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On behalf of:
Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection
the Federal Republic of Germany

CCL Cold Chain Logistics Resource Centre

CII Confederation of Indian Industry

Post-Harvest Management Protocols

MEAT, POULTRY, FISH AND EGGS

Meat, poultry, fish, and eggs are highly perishable and potentially hazardous due to their high moisture and high protein content. Generally, fresh cuts of meat contain spoilage bacteria on the surface that will grow, produce slime, and cause spoilage after 3 days of refrigerator storage in oxygen-permeable packaging film. Meat, poultry, and fishery represent an important component of human food, and its quality is of extreme importance to the consumers, regulators, processors and the retailers. Major issues in meat food safety include microbial, physical, and chemical contamination, sale of stale meat, adulteration of meat with lower-quality meat or non-meat food, mislabelling etc. Meat quality depends on its compositional quality (lean to fat ratio) and the palatability factors such as visual appearance, smell, firmness, juiciness, tenderness, and flavor.

Consumers as smart buyers can make an informed choice based on these parameters while purchasing meat and poultry. They can easily examine its visual appearance (colour, marbling), firmness and smell. Edible meat should be free from any discolouration, off-odour, and off-flavour. It should also be free from any kind of blemishes and blood spots. Safe handling of meat and poultry products is extremely important for maintaining it quality. Consumers should follow basic steps for its safe handling which includes washing hands and contact surfaces properly, avoiding cross-contamination, cooking and storing the meat at ideal temperature and conditions.

STORAGE

Chilled Fresh Meat

Frozen Poultry Meat should be stored at 4°C for short term storage and at -18°C or below for long term storage. Meat under normal chilling conditions (0 – 4°C) of storage shall be consumed within 2 to 4 days. Long duration Frozen meat stored at -18°C or below must preferably be consumed within 10 -12 months. Ground meat products including pork are more susceptible to spoilage due to the manufacturing process and increased surface area of the product. Freezing inhibits the growth of bacteria. Whole cuts of meat may be stored in the freezer ranging from 4 to 12 months, whereas ground meat may be stored for 3 to 4 months. For maximum storage, wrap meats in moisture-proof, gas impermeable packaging to prevent freezer burn. Bacteria in ground meats are distributed throughout, providing rapid growth in the presence of air. Refrigerator storage slows bacterial growth; however, the product will eventually spoil.

Cured Meats

Cured meats, such as bacon, should be stored in their original packaging in the refrigerator. Cured meats tend to become rancid when exposed to air. Therefore, rewrap cured meats after opening the package. Expect approximately a 1-week shelf-life for cured meats. Vacuum-packaging (absence of air) and modified atmospheric packaging (partial removal of air) extends shelf-life of meats and meat products (i.e. luncheon meats). The shelf-life of vacuum-packaged meats and gas-flushed meats is 14 days and 7 to 12 days,respectively.

Fish Shrimps and Crab

Fresh fish, shrimp, and crab stored in the refrigerator (slightly above 0°C) should be consumed within 1 to 2 days. Fresh fish should never be stored in water due to leaching of nutrients, flavor, and pigments. Frozen fresh lean fish and seafood (except shrimp) may be stored for 3 to 6 months at 0°C. Shrimp may be stored for 12 months at 0°C.

Summary of storage protocols for different kinds of Frozen Meat: (Long Duration Storage)

Product	Storage Temperature in °C	Relative Humidity %	Approximate Storage Life
Frozen Fish	30 - 20	90 to 95	6 to 12 months
Frozen Beef	20	90 to 95	6 to 12 months
Frozen Pork	20	90 to 95	4 to 8 months
Frozen Poultry Meat	20	90 to 95	12 months
Lamb	20	90 to 95	8 to 12 months
Ham	20	90 to 95	6 to 8 months

Eggs

Eggs are usually stored in the refrigerator(0 to 4°C) in their original carton. Storage of eggs in the original carton reduces absorption of odours and flavours from other foods stored in the refrigerator. Refrigerated eggs should be used within 3 to 5 weeks from the time they are laid. At room temperature eggs maintain their freshness for about 10 -12 days after being laid. After this the quality of eggs begins to deteriorate. Leftover egg yolks and egg whites may be stored in the refrigerator covered for 2 and 4 days, respectively. Hard-boiled eggs may be stored in the refrigerator for 1 week, whereas pasteurized liquid eggs may be stored in the refrigerator for 10 days. Egg whites and pasteurized eggs may be stored at freezer temperatures for one year. Shell eggs should never be stored in the freezer.

Dried eggs may be stored in tightly closed containers in the refrigerator for upto one year. Eggs lose as much quality in one day at outside temperature as they would lose if kept 4 to 5 days in a refrigerator.