

## Separation Process

The removal of some component from the original food or beverage product.

Food Process	Purpose	Food Use Examples	Used at Home	Benefits	Drawbacks
<b>Centrifugation</b>	Use of a rotational force to separate food components, (e.g., fat) by size, density, shape or thickness	Separation of butterfat in milk, fruit pulp in fruit juice	No	Enables separation and concentration of food components	Separation can remove some nutrients present in the original food or beverage source
<b>Coagulation</b>	Adhesion or collection of particles into a common mass (e.g. cheese curd) to increase density, solidify, or separate solid from liquid	Cheese and eggs	Yes	Enables concentration of food components, such as protein in cheese curd in making cheese; change in the protein structure could help with consumption of a food product (e.g., hard-boiled eggs vs. raw egg)	Separation of some nutrients present in the food, for example, whey proteins in milk; changes in the protein structure could affect digestion
<b>Crystallization</b>	Precipitating a solid food component from a liquid mixture as crystals	Sugar, candy, butter and margarine, solid fats, ice cream, and fudge	Yes	Easy to use/consume the food product (e.g., dissolves better or improves mouthfeel); changes the	Loss of beneficial nutrients due to separation from original food product

				melting point at which the product (e.g., fat crystals) melts to keep the product stable in warm climate	
<b>Filtration &amp; Separation (including membranes)</b>	Separating larger components by passing a fluid under pressure through size restricted porous membrane	Water, fruit pulps, milk, whey, and other dairy products	Yes	Improves quality, safety, or taste by removing unwanted components (e.g., salts from water); concentrates desired components important in product formulation (e.g., proteins in milk to formulate beverages with high protein content)	Loss of beneficial nutrients due to separation from the original food source
<b>Sorting</b>	Separating food products/ingredients from other materials by size, color, shape, appearance, or other criteria	Fruits and vegetables, grains, coffee beans, potato chips, and corn chips	Yes	Removes damaged or undesirable food products (e.g., burnt cereal pieces or bruised fruit) to maintain and improve food quality	Food waste (edible food is not used because the food product does not meet certain quality specification, leading to

					additional food waste)
<b>Thermal Concentration &amp; Evaporation</b>	Heating a liquid food or ingredient to vaporize more volatile components (e.g., water) to obtain a higher concentrated product or ingredient	Milk and dairy products, fruit juice, starch, food flavors	Yes	Provides a concentrated product (e.g., evaporated milk); easy to transport the product due to reduced volume (e.g., concentrated juice); food safety due to lower water content	Potential loss of heat-sensitive vitamin(s); changes flavor, color, and appearance of food