Comparison between ice media

Optimisation of chilling methods for fish is one of the research projects of the division of Value Chain, Processing and Aquaculture at Matís.

Various studies have shown that two-phase slurry ice is more efficient than ordinary flake ice for chilling fresh fish. In most of the studies only one type of slurry ice has been applied, most often prepared in commercial ice-machines. The objective of this work was to investigate both chilling and maintenance of low temperature utilising flake ice and different kinds of ice slurries.

Materials and methods

Model studies were performed in controlled consistent conditions. The different ice media under consideration were the following:

1. Three types of slurry ice – made with three different types of ice machines. The slurry ice types were made of brine, 1,5-4,0 wt. % in salt concentration. The ice concentration was 14-39 wt. % and the medium initial temperature was -3,0 to -1,1 °C. The ice particle size was in the intervals from 5-500 µm according to the ice machine producers.
2. Flake ice (FI) with flake size of ca. 1-3 cm.
3. Mixture of flake ice and brine (FI+SW).
4. Mixture of crushed flake ice and brine (crushed FI+SW). The flake ice was crushed to a particle size of ca 0,5-3 mm. The whole, gutted saithe used both for investigating chilling and maintenance of low temperature during storage weighed 1,5-2,0 kg. The ratio between fish and slurry ice was 1:1 and 10:4 for the flake ice. In the storage experiments 54 kg of both slurry ice and crushed flake ice were packed evenly in isulated tubs along with 100 kg of saithe in each tub. The initial medium temperature was -2,2 °C and the ice ratio 37,1 wt. % which equates to the 20,0 kg of uncrushed flake ice used in the third insulated tub.

Results

- The cooling rate of all the different slurry ice types was superior compared to flake ice.
- The most important property of the chilling medium is the temperature since the size of the ice particles seems to have only minor influence on the cooling rate. The importance of distributing the ice medium evenly when packing fish and ice medium in fish tubs became evident in this work.
- After a few days the faster melting of the ice slurries results in inferior cooling capacity so the flake ice, in general, maintains lower temperature in fish through long storage.

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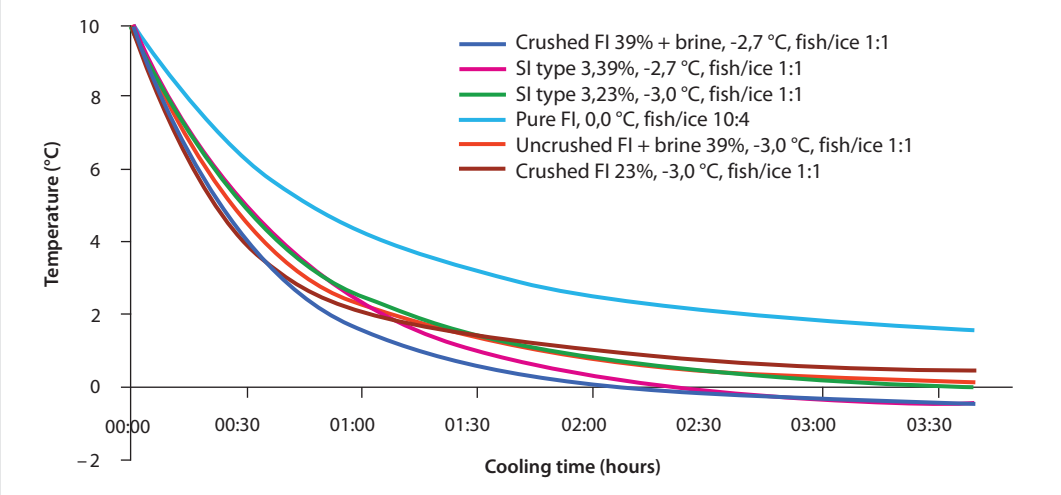

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