Milk, Condensed and Evaporated

Revised 2018

Thermal Properties

	Canned, condensed, sweetened		Evaporated	
	English	**Metric**	**English**	**Metric**
Moisture, %	27.16	--	74.04	--
Protein, %	7.91	--	6.81	--
Fat, %	8.70	--	7.56	--
Carbohydrate, %	54.40	--	10.04	--
Fiber, %	0.0	--	0.0	--
Ash, %	1.83	--	1.55	--
Specific Heat Above Freezing	0.56 Btu/lb*°F	2.35 kJ/(kg*K)	0.85 Btu/lb*°F	3.56 kJ/(kg*K)
Specific Heat Below Freezing	--	--	0.50 Btu/lb*°F	2.08 kJ/(kg*K)
Latent Heat of Fusion	39 Btu/lb	91 kJ/kg	106 Btu/lb	247 kJ/kg

Storage Conditions

Temperature		70°F (21°C)	50°F (10°C)	40°F (4°C)	32°F (0°C)
Storage Period		A few weeks	A few months	6-12 months	1 year+
Relative Humidity		Controlled by air-tight packaging			
Freezing Point	Sweetened Condensed Milk	5°F (-15°C)			
	Evaporated Milk and Unsweetened Condensed Milk	29.5°F (-1.4°C)			

Condensed Milk

Condensed milk products are produced by evaporation of water from milk or modified milk. Modified milk includes milk that has been altered with respect to the proportion of normal components, milk in which one or more of the normal components has been removed or replaced with another constituent, such as the removal of milk fat to produce skim milk and substitution of vegetable fat for milk fat, or milk to which new chemicals such as salts or sweeteners have been added.

Unsweetened whole, part-skim, or skim milk should be stored under refrigeration at temperatures of less than 50°F (10°C). Temperatures at or slightly above 32°F (0°C) will result in better retention of quality than a temperature of 50°F (10°C). Temperatures should be reasonably constant to minimize growth and separation of lactose crystals. Freezing is not desirable since excessive lactose crystallization will occur and the resulting crystals are difficult to redissolve following thawing. Storage temperatures above 60°F (15°C) should be avoided since undesirable changes, such as a darkening in color and proteolysis, will occur relatively rapidly.

Sweetened Condensed Milk

Sweetened condensed milk is a defined product consisting of 28.5% total milk solids, 8.5% milk fat and 42% sugar. This product is thermally processed and sold in a canned form. Other sweetened condensed products containing milk are custom-processed for use in confectionery, bakery, and other food products. They vary in composition by specification and are made by combining sweeteners, butterfat, vegetable and other animal fats, and normal or modified milk solids-non-fat, the latter ranging in concentration from 15 to 28%. The products differ in concentration of total solids and sweetener, and vary from viscous to highly viscous. Bulk products are thermally processed and sufficiently concentrated to ensure short-term stability. These products can be transported in tank trucks or packaged in 55-gal (208-L) steel drums, 5-gal (19-L) pails, or smaller 6- and 14-oz (170- and 400-g) cans.

Evaporated Milk

Evaporated milk is obtained by concentrating whole milk to approximately half its original volume. The U.S. Food and Drug Administration (FDA) Standard of Identity requires this product to contain a minimum of 7.5% milk-fat and 25.0% total milk solids. When this product is canned and sterilized it is considered non-perishable. However, changes in physical properties may occur when the product is stored for extended periods at temperatures above 60°F (16°C). These changes may include a change in viscosity, separation of fat or other solids, and darkening. The FDA Standard of Identity allows the addition of stabilizers such as carrageenan which delay separation of fat and other solids. When added, such milk can be stored at 60-65°F (16-18°C) up to 6 months without significant change. Evaporated milk is packed in 5.3 fl. oz (158 mL) and 13 fl. oz (384 mL) cans for consumer use and in No. 10 cans for institutional trade.

Evaporated Skim Milk

Evaporated skim milk is obtained by concentrating skim milk to a point where it contains a minimum of 20% total milk solids and not more than 0.5% fat. The resulting product is canned and sterilized. This product should be stored at a temperature of less than 60°F (16°C).

WFLO is indebted to Dr. Charles H. White, Food Science and Technology, Mississippi State University, Mississippi, for the review and revision of this topic.