Milk, Non-Fat Dry

Revised 2018

Storage Conditions

Relative Humidity	100°F (38°C)	70°F (21°C)	40°F (4°C)	0°F (-18°C)
60%	2 Months	5 Months	10 Months	20 Months
40%	5 Months	9 Months	15 Months	30 Months
Canned (vacuum)	10 Months	15 Months	30 Months	--

Dehydrated skim milk, which is legally defined as non-fat dry milk in the United States, is produced in vast quantities and serves as a highly nutritional ingredient in many foods and feeds. A 4-oz. (113-g) portion is expected to supply more than half of the U.S. recommended daily dietary allowance of all nutrients involved in nutrient labeling except for vitamins A and C. Of all the nutrients contained, undoubtedly protein is the most important, since casein, the primary milk protein, has excellent nutritive value and is a reference protein used to evaluate nutritive value of other proteins. However, the nutritive value of casein can be significantly damaged if the storage temperature is too high or excessive amounts of water vapor are present. Thus, to retain nutritive value of milk solids, the product must be stored at low temperature and packaged to minimize penetration of water vapor. Non-fat dry milk should be packaged in materials no less protective than 50-100 weight Kraft paper bags with polyethylene liners. Water vapor permeability should not exceed 0.35 gram per 100 square inches (645 cm^2) at 100°F (38°C) and 90% relative humidity.

Mold Growth on Bags of Non-Fat Dry (NFD) Milk Powder

A problem of mold growth on lower bags of NFD milk powder, especially in spring and early summer, prompted the Agricultural Stabilization and Conservation Service of the United States Department of agriculture (USDA) to issue a warning about this potential problem in March 1985. The release contained the following information:

Cause: Most NFD milk is stored in unheated buildings in the northern part of the country. The floors, floor pallets, and lower bags of NFD milk are cold, remaining so until they gradually warm as the weather changes. Problems arise when warm humid air of spring and early summer replaces the cold dry air of winter. The floors, pallets, and lower bags "sweat" as moisture condenses and the conditions for mold growth become quite favorable.

Prevention: Warehousemen should inspect their warehouses and the NFD milk every day as warmer humid weather arrives. Use a good strong light to examine the floors, lower bags, and between upper and lower boards of floor pallets for moisture and mold. Good ventilation, forced air circulation, heating, and dehumidification may be used to reduce moisture and prevent mold. Large portable fans mounted close

to the floor can be used. Discretion should be used with vent fans, especially if the outside humidity is much higher than the inside humidity. Dry outside air can be circulated through the warehouse when outside humidity is low.

Liability: Warehousemen should be aware that losses from mold contamination of CCC owned commodities, if caused by negligence and/or inaction of the warehouseman, will be for the warehouseman's account. If a moisture or mold problem is detected in your facility, advise the Kansas City Commodity Office immediately. Your losses could be mitigated by prompt notification and corrective action.

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