
Walnut oil, unrefined	305-320°F (151-160°C)	Low to medium	
Walnut oil, refined	400-425°F (204-218°C)	High	

Can You Cook with Extra-Virgin Olive Oil?

You've probably seen chefs on TV who use extra-virgin olive oil for cooking and baking. If the temperature is controlled, this is generally OK. That is because the food and pan don't necessarily reach the temperature on the dial of your cooking appliance. For example, food cooked in a 350°F (176°C) oven may only reach an internal temperature of 165°F (73°C). (If the food was heated to reach an internal temperature of 350°F [176°C], it would be burnt.) Plus, the antioxidants in the oil help protect against the formation of harmful byproducts.[15]

What Does It All Mean?

There are many ways to describe oils, and reading food labels with these different words can be confusing. Some common descriptors found on packaging include the following:

- **Refined:** Oils that are extracted and treated with heat or chemicals to remove flaws. This process can also destroy the beneficial properties of oils.[12] Refined oils are generally more stable than unrefined oils, so they tend to be better choices for most high-heat cooking.[6] "Light" oils are examples of refined oils.
- **Unrefined:** Oils that are not treated with chemicals or heat during processing. These oils retain the minerals, vitamins, and phytonutrients of the source ingredient.[13] Virgin and extra-virgin oils are in this category.
- **Cold-pressed:** Oils that are mechanically extracted from their source using pressure under controlled temperatures. Chemicals and heat are not used in this process. This helps the oils retain the nutritional benefits of their source.[6,13]
- **Extra-virgin:** Oils that are unrefined, cold-pressed, and from the first "pressing" (extraction) of the source ingredient.[6] These oils can be fragile, so they are generally best for dressing, drizzling, and dipping. Note that olive oil must meet specific low-acidity requirements to be labeled "extra-virgin."[14]
- **Virgin:** Oils that are unrefined and cold-pressed but have some minor flavor defects.[6] These oils are also fragile and should be reserved for low-heat cooking, dressing, and drizzling. Virgin oils must pass standards for taste and quality, but the standards are not as rigid as those for "extra-virgin."[14]

What About Other Fats and Oils?

Most of the following fats and oils have high smoke points and seem safe for cooking. However, these fats and oils tend to be highly refined, which may counteract potential health benefits.[12] Some are also produced from genetically modified sources.[16] Finally, many of these are high in omega-6 fats, which can contribute to chronic inflammation in the body.[1,17,18] Because of this, consuming fats and oils from this list should be done in moderation. If you do occasionally consume these fats and oils, be sure to choose brands that are certified organic and made from non-GMO crops.

- Canola oil (rapeseed oil)
- Corn oil
- Cottonseed oil
- Grapeseed oil
- Safflower oil
- Soybean oil
- Sunflower oil
- Vegetable shortening

Tips for Buying and Storing Fats and Oils for Cooking

Fats and oils can become damaged by contact with light, heat, air, and plastic.[5,6,19] Many fats and oils sold in grocery stores are poorly packaged, which can increase the risk that the fat will be damaged before you consume it. To maximize the health benefits of fats and oils and help you make sure you are consuming high-quality products, follow these tips:

- Buy oils packaged in dark glass bottles rather than plastic.
- Tightly fasten the lid on oils when not in use.
- Store fats and oils away from the stove and other heat sources.
- Keep fats and oils away from light, such as in a dark cupboard.
- Measure fats and oils away from hot pans and other heat sources.

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