

Brussels Sprouts

Revised 2008

Thermal Properties

	English	Metric
Moisture, %	86.00	--
Protein, %	3.38	--
Fat, %	0.30	--
Carbohydrate, %	8.95	--
Fiber, %	3.80	--
Ash, %	1.37	--
Specific Heat Above Freezing	0.93 Btu/lb*°F	3.90 kJ/(kg*K)
Specific Heat Below Freezing	0.46 Btu/lb*°F	1.91 kJ/(kg*K)
Latent Heat of Fusion	123 Btu/lb	287 kJ/kg

Storage Conditions

	Fresh	Frozen	
Temperature	32°F (0°C)	0°F (-18°C)	-10°F (-23°C)
Relative Humidity	95 to 100%	Vapor proof packaging	Vapor proof packaging
Storage Period	3 to 5 weeks	10 months	1 year +
Highest Freezing Point	30.5°F (-0.8°C)		

Brussels sprouts may be cold-stored for processing or favorable markets. Sometimes Brussels sprouts are stored in large containers, although this is not advisable since they pack rather closely and have a tendency to heat, discolor, and develop mold, especially in the center of the mass. Prompt refrigeration, good aeration, and high relative humidity are essential for successful storage.

The maximum storage life for Brussels sprouts is 3 to 5 weeks at 32°F (0°C) with 95 to 100% relative humidity and depends on sound, clean, mold-free sprouts being stored. Storage life is only half as long at 41°F (5°C) as at 32°F (0°C), and only 10 days at 50°F (10°C). Deterioration in the form of yellowing and discoloration of the stem end is rapid at temperatures of 50°F (10°C) and above. As with broccoli,

sufficient air circulation and spacing between packages is desirable to allow good heat removal and to prevent yellowing and decay.

Brussels sprouts may be cooled rapidly by vacuum cooling or hydro-cooling. Vacuum cooling is most effective if the sprouts are wetted prior to cooling in order to minimize wilting. Bulk shipments usually are package-iced and top-iced to ensure maintenance of desirable low temperature and high humidity. After precooling, shelf life can be extended by the use of perforated polyethylene liners, which prevent moisture loss. Non-perforated poly liners can lead to accumulation of injurious CO₂ levels or depletion of O₂, leading to off-odors.

Controlled atmosphere (CA) storage benefits Brussels sprouts, retarding yellowing and decay, if storage conditions are higher than 32°F (0°C). Brussels sprouts are tolerant of up to 10% CO₂ and down to 1% O₂ levels. At 41 to 45°F (5 to 7°C) the best CA for quality preservation is 1 to 2% O₂ with 5 to 10% CO₂. CA storage can extend storage at 41°F (5°C) to about 4 weeks, but is not beneficial at 32°F (0°C).

Brussels sprouts are extremely sensitive to exposure to ethylene, which causes rapid leaf yellowing and leaf abscission. Brussels sprouts must never be stored with fruits that produce substantial quantities of ethylene, especially apples, pears and peaches.

Essentially the same diseases that affect cabbage also invade Brussels sprouts. The most important diseases that affect storage life are Bacterial Soft Rot and Alternaria Rot. Additional information is located elsewhere in this manual, in the **Cabbage** topic.

Freezing

Brussels sprouts may be blast frozen after packing on trays or individually quick frozen (IQF). If packed in bulk in 20 to 60 lb. (9 to 27 kg) cartons or tote bins, it is advisable to IQF the product, preferably by fluidized bed technique before packing. Sometimes Brussels sprouts are 'shocked' with dry ice (CO₂) to enable them to be frozen by IQF.

Frozen Brussels sprouts lose their brilliant green color and become soggy when stored at temperatures above 0°F (-18°C). The chlorophyll changes to a brown color. Exposure to elevated temperatures for short periods of time is not critical, but repeated exposures do damage quality. If stored at 0°F (-18°C), good quality is maintained for 10 months and, if stored at -10°F (-23°C), for 1 year or longer.

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