Mushroom

Recommendations for Maintaining Postharvest Quality

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Maturity Indices*Agaricus bisporu*s mushrooms (Button Mushrooms) are harvested by maturity and not by size. Maturity is reached when the caps are well- rounded and the partial veil is completely intact. The stipe (stalk) should have a small length to thickness ratio. Stipe length should be sufficient to permit some trimming without cutting flush to the veil.

Quality Indices Good quality, fresh *'Agaricu*s' mushrooms should be white to dark brown. White forms are most prevalent. Uniform, well rounded cap with a smooth glossy surface and fully intact veil are indicators of best quality. Stipes are straight and glossy in appearance with an even cut edge. Cleanliness (minimal growth medium residue) and absence of browning or other discoloration are additional quality factors. Visible, open gills and absence of a stipe are negative factors.

U.S. grades are No. 1 and No. 2. Sizes range from Small {Button} (1.9 – 3.2cm / .75 – 1.25 in.), Medium (3.2 – 4.5cm / 1/25 – 1.75 in.), to Large (4.5 cm / 1.75 in. and larger) measured as cap diameter. Grades discriminate for maturity, shape uniformity, cleanliness and trim quality.

Optimum Temperature0° – 1.5°C (32° – 35°F) Storage life is typically 5-7 days at 1.5°C(35°F) and 2 days at 4.5°C (40°F).

Optimum Relative Humidity95-98 %; High relative humidity is essential to prevent desiccation and loss of glossiness. Drying is correlated with blackening of the stipe and gills and curling of the cap. Commonly mushrooms are packed and shipped in cartons with a perforated overwrap to maintain high humidity.

Rates of Respiration

Temperature °C	°F	mg CO_2/kg·hr
0	32	28-44
5	41	71
10	50	100
15	59	NA
20	68	264-316
25	77	NA

To calculate heat production multiply ml CO_2/kg&3183;hr by 220 to get Btu/ton/day or by 61.2 to get kcal/metric ton/day. NA= not applicable

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Rates of Ethylene Production>0.1µl / kg·hr at 20°C (68°F)

Responses to Ethylene*Agaricus* mushrooms are not significantly impacted by exogenous ethylene.

Responses to Controlled Atmospheres(CA) Extended storage (~12-15 days) in 3% O_2 and 10% CO_2 at 0°C has been Controlled demonstrated. Elevated CO_2 at 10-15 % (typically 10%) in air is beneficial in Atmosphere (CA) preventing decay and reducing the rate of blackening of the stipe and gills. The beneficial effect is most pronounced if temperatures cannot be maintained below 5°C (41°F). Short exposure to higher CO_2 concentrations (20 %) is safe and beneficial only if temperatures can be maintained at 0° – 1°C (32° – 34°F).

Improper control of controlled atmospheres or improper packaging can rapidly lead to depletion of oxygen resulting in conditions favorable for *Clostridium botulinum*. For this reason, primarily, the use of CA and MA is not common.

Physiological & Physical Disorders Mushrooms will continue to develop after harvest which is why low & Physical temperature postharvest management is critical. Common disorders include Disorders upward bending of caps and **opening of the veil**.

Mushrooms are easily **bruised** by rough handling and develop patches of browning discoloration.

Freezing injury (water-soaked appearance leading to extreme softening) will likely result at temperatures of -0.6°C (30.9°F) or lower.

Signs of **CO_2 injury** are blackening and pitting.

Pathological Disorders Disease is generally not an important source of postharvest loss in comparison with physiological senescence and improper handling or bruising. Diseases, such as Bacterial Blotch, and spoilage due to other *Pseudomonas spp*. are generally eliminated during the harvest or sorting phases although development of patches of decay can occur with elevated temperature or extended storage.

Special Considerations Rapid forced-air cooling soon after harvest is strongly recommended. Center-loading during shipment promotes good cooling-air circulation necessary for this commodity. Good arrival following surface transportation is enhanced when trailers are equipped with ‘air-shocks’ suspension. *Agaricus* mushrooms are reported to acquire strong odors, such as onion, in mixed loads or short term storage.

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Produce/ProduceFacts/Veg/mushroom.html updated July 10, 2000