Sensory comparison farmed and wild turbot

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Introduction

Since the last decades turbot (*Psetta maxima*) has originated from fisheries as well as aquaculture. The production of farmed turbot is focused on the fresh fish markets in Europe and Asia. Usually farmed turbot is packed whole (dead or alive) and transported directly to customers. On some occasions the fish are bled and gutted first. It is obvious that for fresh markets prime quality farmed turbot is of interest. However, only a few studies have been carried out to compare quality of the farmed product to the wild caught species. In addition an effect of post killing treatment on flesh quality has not been studied in detail either. The study presented here compare shelf-life of the whole turbot from fish farms to the wild caught species and investigates effects of various post killing treatments on the eating quality. The outcome enables farmers to select suitable post killing conditions to tune the quality of the products to the needs of their customers.

Materials and Methods

Freshness of wild and farmed turbot from four different farms, during storage was assessed using the Quality Index Method (QIM). The QIM assesses 10 elements for appearance, eyes, gills and fillet (when gutted). Figure 3 shows the mean sum of scores (Quality Index) from the QIM-panel (n = 4 to 6) and replicates (r = 5 fishes) related to storage time in ice.

Figure 1: Assessment of freshness of fresh turbot by QIM.

Quantitative Descriptive Analyses (QDA) were used to evaluate wild turbot and farmed turbot varying on post killing processing (gutting, no gutting pre and post rigor filleting) during storage in ice up to 21 days. In the QDA 32 attributes were used to describe (changes in) appearance and odour of both raw and cooked fillets as well as texture and taste of cooked fillets. Figure 4 shows the mean scores for the panel (n=6) and replicates (r = 2) after 8 days of storage in ice.

Figure 2. Sensory assessment facilities for QDA of raw and cooked turbot fillets.

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Results

Freshness evaluation.

The results obtained from the comparison of farmed to wild turbot are presented in figure 3. Statistical analysis revealed a significant difference between wild turbot to turbot produced by the farms Zeeland, Ecomares and ACC. It was established that shelf-life of farmed turbot can be nine days longer than the wild species. However, no significant difference in shelf-life was observed between turbot produced at the farm Stolt compared to the wild species.

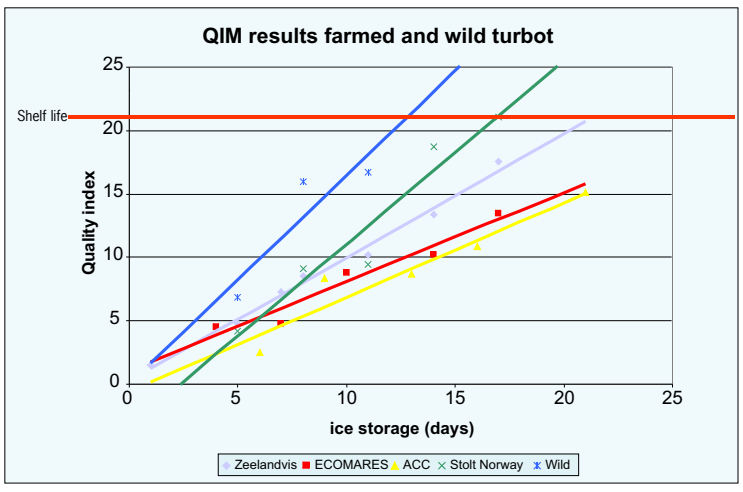

Figure 3: Development of freshness for various turbot during storage in ice by Quality Index Method. The end of shelf life is determined at a QI-score of 21 resulting in a storage time of 13 days in ice for wild turbot and up to 22 days for farmed turbot.

Eating quality.

Statistical analysis showed that wild turbot had a more creamy colour for both raw and cooked fillets, compared to only farmed variants that were bled (Figure 4). The texture of the pre rigor filleted turbot was least firm, followed by the wild turbot. Wild and farmed turbot were not significantly different with respect to tenderness. Overall, the cooked odour and flavour of wild turbot was significantly more intense , compared to the farmed variants. Characteristic sensory attributes for both farmed and wild turbot were a cooked milk odour, low fish odour, cooked potato- and chicken taste.

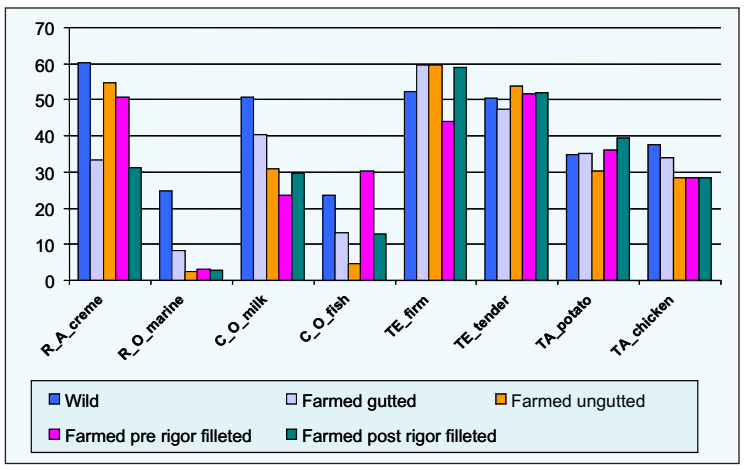

Figure 4: Sensory profile for various turbot after 8 days of storage in ice by Quantitative Descriptive Analyses.
R = raw, C = cooked,
A = appearance,
O = odour, TE = texture,
TA = taste.

Conclusion

- These results are very useful for further market research identifying unique selling points for farmed turbot.
- The shelf-life of farmed turbot can be up to 9 days longer than for wild turbot. This shows that turbot of prime quality can be produced in aquaculture. This is an unique opportunity for farmed turbot, as specified by both farmers and their customers.
- For the first time a clear sensory profile of farmed and wild turbot was produced, using Quantitaitive Descriptive Analyses. Farmed turbot had a typical non-fishy taste and can be described as having a firm texture, a chicken-like taste and a potato like odour. Post killing methods can influence the sensory quality, which then approaches characteristics of wild turbot.

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