Firmer salmon fillets

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Atlantic salmon is the major component of Norwegian aquaculture with a total value of four billion Euro in 2010. Salmon products are sold in 100 countries, with the EU as the largest market. Although Norwegian farmed salmon are generally of good quality, defects such as soft texture may occur.

Soft fillet texture, a challenge

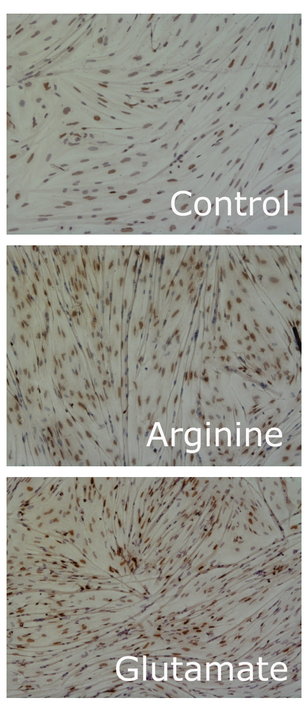
Soft fillets are downgraded because they are not suited for manufacturing of high quality products.

Therefore, the problem with soft texture →

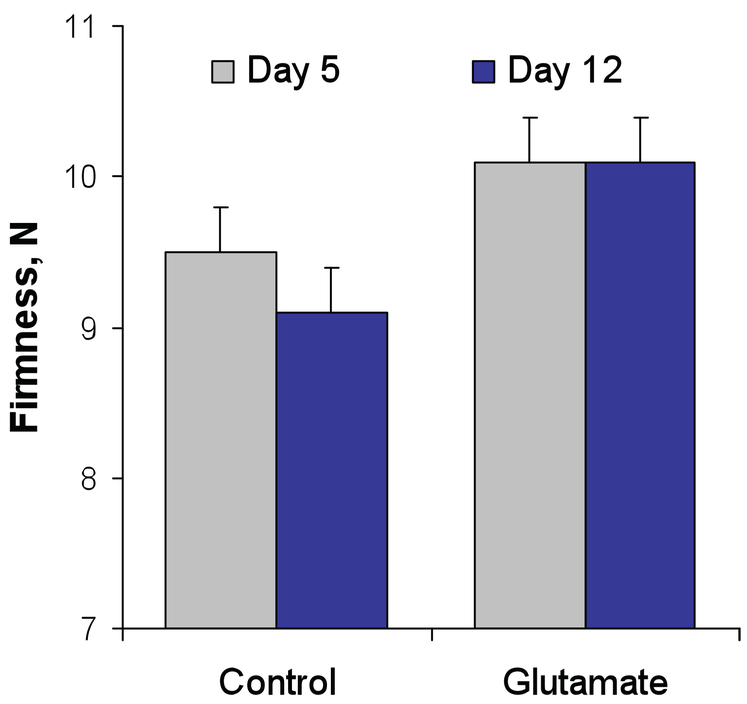
- Large economical losses to the farming and processing industry
- Harmful to the reputation of the industry as a supplier of high quality products

Our new research efforts show that supplementing salmon feeds with specific amino acids (arginine and glutamate) can stabilise the texture and reduce the problem with soft flesh of salmon fillets.

Fortunately, supplemented feeds results not only in firmer texture, but also improved health, improved robustness to stress during slaughter handling and also increased body weight increase during certain life stages in seawater.



The muscle cell density and structure is responding positively to added levels of arginine and glutamate



Results from instrumental texture analyses of salmon fillets after 5 and 12 days of ice storage, respectively

Fruitful interdisciplinary research

These encouraging results are the outcome of interdisciplinary research of salmon throughout two production cycles, from sea transfer to slaughter, and also from in-vitro studies (cell culture). The novel insight helps to improve fillet quality of salmon, and has provided breakthrough knowledge regarding the complex interrelationship between fish health and fillet quality.

Summary of results:

Addition of specific amino acids (glutamate and/or arginin)

Growth: Higher growth rate during Autumn in arginin fish

Texture: Higher firmness (breaking force) and lower degree of gaping

Organs: Smaller and leaner livers. Less organ adhesions (lower Speilberg score)

Histology: Lower degree of deviations in organs (liver, gut, heart) and muscle

Plasma analyses: Lower levels of CK and ALAT

Muscle: Improved buffer capacity in the glutamate fish (higher level of histidin and anserin)

Gene expression for glutamat vs. control feed (Microarray): Changed energy metabolism, healthier tissue, improved antioxidative status, higher protein turnover

In-vitro study: Higher expression of myosin LC, myogenin and higher proliferation (% of positively stained nuclei, PCNA)

Conclusion

Addition of amino acids (glutamate and arginine) improves the

- **Firmness of salmon fillets**
- **Health of the fish**
- **Robustness to stress**

- thus helps to ensure a strong and predictable economy and good reputation of the salmon farming industry throughout the whole value chain

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Partners: