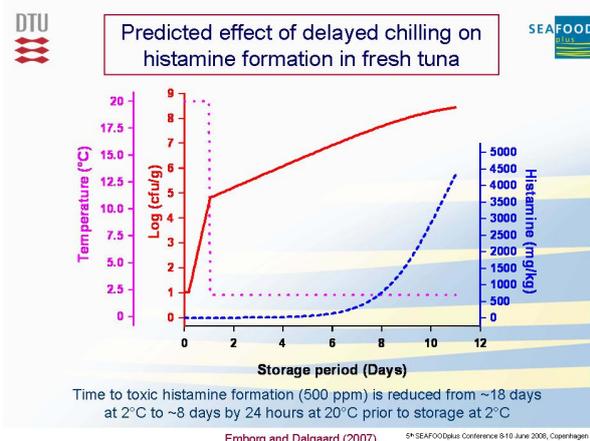
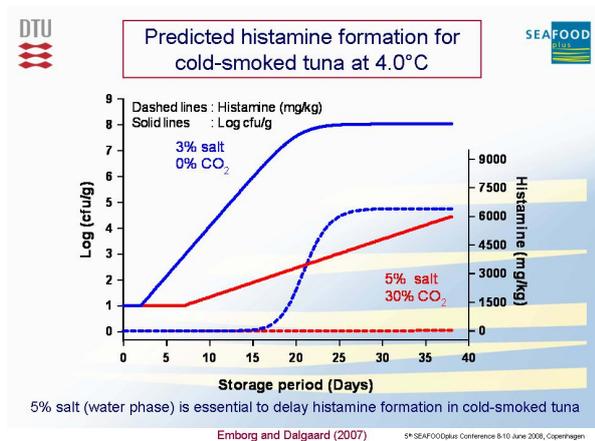


Histamine fish poisoning – new controls for a common seafood safety issue

Presenting author: Paw Dalgaard, co-author: Jette Emborg
 National Institute of Aquatic Resource (DTU Aqua), Technical
 University of Denmark (DTU)



The overall objective of the BIOCUM project was to reduce the occurrence of histamine fish poisoning. The project was the first of the SEAFOODplus projects to be completed.

The BIOCUM project documented the occurrence of histamine fish poisoning, determined the relative importance of histamine and other biogenic amines with respect to this intoxication and identified psychrotolerant (*Morganella psychrotolerans* and *Photobacterium phosphoreum*) and mesophilic (*Morganella morganii*) bacteria responsible for the formation of toxic concentrations of histamine in seafood that actually caused histamine fish poisoning. Importantly, BIOCUM determined the effect of storage conditions, including temperature (0-20°C), atmosphere and product characteristics (salt and pH) on histamine formation and developed a mathematical model to predict histamine formation in seafood depending on these parameters and the initial concentration of *Morganella psychrotolerans*. The developed predictive model can be used to determine combinations of conditions required to prevent toxic histamine formation in seafood within a given shelf-life. This is an important new approach to control histamine formation. Added salt and modified atmosphere packaging are e.g. important to control histamine formation in chilled cold-smoked tuna (left graphic above). Delayed chilling of fish after catch is a major problem in some fisheries and the new model can predict a safe shelf-life when delayed chilling occurs. A predicted time to toxic histamine formation (500 ppm) is for example reduced from ~18 days at 2°C to ~8 days with 24 h at 20°C prior to storage at 2°C (right graphic above).

We have recently developed a new mathematical model to predict the effect of temperature (7-37°C) on growth and histamine formation by the mesophilic and strongly histamine producing bacterium *Morganella morganii*. This new model can be used together with the *Morganella psychrotolerans*-model from BIOCUM to predict histamine formation within the entire temperature range from 0°C to 37°C including both storage in ice and delayed icing of tropical fish. Predictions show that *Morganella psychrotolerans* is most important for histamine formation below ~15°C whereas *Morganella morganii* is most important above ~15°C.

Information from BIOCUM can be used together with new data, from an ongoing national research project, to control and understand histamine formation in seafood. In addition, a recently, initiated research project "Detection of strongly histamine producing and psychrotolerant bacteria in seafood" will be presented to demonstrate how results from BIOCUM is linked to future research.

The BIOCUM project has provided an important step ahead in our understanding of the factors that lead to toxic concentrations of histamine in seafood.