

Optimised chilling technologies for cod from catch to consumers



Figure 1. Conveyor belt to the CBC tunnel.

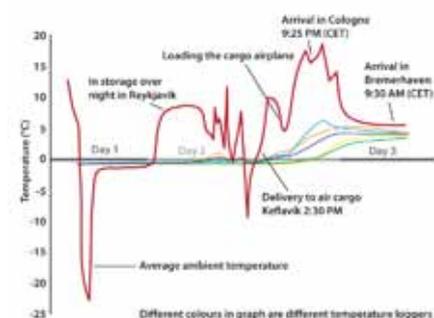


Figure 2. Changes in temperature during air cargo transport. Average ambient temperature (red line) and temperature inside EPS boxes (different colours represent different positions).

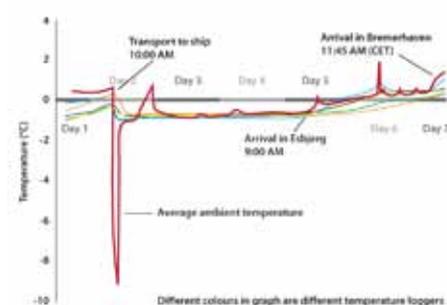


Figure 3. Changes in temperature during transport by land and overseas. Average ambient temperature (red line) and temperature inside EPS boxes (different colours represent different positions).

Introduction

Fresh seafood products are perishable, and the relatively short shelf life of fresh cod loins is largely influenced by temperature from catch, through processing, storage and transport. The overall aim was to develop supporting technologies contributing to increased efficiency of the supply chain and improve quality and safety of chilled (fresh) fish products.

Different chilling technologies were studied with regard to heat transfer, cooling rate, cooling capacity and applicability in the different links in the chain from catch to consumers. Effects of chilling technologies at various stages in the supply chain on microbial growth, physical and sensory characteristics and storage life of cod were investigated.

Results and Discussion

On board fishing vessels

Pre-cooling of whole fish in insulated tubs in slurry ice is recommended as considerably faster cooling is achieved with slurry ice compared to flake ice. However, storage in slurry ice for too long time is not recommended due to salt uptake, softening of the fish flesh and more rapid microbial spoilage.

Processing of fillets

Rapid chilling during processing of fillets, for example using CBC (Combined Blast and Contact, Fig.1) cooling, extends shelf-life by several days, especially under dynamic temperature conditions during distribution. Delayed processing of raw material is undesirable if it is intended to be packed under modified atmosphere (MA) and sold as more valuable products.

Packaging and Storage

It has been found that superchilling of processed products will extend the freshness period (selling life), and thereby the overall shelf life. Synergism of combined superchilling ($-1\text{ }^{\circ}\text{C}$ to $-1,5\text{ }^{\circ}\text{C}$) and MA packaging leads to considerable shelf life increase, especially extending the freshness period.

Transportation

Results from temperature mapping during airfreight transportation show that this stage is the most hazardous in chill chains including this transportation mode (Fig. 2). Temperature abuses occur before and during loading into air planes and temperature inside the aircraft hold is not allowed to fall below $7\text{ }^{\circ}\text{C}$. The temperature control in containers transported overseas is significantly better than in the airfreight transportation (Fig. 3).

Maintaining low temperature from catch to consumer is of utmost importance because of the relevance to the quality and shelf-life of the product.

www.chillfish.net is a website with practical information and coverage on cooling and handling of fish at all stages of the value chain from catch to market.

Acknowledgement

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