WEFTA Conference in Tromsø 9.-11 October 2013

Mechanical killing and bleeding

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Introductions

The limited number of crew members on-board fishing vessels, combined with high capture efficiency limits the ability to bleed the fish in a proper way. It is not unusual that large hauls of fish, can be kept in storage bins for hours before bleeding and gutting. The last fish in the storage bin are often dead long before bleeding, and this leads to insufficient exsanguination and muscle discoloration (Margeirsson et al., 2007; Rotabakk et al., 2011; Olsen et al., 2013). The fish should be bled as soon as possible after catch and preferably immediately after capture, but this is difficult for trawlers and Danish seine vessels. The results from a series of projects point to the fact that more than 90 % of these catches may be kept alive in tanks on board the vessels. Keeping the fish alive on board the vessel for several hours prior to slaughter leads to better handling, bleeding and whiter fillets (Midling et al., 2012; Olsen et al., 2013). However, after a longer period in live fish tanks the fish recuperate and may be difficult to kill and bleed. Today mechanical percussive stunners, which also enhance bleeding immediately after stunning, are used on farmed fish (Midling et al., 2008). Such mechanical stunners could be utilized in catch handling on board fishing vessels to ensure that catch handling becomes efficient and safer. Through a project financed by the Norwegian Seafood Research Fund (FHF), Nofima has tested the stunning and bleeding technology from the Australian company Seafood Innovations by using the machine SI-7 Combo, which kills and bleeds the fish in one operation. Experiments were conducted on board two coastal fishing vessels.

Materials and methods

The efficacy of the machine (SI-7 Combo) was measured on board the M/K Kildin from Båtsfjord. The machines were placed directly on the receiving bin, resulting in poor working conditions. Despite this, more than 30 cod per machine were killed and bled. Quality defects, caused by improper bleeding were evaluated on the de-headed gutted fish (n=20) and fillets (n=20) according to Rotabakk et al. (2011).

Figure 1. The mechanical killed Atlantic cod showed no behavioral response or movement after the blow and hemorrhages in the brain indicate instant death.

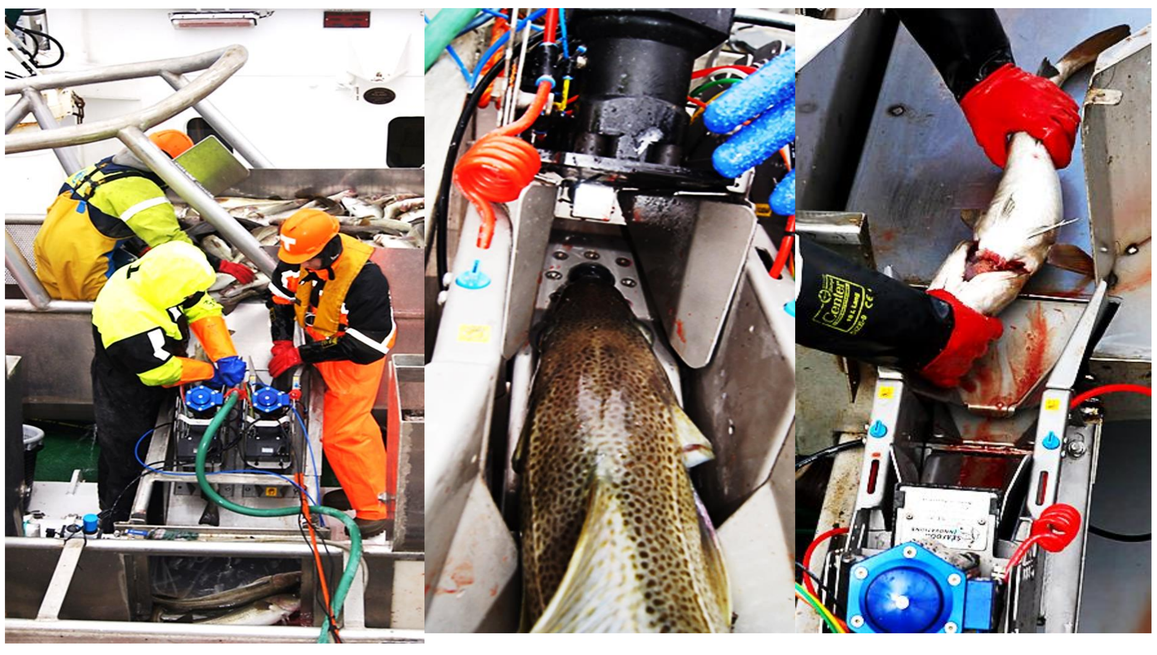

Figure 2. The fish is feed into the machine and stunned with a blow from above while the throat is slit immediately from below.

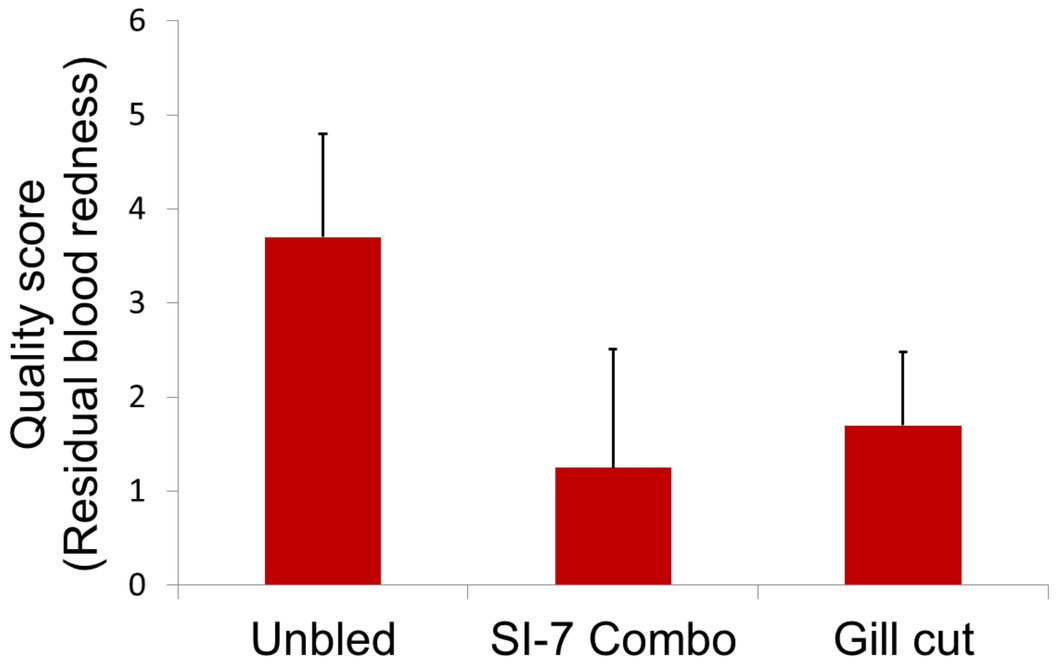

Figure 3. Average (mean ± SD.) quality score (discoloration and residual blood) in Atlantic cod (n=20) muscle as a response to different bleeding methods.

Results

The machine's ability to kill the cod was documented by looking for blood or bruises in the brain. Heavy hemorrhages indicate instant death (Figure 1). The Australian machines are designed for harvesting salmon, and thus did not give optimal results regarding efficient and steady bleeding of cod. Subsequently, adjustments were made to the knife and the entry to the machine to make it fit the cod's head shape (Figure 2). A new stunning and bleeding experiment was then conducted on board the M/K Bernt Oskar from Moskenes. The adjustments of the machine improved the results and provided equivalent bleeding to traditional manual methods, such as throat or gill cutting (Figure 3). Our conclusions is that this machine can be effectively utilized for on-board catch handling in fishing vessels and their use would make the process more efficient as well as safeguarding the quality of the fish.

References

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