Increasing quality through rapid chilling

Mode Slurry Ice Systems

Thorsteinn Ingi Viglundsson (Thor)

Barbados March 2008

Increasing quality through rapid chilling of fish

Personal experience:

‣ 8 years of work with rapid chilling

‣ Sale and implementation of over 200 systems worldwide

‣ Research work together with Matís Iceland, Seafood Scotland and Seafish UK

High Quality Fish

‣ What is high quality fish?

‣ How do we improve quality?

‣ Why improve quality?

Results of enhanced Quality

‣ Fresh fish (looks, oder, taste, feel)

‣ Better processing, more yield

‣ Longer shelf life:

   ‣ Lasts longer in transport,

   ‣ Opens possibility for new markets

      ‣EU

      ‣US

   ‣ Gives buyers more flexibility

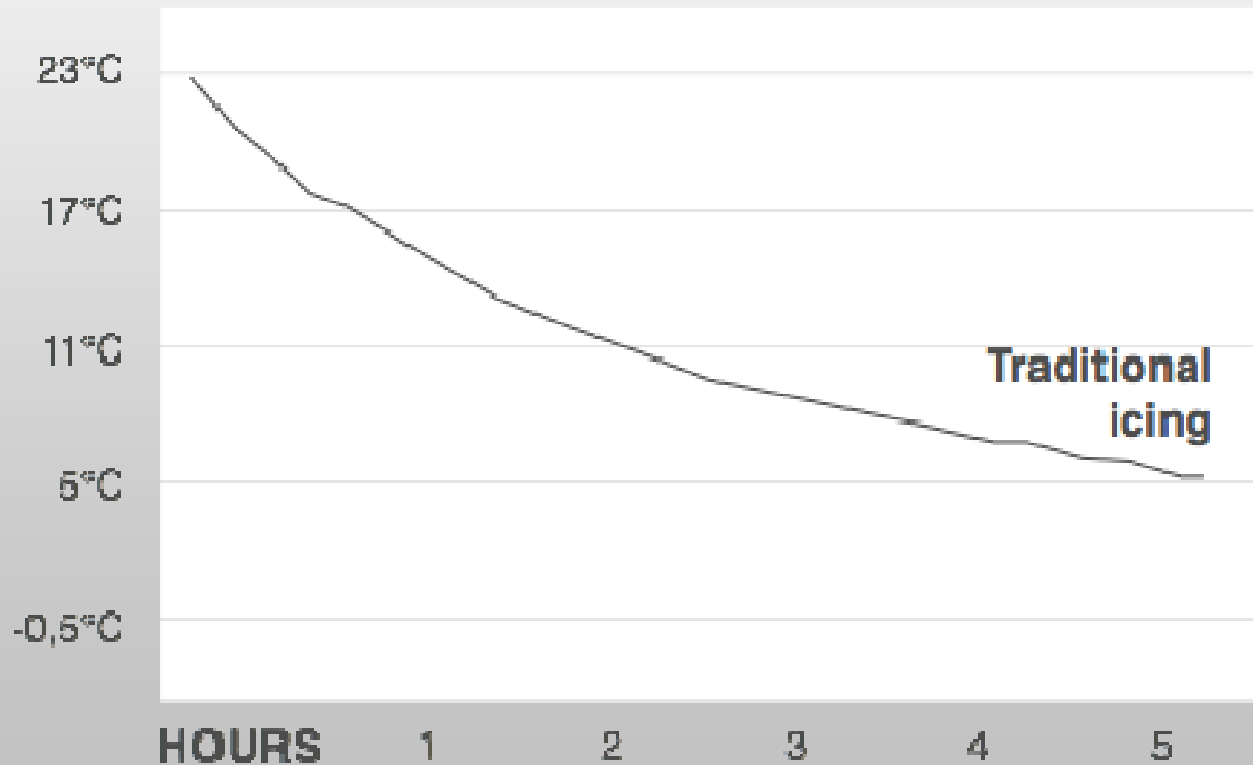# Which cod would you buy?

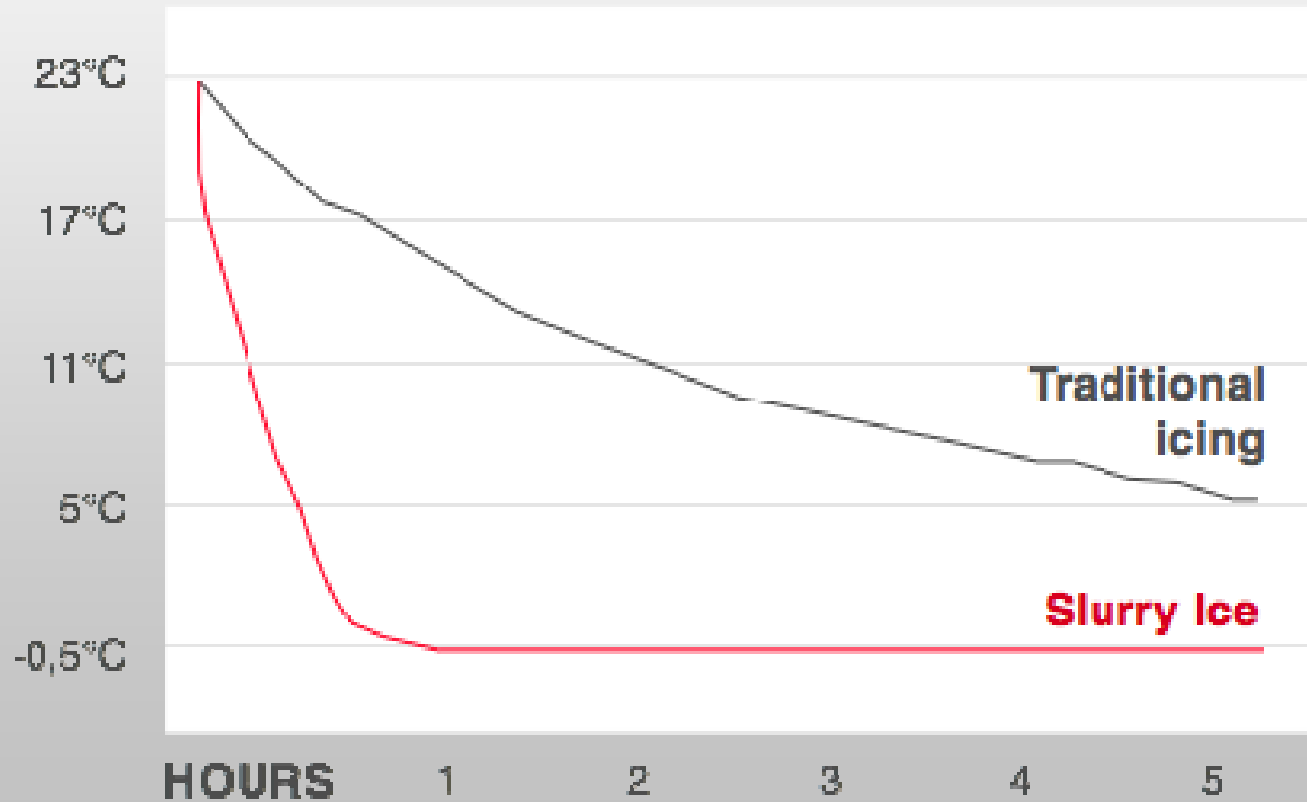▸ Rapid chilling

▸ Traditional iceing

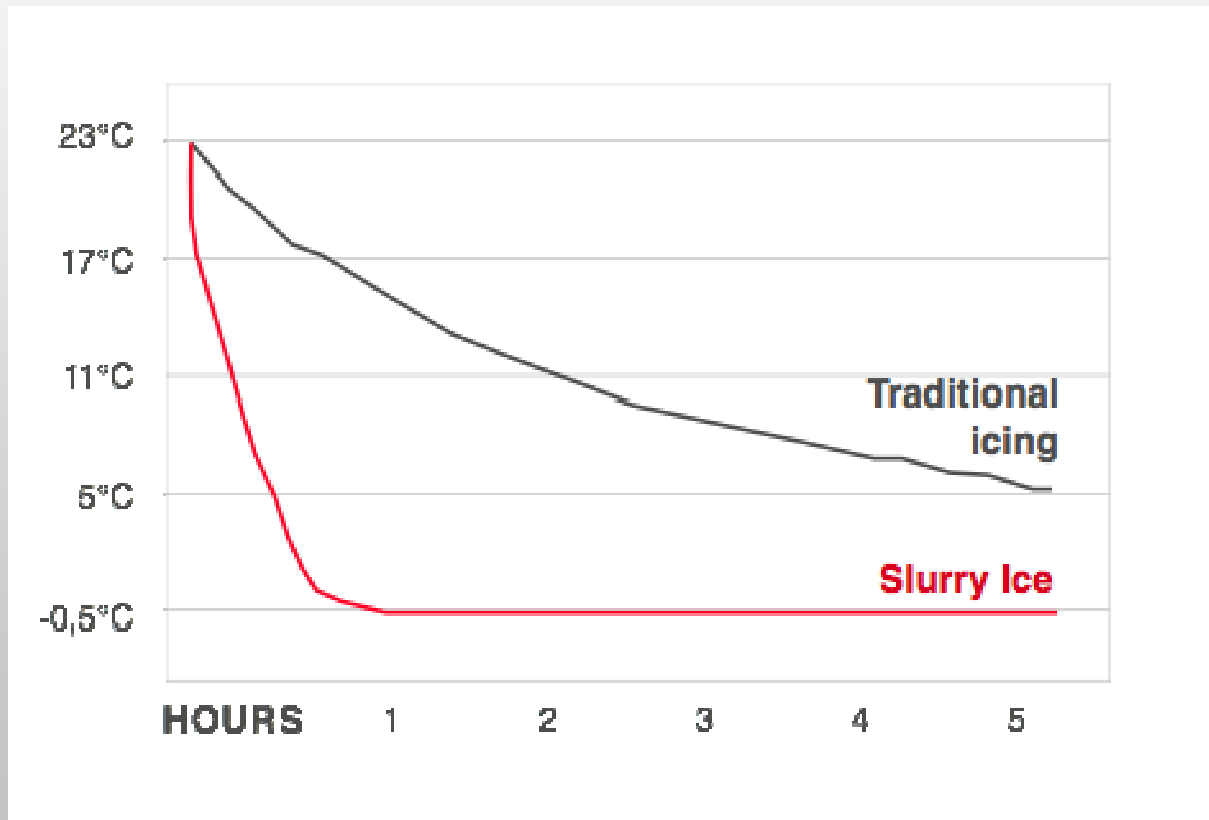# Different methods

‣ Traditional iceing with flake ice

Different methods

Rapid chilling with Slurry Ice

Rules of thumb for quality:

‣ Chilling 1 hour faster gives 2 days in added shelf life

‣ Effect bigger in warm seawater than cold

Quality starts at sea

‣ Handling of the fish from catch to dish!

‣ Rapid chilling on board

‣ Storage at the right temperature at sea and on shore

‣ You cannot regain lost quality!!

Financial gain
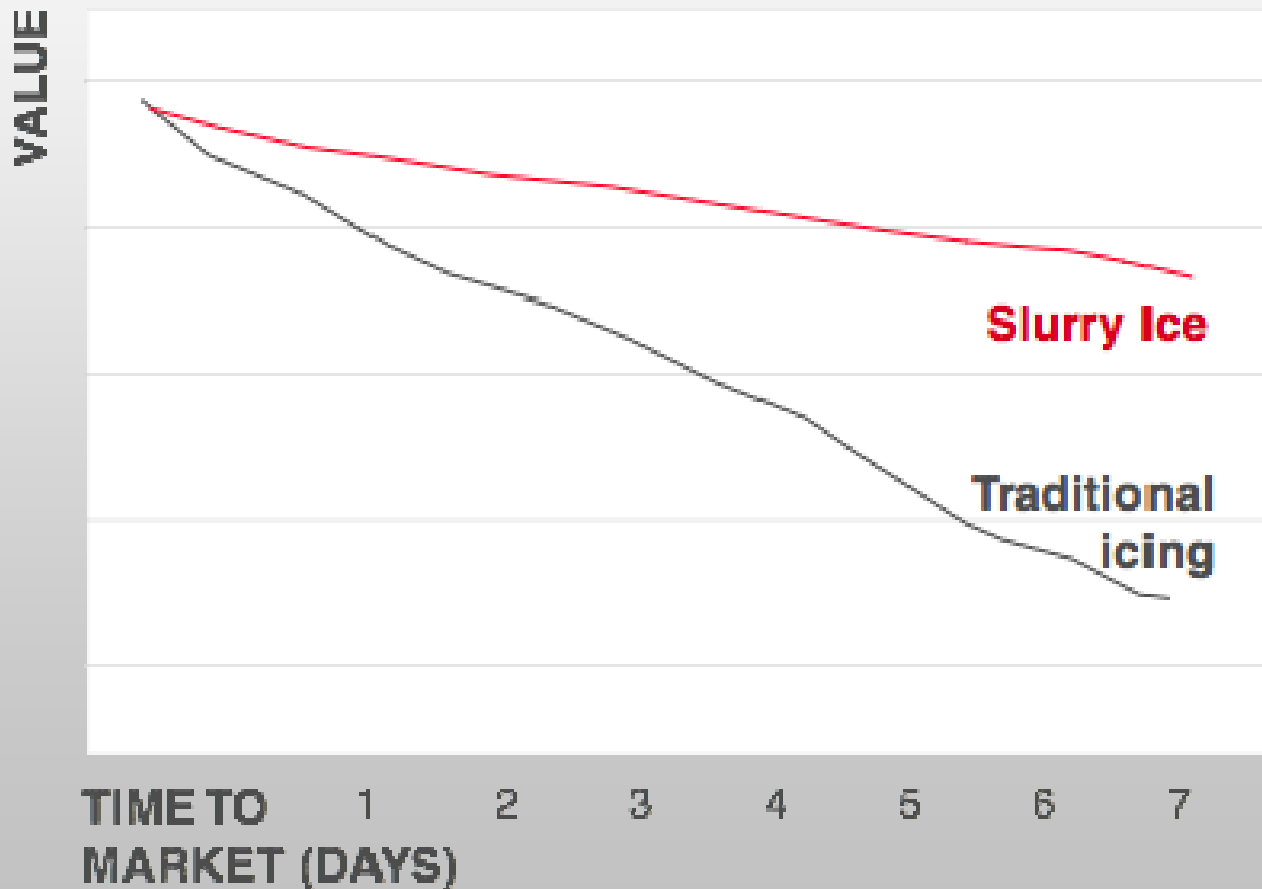## a case study: Challenge UL33, Scotland

VALUE

Traditional icing

TIME TO MARKET (DAYS)   1   2   3   4   5   6   7
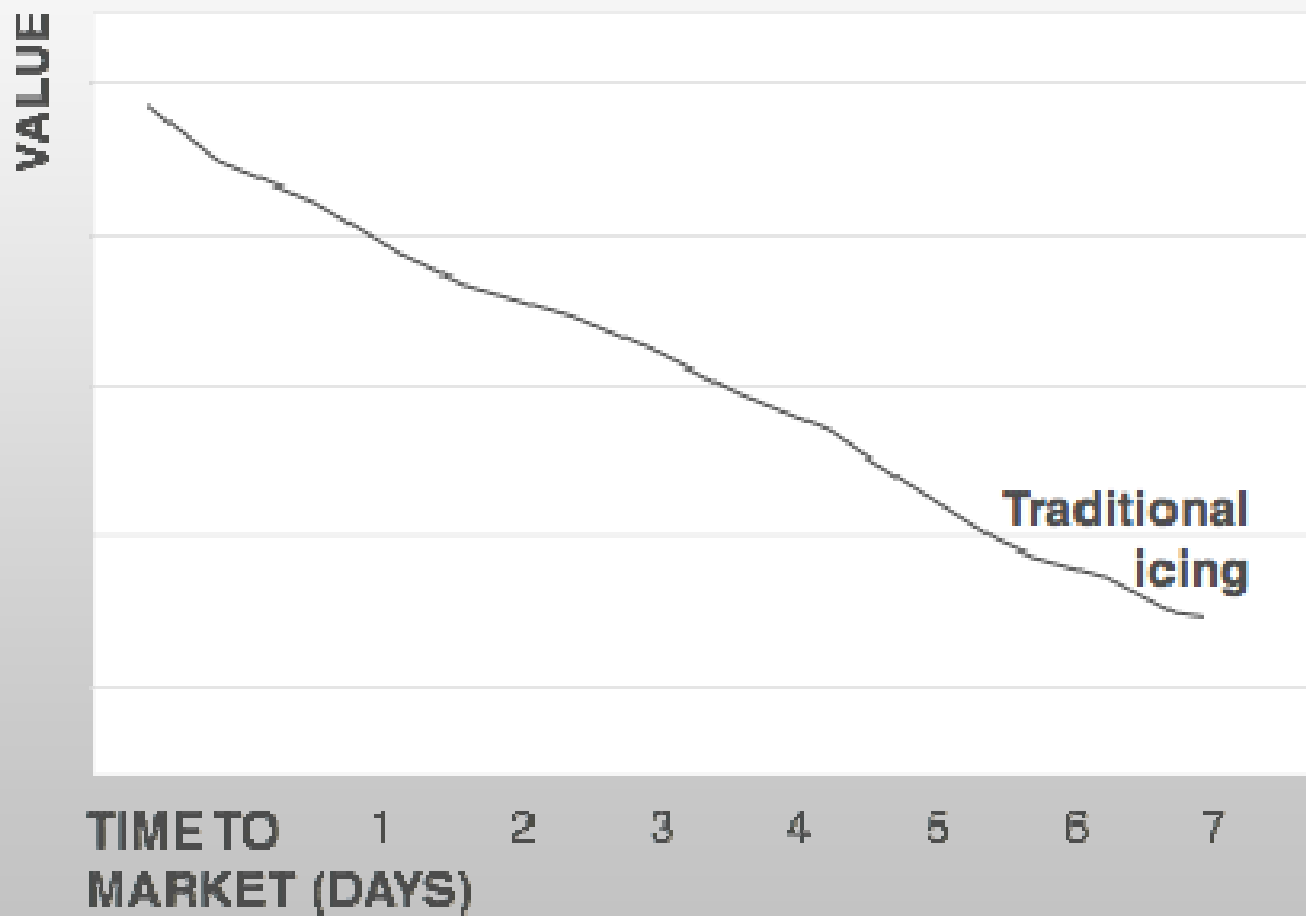
‣ Price drop from catch to market

Financial gain
a case study: Challenge UL33, Scotland
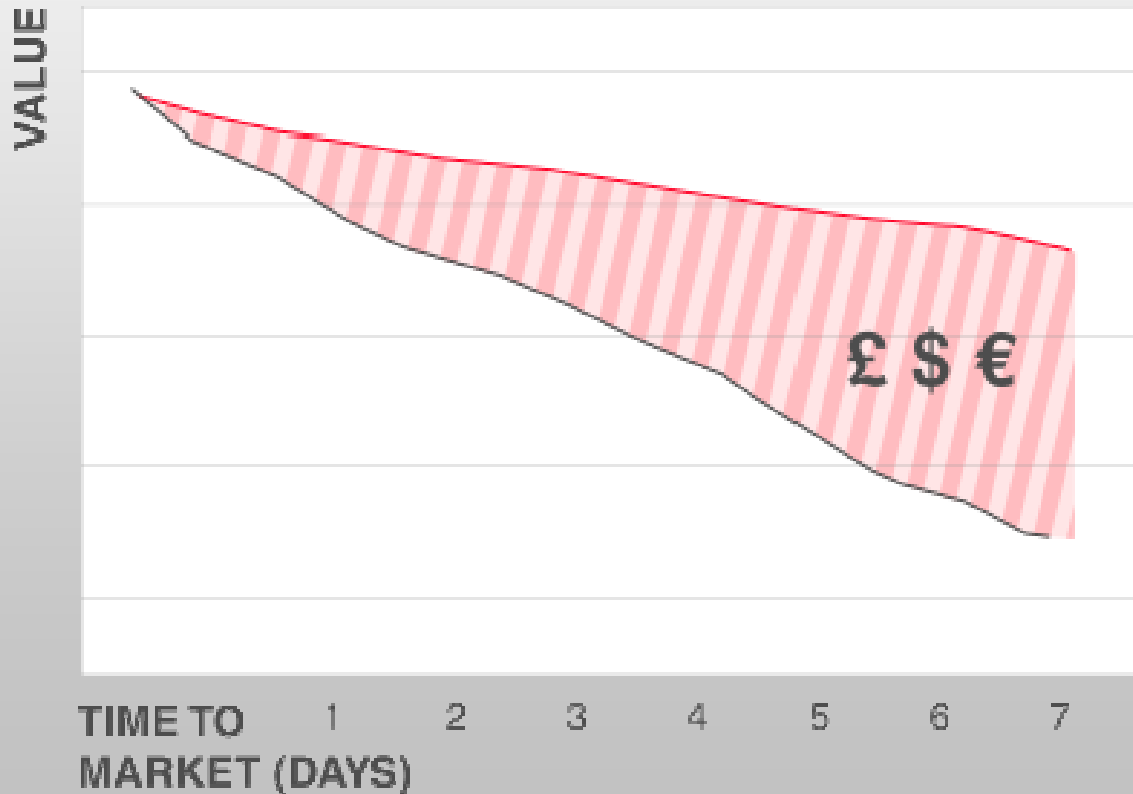

▸ Less drop in price
▸ Longer shelf life

Financial gain
a case study: Challenge UL33, Scotland

- ‣ High value for all the catch, not just the newest!!
- ‣ Adds up quickly

£ $ €

VALUE

TIME TO MARKET (DAYS)   1   2   3   4   5   6   7

Rapid Chilling
What fish does it work on?

‣ Tuna

‣ Pelagic

‣ Shrimp/shellfish

‣ Groundfish

‣ (what is being fished in the area)

Where do we Chill?

‣ Chilling on arrival on board (on the deck or hopper)

‣ Chilling on the workdeck (in tubs or tanks)

‣ Iceing in the hold

Who uses slurry-ice?

‣ Small boats (1-5 days at sea)

‣ Freezer vessels
‣ Pelagic vessels
‣ Longliners
‣ Tuna catching
‣ Shellfish (crab, shrimp, lobster)

Small boats in Iceland

‣ Stay at sea for 1-5 days

‣ Highest quality fish

‣ Chill on the workdeck or in tubs/boxes in the hold

‣ Small machines suited for their size

Case Studies

‣ Pelagic fishing in warm seas

‣ Small boats fishing in Iceland

‣ Groundfish in Scotland

‣ Tuna

‣ Prawns in Scotland

‣ Processing

Payback

‣ Payback varies / situation differs

‣ Eliminates the need to buy ice

‣ Less time spent in waiting for ice

‣ Higher price at the market

‣ Less reduction in price due to days at sea

‣ More days at sea without landing the catch

Business consept

‣ Mode supplys generators and know-how

‣ The heart of the slurry-ice machine is the generator

‣ Local production of the ice machine

‣ Local service

‣ Local know how combined with our know-how

Matís ohf.

- **The Icelandic Fisheries Laboratories (IFL), which was an independent food research institute.**

- **MATRA: which was a joint venture of IceTec and the Agricultural Research Institute.**

- **RUST: The research division of the Environment and Food Agency.**

- **Matis also operates Prokaria, a private biotechnology company and Iceprotein, a protein production company.**

About Matis ohf.

- **Matis is a dynamic R&D company which specialises in various services for the food industry in Iceland and abroad**
  research, innovation and consultancy

- **Number of employees: 100**
  Engineers, food scientists, fishery scientists, chemists, biologists, microbiologists and technicians

- **Education**
  PhD   15
  MSc   20
  PhD students   12
  MSc students   16

- **Matis is an important link between the fish and transport industries, universities and other research companies**

- **Processes**

- **Shelf life and chilling**

- Trace and sustainable production

- Aquaculture

- Consumer behavior and food market developments

- **Products development**

Bioligy and theory

‣ Rigor Mortis

‣ Bakteria Growth (TMA)

Bakteria-growth in fish flesh

‣ Chart showing bakteriagrowth vs temperature vs time

‣ Chart showing reduced growth if temperature is reduced

The influence of Rigor Mortis

‣ Rigor mortis delayed by .... Hours

‣ The fish stays longer in Rigor

‣ Bakteria growth doesn´t start until Rigor is over

‣ (Graph ....)