

Catch quality parameters & fishing gear

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matís



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Presentation Outline:

- Intro to an on-going Matís project
- Catch quality parameters
- Use of official data
- Industry data
- Quality evaluation methods



Ongoing Matis project to evaluate catch quality

Aims to evaluate catch quality from different fishing gear or fishing methods:

- Comparison measurements (physical, chemical and sensory evaluation)
- Industry interviews and surveys (anonymous)
- Data analysis, existing official data and also from the industry and market

Limited Icelandic research available on a direct and comprehensive comparison



Can we respond to general statements with reliable data?

- Line-caught fish is the best quality!
- Trawled fish has better processing qualities!
- Catch from costal fisheries is poor quality!

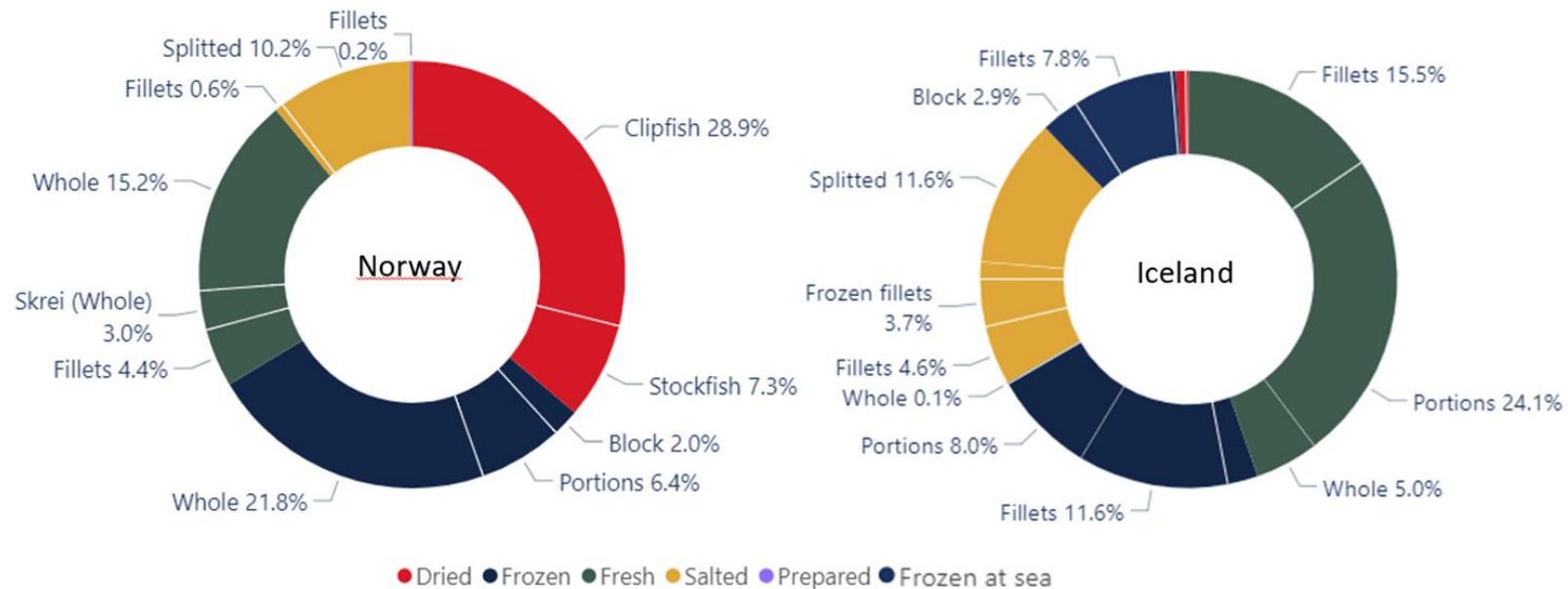
The goal is to unobjectively assess the quality and to identify improvement measures

Quality demands depending on different products

What is quality? A conformance to specifications?

Importance of uniform quality to the seafood industry! To meet the consumer expectations.

Comparison of Norwegian and Icelandic cod export products

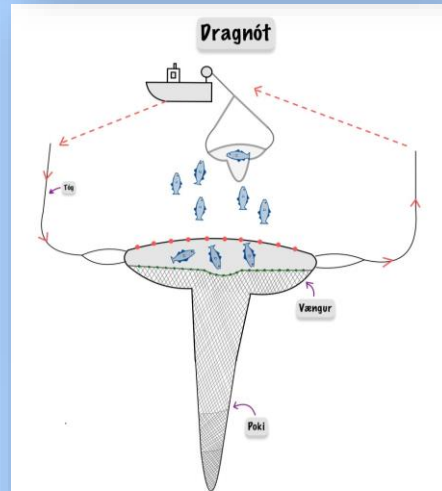
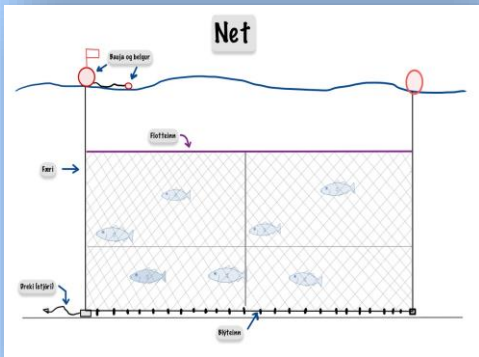
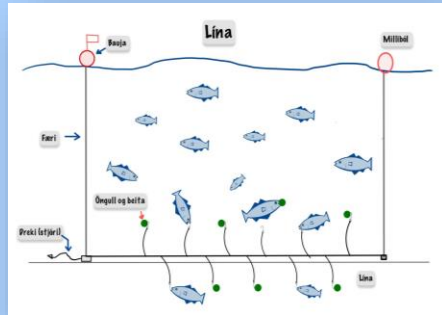
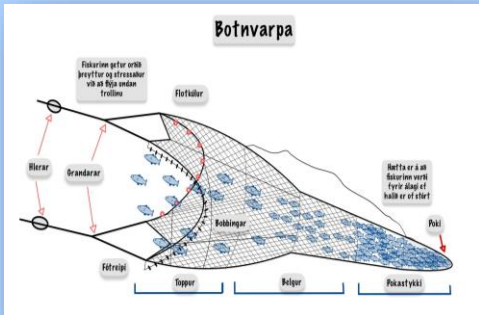


Challenges of QC in wild fisheries

Fisheries quality parameters and impact factors:

Biological	Environment	Fishing and handling	Processing
Length and weight	Seasonal	Fishing trip time	Cold storage and time
Thickness	Fishing zone	Fishing gear impact	Machinery type and settings
Age	Food	Towtime	Grading and handling
Maturity	Parasites	Haul sizes	Processing lines
Guts ratio/viscera	Nematodes	Bleeding and gutting	Processing temperature
Condition factor	Weather	Onboard handling	Throughput and utilization
Origin		Storage	Human factors and sanitation
Natural muscle condition		Temperature	
Texture		Human factors and sanitation	
Chemical/physical properties		Blood spots	
		Rigor mortis	

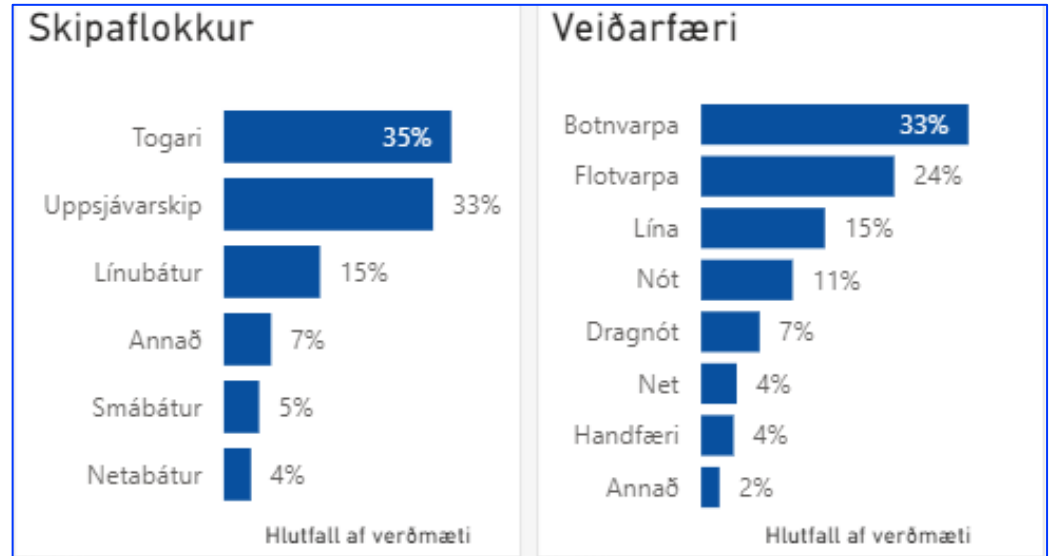
Fishing gear impact



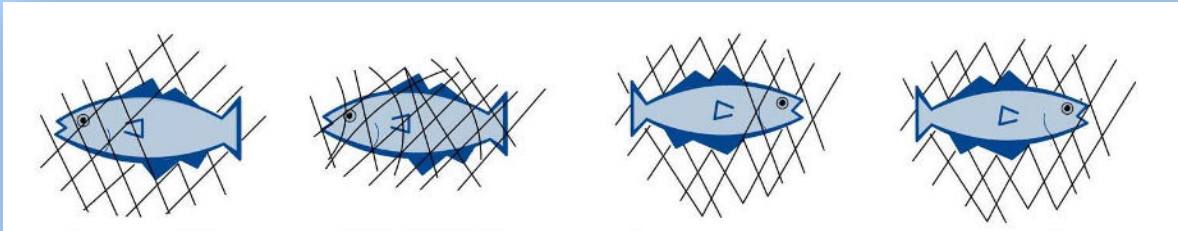
Fishing gear impact on:

- Quality parameters
- Fisheries economy – cost vs efficiency
- Carbon footprint

Defined by Vessel type Or Fishing gear



Quality evaluation methods

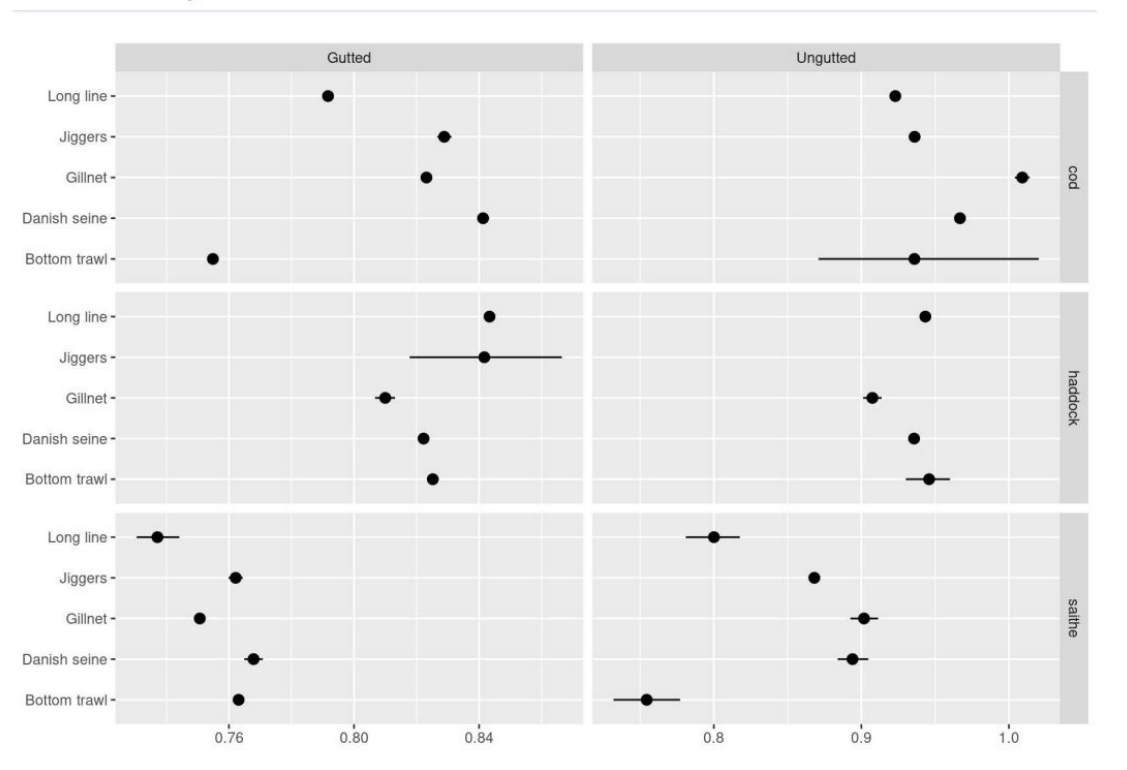


Catch-damage-index scheme for cod and other white fish captured by gillnet, Danish seine, longline or handline.

Damage	Description	Score
Dead in gear	Flawless: Live when brought onboard	0
	Serious: Distinct dead-fish character. Stronger red discolouration on skin, off-smell in belly, scale loss and skin abrasion, much remaining blood in vessels, belly and cuts	2
Gear related damages	Flawless: No marks from gear	0
	Moderate: Stripes in the skin, fin damage	1
	Serious: Deep marks in skin/muscle causing blood extravasation and/or crushing.	2
Bruises	Flawless: No red discolouration on skin	0
	Moderate: Red discolouration in located below the pectoral fin or close to the tail fin	1
	Serious: Red discolouration located above the pectoral fin or in the tail and mid-part	2
Gaffing damages	Flawless: No incision other than in head	0
	Moderate: Incision in belly/tail	1
	Serious: Incision in loin/back	2
Poorly bled	Flawless: Empty blood vessels, white neck/belly	0
	Moderate: Some blood remaining in belly vessels	1
	Serious: Blood in vessels, blood in neck/belly	2
Skin abrasion	Flawless: Undamaged, glossy skin, no descaling	0
	Moderate: Minor descaling	1
	Serious: Severe descaling, perforated skin	2
Pressure injuries	Flawless: No injuries	0
	Moderate: Squeezed in tail part (behind anus)	1
	Serious: Broken back, squeezed in loin part	2
Biting injuries	Flawless: No injuries	0
	Moderate: Damaged fins/tail	1
	Serious: Deep wounds/bite marks	2

Quality parameters from official data

Quick analysis - Fulton



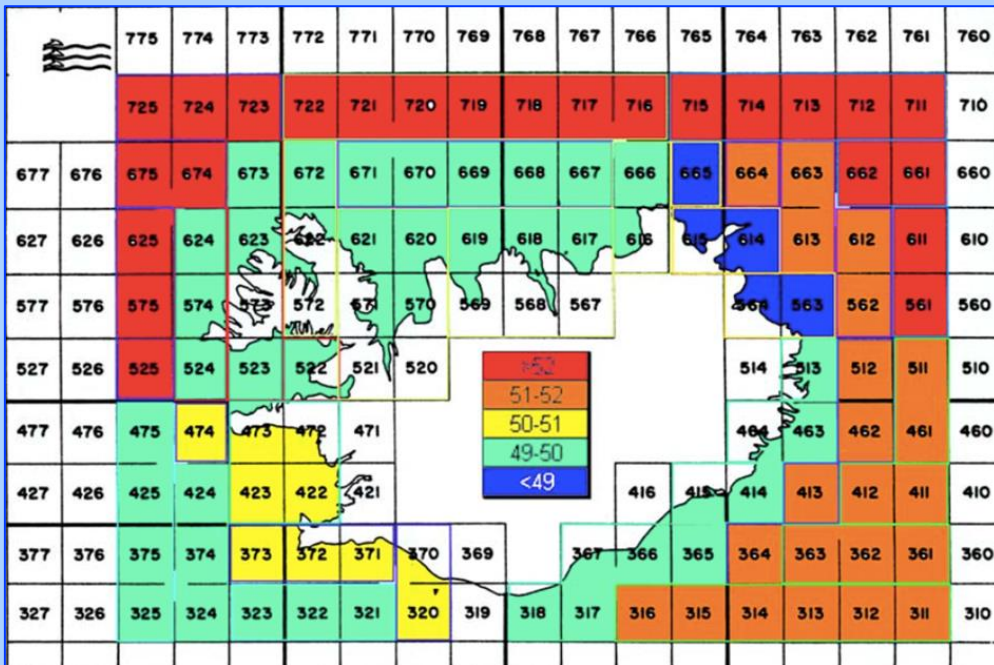
Very limited data from Statistics Iceland and Directory of Fisheries to link directly to quality parameters.

From the Marine & Freshwater Research Institute we have reliable data on the

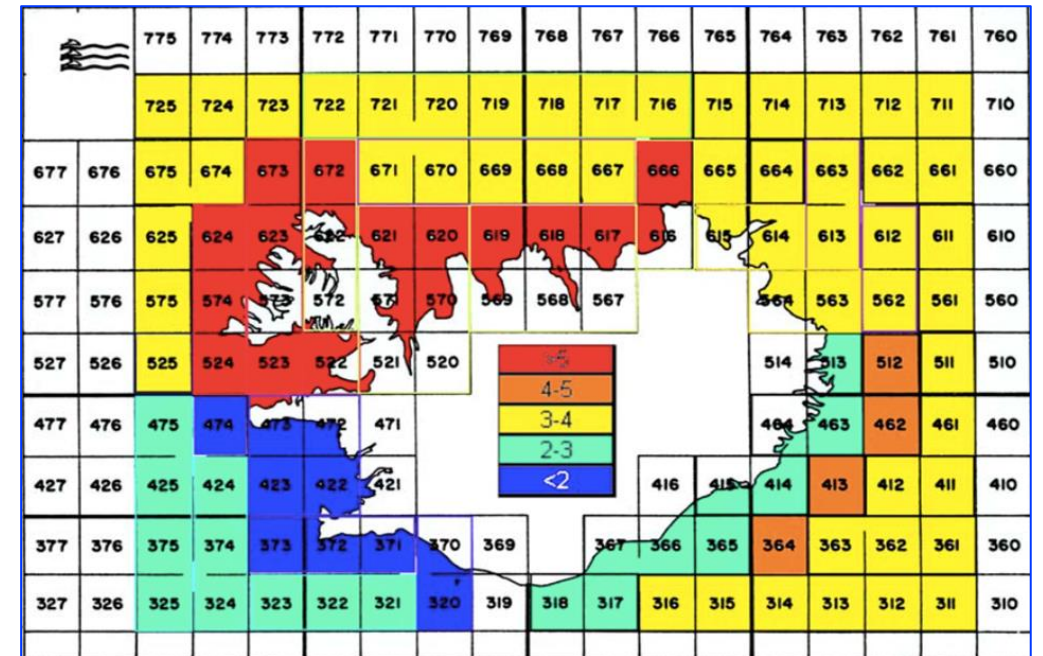
$$Fultons\ condition\ factor: K = \frac{W}{L^3}$$

an accessible parameter from semi-official data

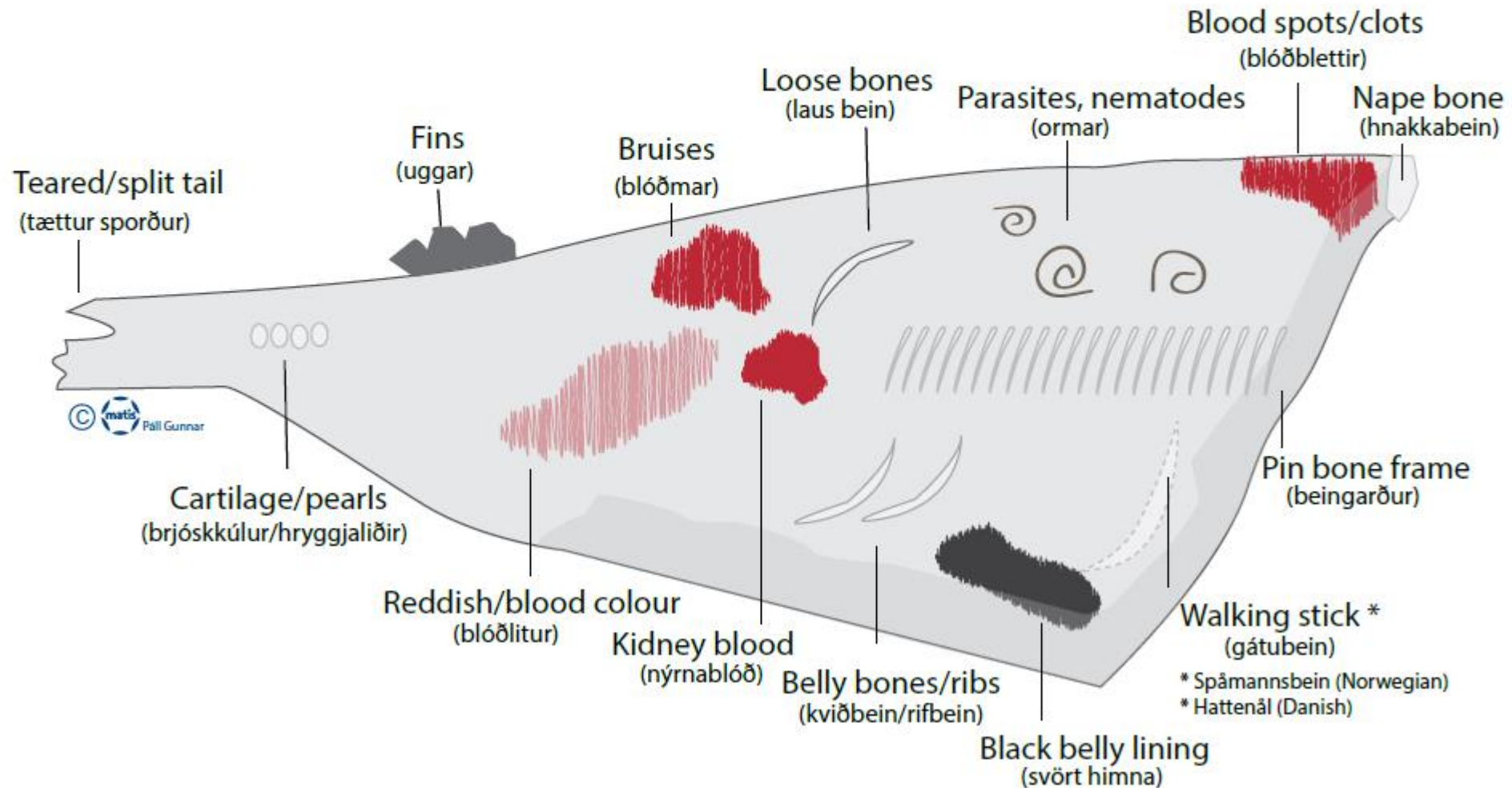
Quality parameters linked to fishing zones



Prior study from industry data



What to look for !



What to look for !



Processing QC

Tafla 7 - Mat fisks af skipum Samherja í vinnslu

	Anna	Björgúlfur	Kaldbakur
Nýting	1	-0,06%	-0,13%
Ormur/kg	+0,37	+0,07	1
Þunnildaormur/kg	+0,86	+0,20	1
Blóð/kg	1	+0,11	+0,14
Holdroði/kg	1	+0,23	+0,31
Los/kg	1	+0,09	+0,09
Meðalstærð kg	-0,54	-0,39	1

new screen

Illa kvíðrist	0	x
Hálsbrot	0	x
Ormar í þunnildi	6	x
Aðrir ormar	1	x
Blóð (1=4x4)	3	x
Holdroði (1=4x4)	0	x
Los (1=4x4)	10	x



Standardized quality specifications?

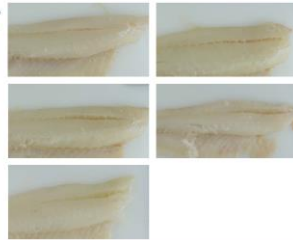
Head bones

If not beheaded correctly, some head bones can be attached to the loin file.
These bones have to be trimmed away.



Gaping along loin

The gaping line in the loin is due to damaged connections between two separate muscles. This gaping can be very thin being hardly noticeable to total separation of the muscles.
The gaping line and the separation of the muscles are due to strain on the fish flesh caused by "bad" handling, throwing the fish, vertical drops in the processing deck or by the filleting gear.

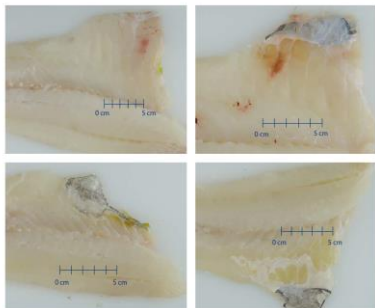


Bile spot or yellowish colour

Bile stains, liver stains or other yellowish discoloration of the fillets are more likely only on the belly flap are due to not gutting the fish immediately after catch or damaging the intestine when bleeding the fish.

Any aggregate area of discoloration is a defect when $> 0,1 \text{ cm}^2$ (10 mm^2) pr. fillet or portion.

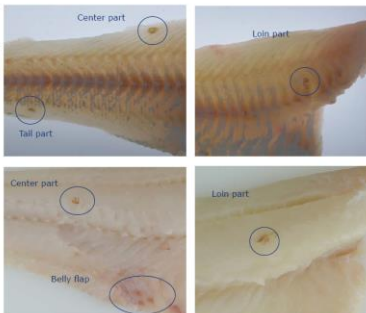
Should not be present in high quality products.



Nematodes

Nematodes can be found in all parts of the fillet and on both sides.

Nematodes can be buried deep in the musculature and thus not visible by candling and visual inspection, which are the traditional detection methods.



Gaping, scoring system



Skin residues

Remains of outer skin are counted as a fault pr. fillet or portion. Parts of skin $> 5 \text{ mm}^2$ ($0,05 \text{ cm}^2$) is considered a defect.

The acceptable limits for size and ratio of defects in products can vary in agreements between seller and buyer (as for many of the faults discussed)

Presence of scales in skinned products are considered as a fault if noticeable loose scales are more than 5 pieces pr. fillet or portion.

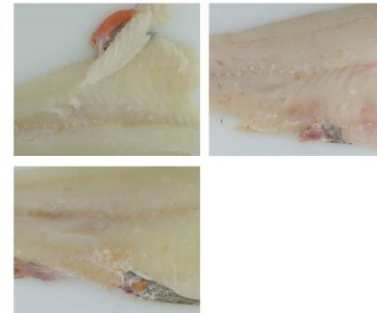


Intestine residues

Intestine residues on fillets are due to improper gutting process and/or the filleting machine is not correctly adjusted.

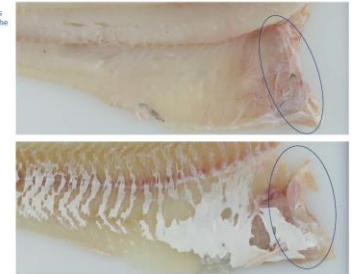
Parts of gut $> 5 \text{ mm}^2$ ($0,05 \text{ cm}^2$) is considered a defect pr. fillet or portion.

The acceptable limits for size and ratio of defects in products can vary between agreements between seller and buyer (as for many of the faults discussed)

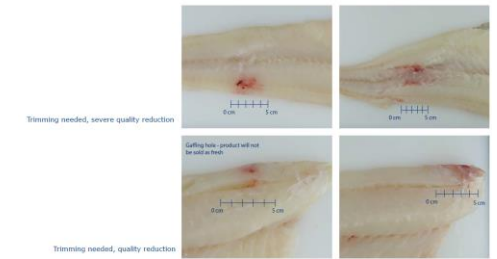


Collar bone

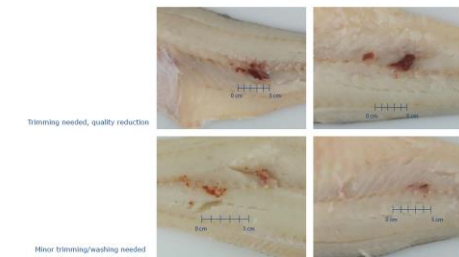
Usually the collar bone is removed by beheading of the fish. If the collar bone is attached to the fillet after processing of the fish, it must be removed by trimming.



Bloodspots / Bruises



Kidney blood - removed by cutting/washing



Fins

Sometimes the fins are still attached to the fillet after filleting.

The fins and cartilage have to be removed by trimming.

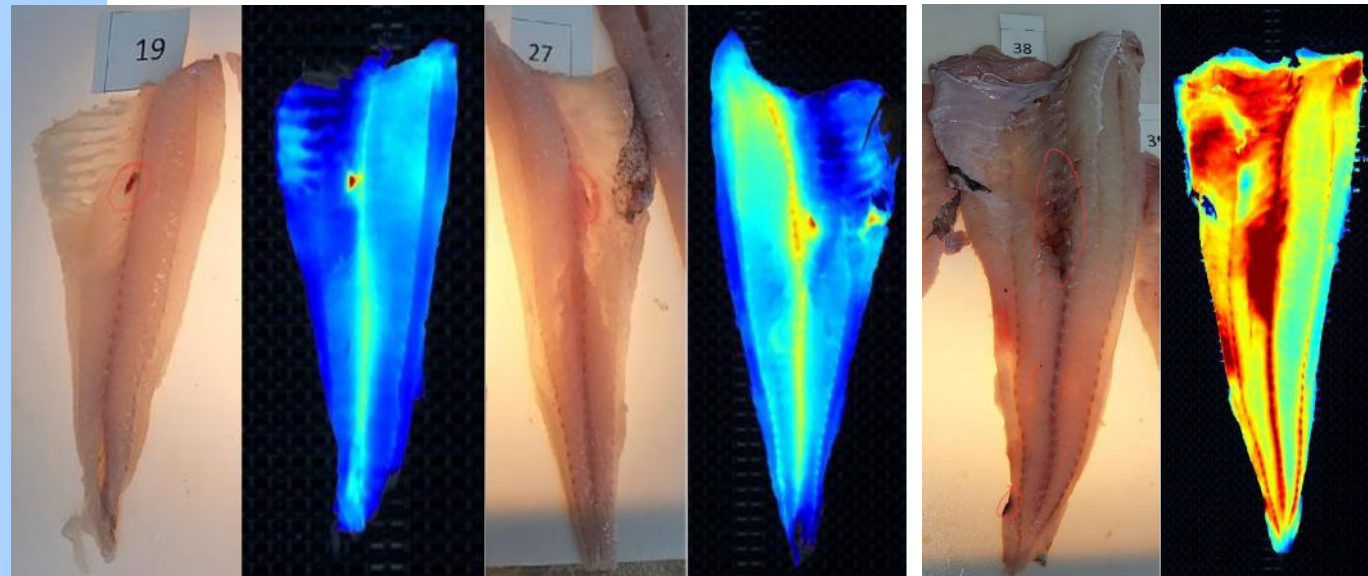
Example of fins remaining on fillets after skinning are shown in the pictures.



Automatic QC - hyperspectral



Can also be used for whole fish

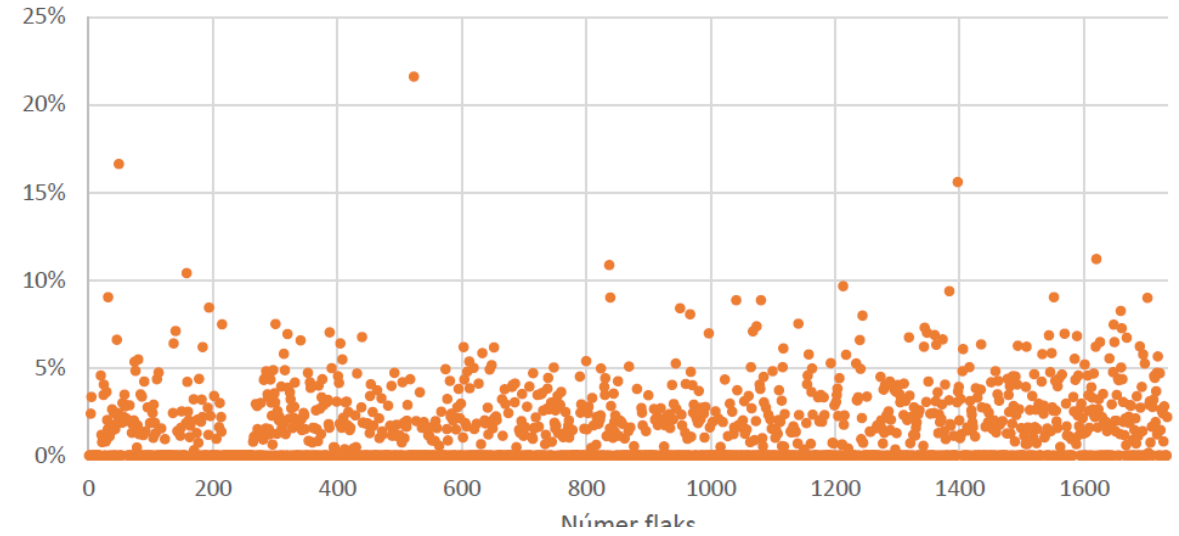


Automated QC



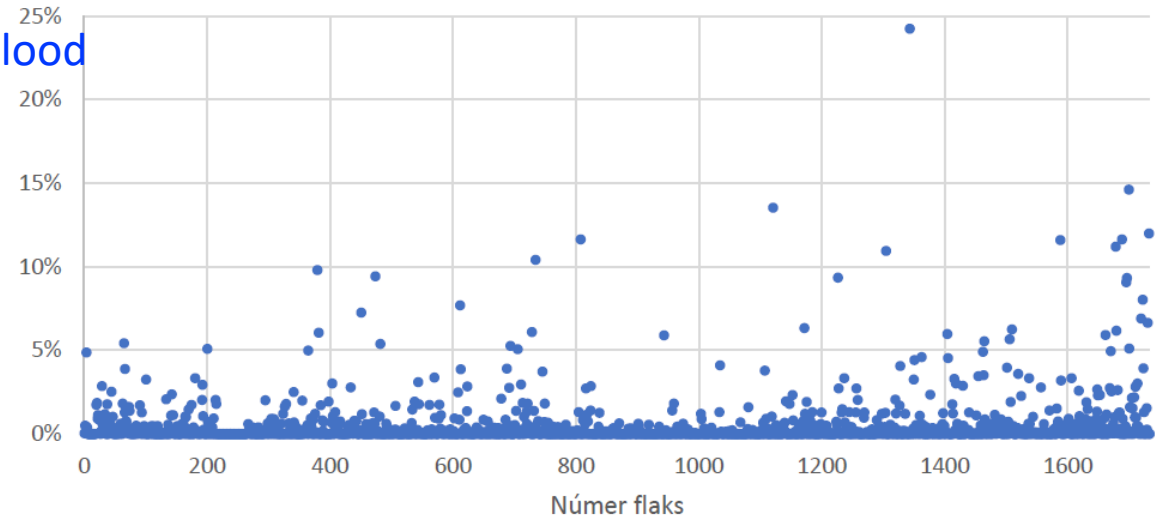
Gaping

Hlutfall galla

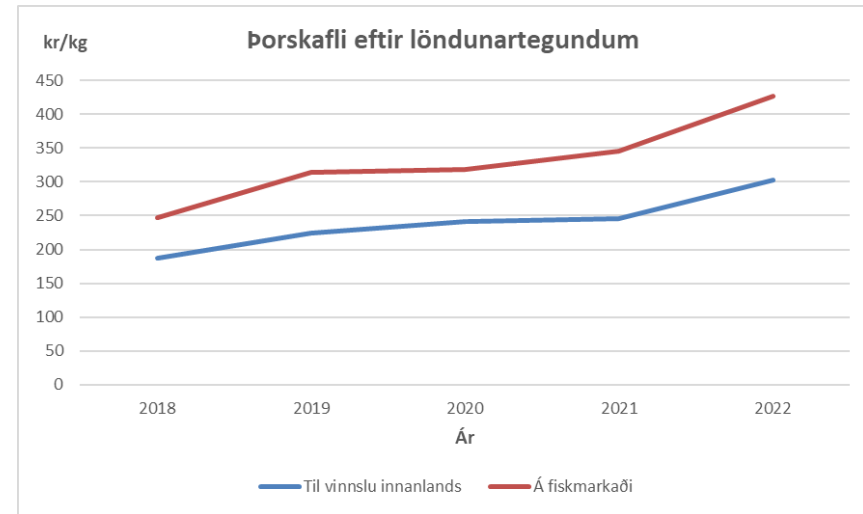


Bruises/blood

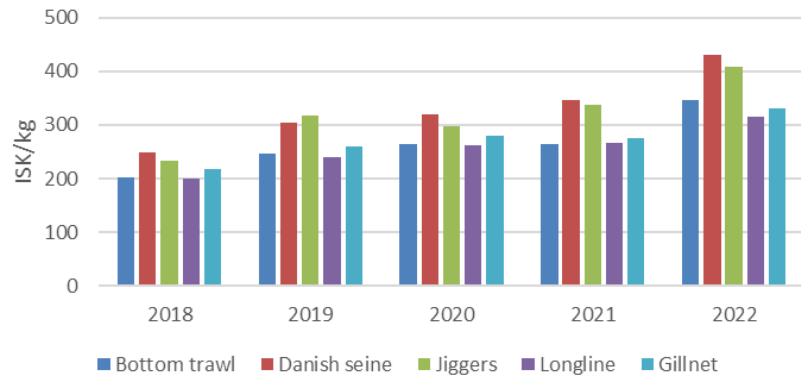
Hlutfall galla



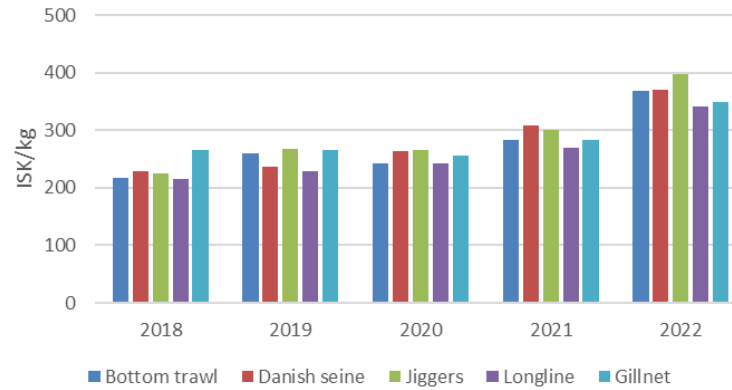
Price - quality - fishing gear?



Cod



Haddock



Saithe

