



भा.कृ.अनु.प.-राष्ट्रीय मांस अनुसंधान संस्थान

(पूर्व भा.कृ.अनु.प.-राष्ट्रीय मांस अनुसंधान केंद्र)

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Superchilling, a promising technology for improving shelf-life of meat and poultry

Inventors /Developers: Dr. Naveena B. Maheswarappa, Dr. Rituparna Banerjee, Dr. M. Muthukumar

Brief Description:

Superchilling process implies storage of muscle food at temperature between its initial freezing point (-0.5°C to -2.8°C) and $1-2^{\circ}\text{C}$ below this, specifically in the borderline between chilling and freezing temperatures. During preservation of muscle foods, superchilling freezes part of the water and insulates the food products from temperature fluctuations, thereby enhancing the shelf-life during storage, transportation, and retailing. Superchilling process synergistically improves the product shelf-life when used in combination with vacuum or modified atmospheric packaging.

A superchilling cabinet is developed by the ICAR-NMRI and the technology is patented (Indian patent No. 2334/CHE/2012). Superchilling (-2°C) was able maintain the shelf life of buffalo meat upto 3 months, poultry meat upto 35 days, and boneless goat meat cut-up parts upto 45 days under vacuum conditions. Superchilled samples exhibit lower rate of oxidation, discoloration, and minimal protein denaturation compared to chilled samples. Superchilling do not adversely affect the quality of meat as compared to freezing due to the damage caused by ice crystals.

Efficiency:

As an alternative to traditional chilling and freezing methods, superchilling enables safe, and high-quality product with higher yield, and reduced energy, labour, or transport costs.

Significantly higher shelf-life ensures better management of supply chain logistics among retailers and e-commerce business platforms.

This technology is transferred to:

1. Technologies for packaging of fresh buffalo meat for improved shelf life (transferred to Mr. Mohammed Abdul Azeem, Hyderabad).
2. Studies on extended shelf life of chicken and enhancing post cooking quality and safety (transferred to Jubilant FoodWorks Limited, Noida, UP)

3. Packaging interventions for chilled and superchilled meat/poultry- a pragmatic solution for improving the quality and shelf-life (**transferred to Sealed Air Packaging Materials India LLP, Ghatkopar, Mumbai**)



Vacuum packed buffalo meat



Shrink wrapped and tray packed chicken



Shrink wrapped lamb cuts



Vacuum skin and heat shrink packed goat meat



Super-chilling cabinet designed at ICAR-NMRI, Hyderabad

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