Why do marine fish products spoil so fast?

Development of shelf life prediction (SLP) model for fish products

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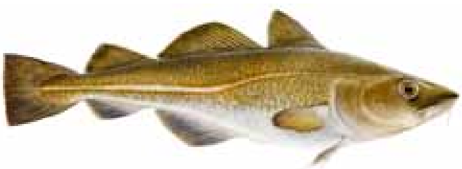
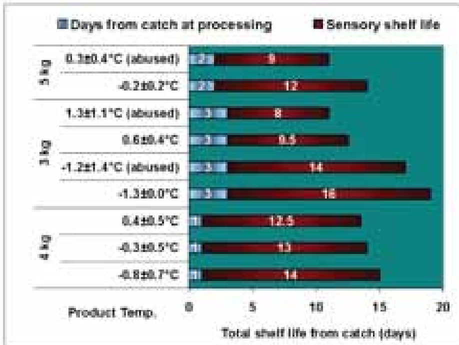
Atlantic cod *(Gadus morhua)*



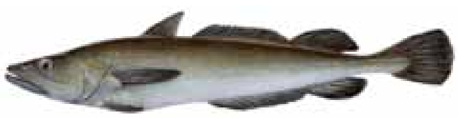
Cod, a popular low fat fish, is an important economic commodity in international markets.

Effect of temperature abuses on deterioration of cod products



Superchilled storage (around -1 °C) of cod products extends their shelf life.

Southern hake or Antarctic Queen *(Merluccius australis)*

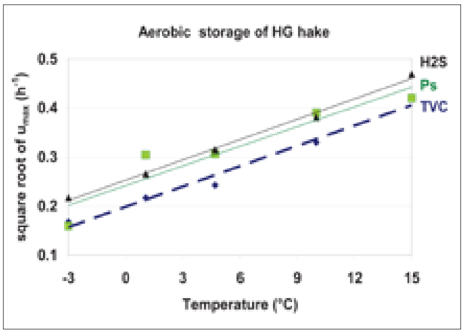


Southern hake is amongst the highest valued white fish in the world, being much demanded in Spain, Portugal and France.

Background

Fresh fish of marine origin have a short shelf life even at refrigeration temperatures. Gadoid products may be expected to have about 10-12 days shelf life for fillets at 0-2 °C as opposed to 13-15 days for gutted fish. The limited shelf life is a large hurdle for the export of fresh fish to foreign markets. Better control of the cold chain is required. Tools to assess quality indicators in fish may contribute to the marketing of value added products. Bacterial spoilage of lean fish is the main cause of quality deterioration. Marine fish spoil rapidly due to growth of SSO (specific spoilage organisms) tolerating well chilling conditions and causing off-odours and off-flavours. Some are capable of producing TMA, the fishy smell.

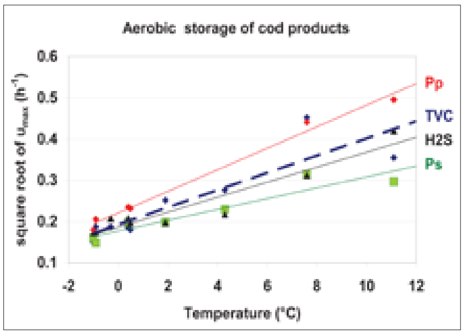
SSO growth data was gathered under isothermal conditions for headed, gutted (HG) hake and cod fillets. Maximum specific growth rates (μ_{max}) for all SSO were plotted against temperature (T) using the square root model.



Effect of T on SSO μ_{max} in HG hake

Main outcome

Two SSO, pseudomonads (Ps) and H_2S-producing bacteria, were determined in HG hake while a third SSO, *Photobacterium phosphoreum* (Pp), was found to be of great importance in cod products. The effect of T on SSO growth in both marine products was studied, which led to the development of SLP models by WIT. The following figure clearly shows that Pp is the most temperature-influenced SSO in cod products, followed by H_2S-producing bacteria while T increase has a lesser influence on pseudomonads.



Effect of T on SSO μ_{max} in cod fillets

Pp, *Photobacterium phosphoreum;* TVC, total psychrotrophic viable counts; H_2S-producing bacteria; Ps, pseudomonads; μ_{max}, maximum specific growth rate (h^{-1}) determined by DMFit[a].

SSO growth rate in Chilean hake was faster at 0°C than in cod products, stressing the importance to optimise chilling methods upon catch and to superchill hake for export. Developed SLP models will be further tested.

[a]Baranyi, J., Roberts, T.A., 1994. A dynamic approach to predicting bacterial growth in food. International Journal of Food Microbiology 23, 277-294.

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