Bedøvelse avliving av fisk med strøm kombinert med hodekapping. Hva har skjedd siden CO2 ble faset ut, fiskevelferd og kvalitet. Effekt på utblødning og velferd.

Welfare of farmed fish from harvest to killing- Meeting the future challange

(Farewell)

UiB, Nofima, Havforskningsinstituttet i Bergen, Akvaplan, Wageningen Imares, Marine harvest, Grieg seafood, Bremnes seashore, Lerøy, Seaside, ScanVacc

Finansiert av Industri, NFR og FHF

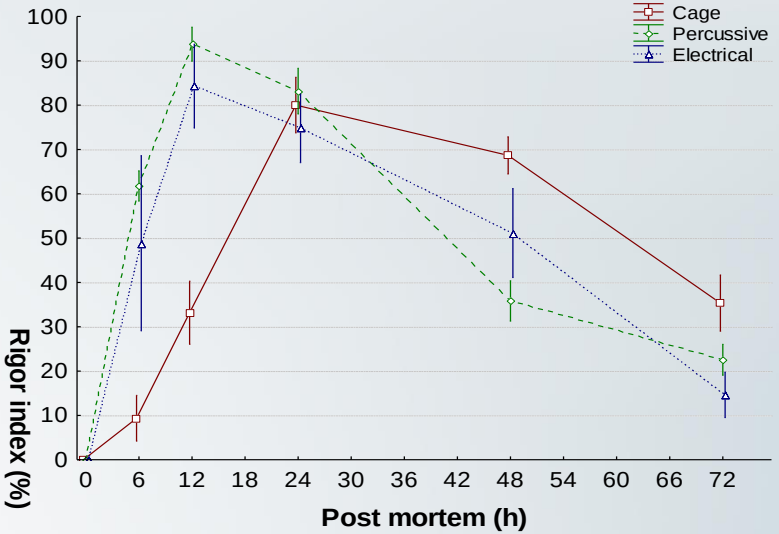
Focus was stunning methods- Salmonids

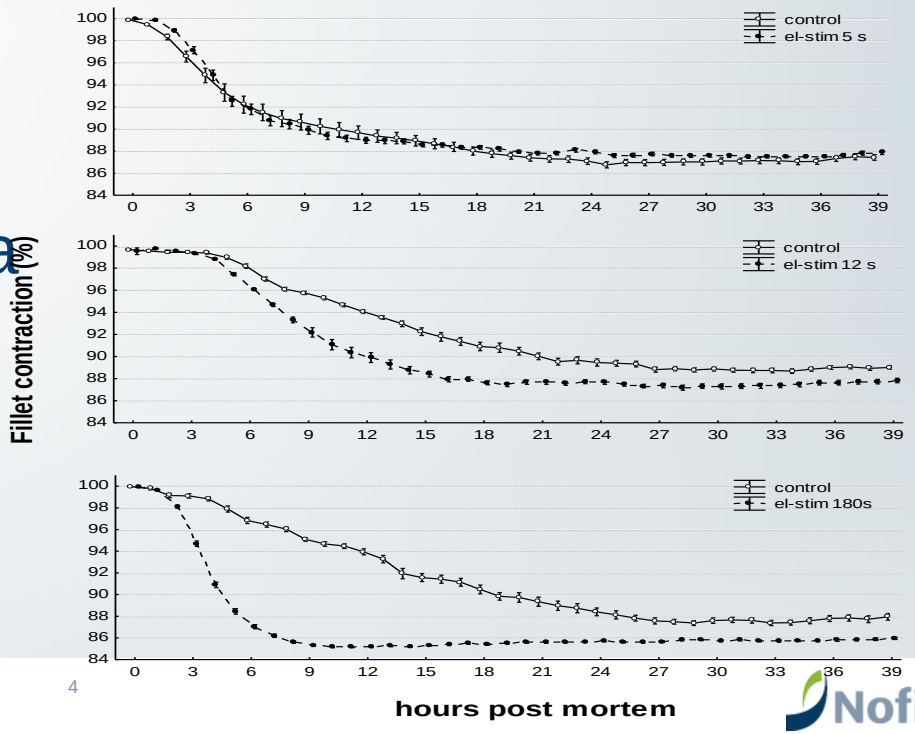
- Electrical stunning
- Percussive stunning
- Gas stunning
  - N2/CO/CO2
- Effect on
  - Welfare
  - Quality

Results

- Results from Fillet-O provided much of the grounds for todays legislation.

- Ban on gas
- 0.5 s stunning criteria
- Focus on mass slaughter/ processes





Next was Live chilling/low CO2

- Project between Marine Harvest, IMR, Nofima and Akvaplan-niva
- Focus on livechilling w/wo CO2
- Controlled tunnel respirometer experiments
- Commercial practice

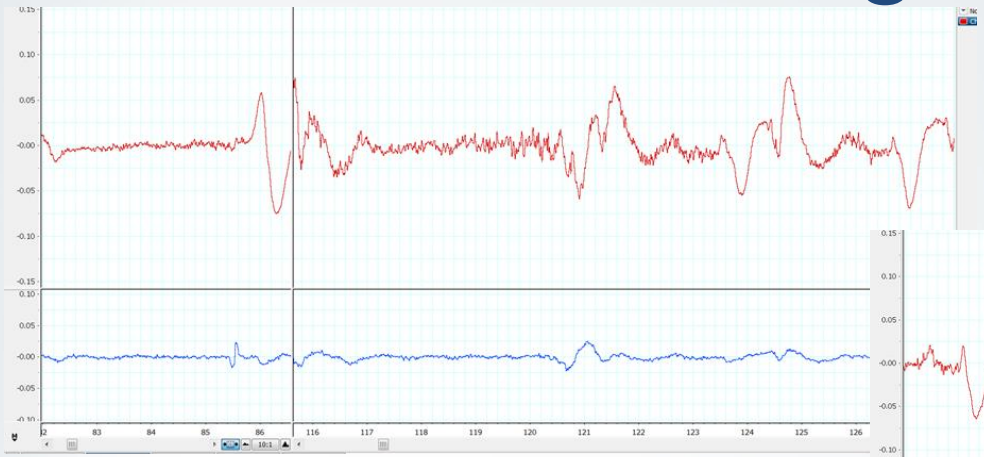
- Results did show that slow immersial of CO2 worked against it pupose (suffecation)
- Should be more than less in order to stun the animals uncoinscious
- Salmon had a good tolerance to cold.

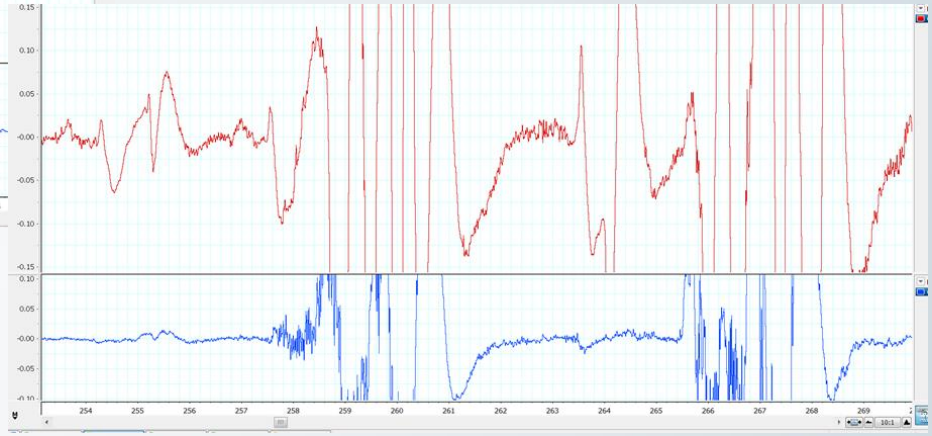
What about other species?

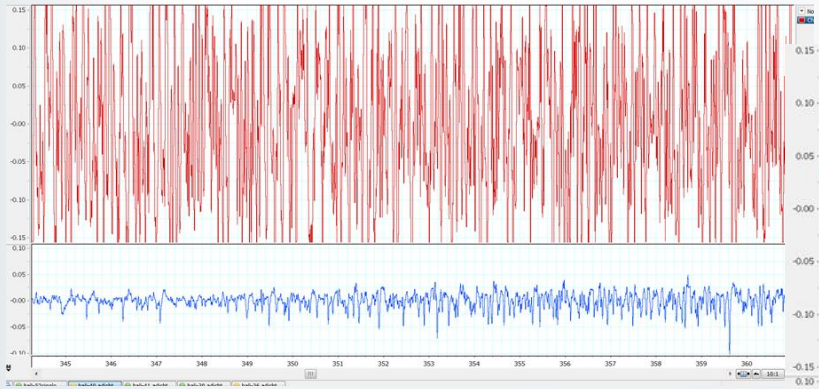
- Turbot (EU Turpro/ Maxiumus). Easy to stun, hard to kill. Sensitive to thermal shocks.
- Halibut.. prone for injuries. Tough fighter. Sensitive quality. Tolerant for thermal shocks and hypoxia
- Artic Charr. Tolerant to thermal shock,

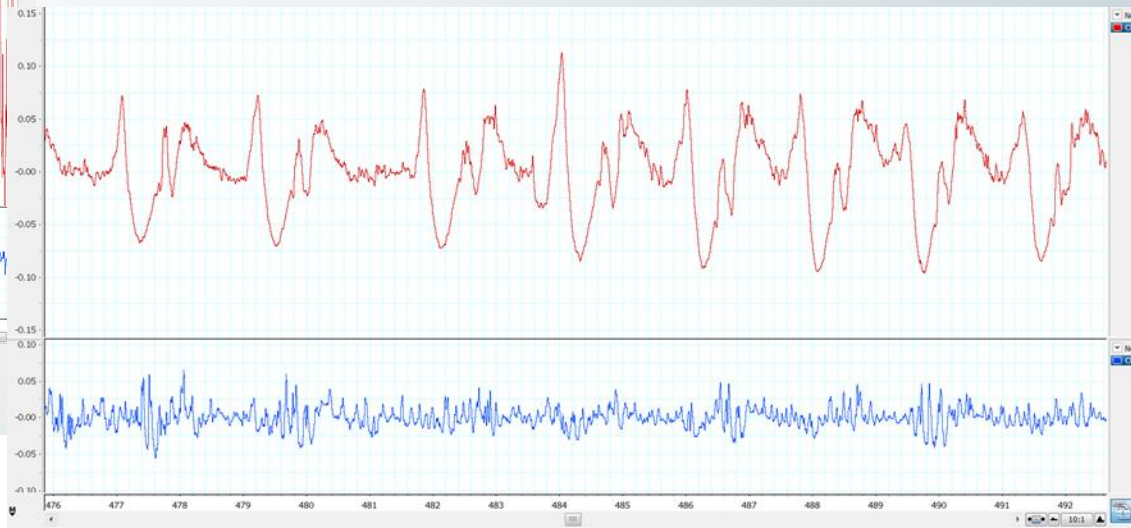
- Halibut was a specie like Eel. Tough to stun and kill.
- May CO2 or pecussive stunning be the only solution?

CO2 and stunning of Halibut

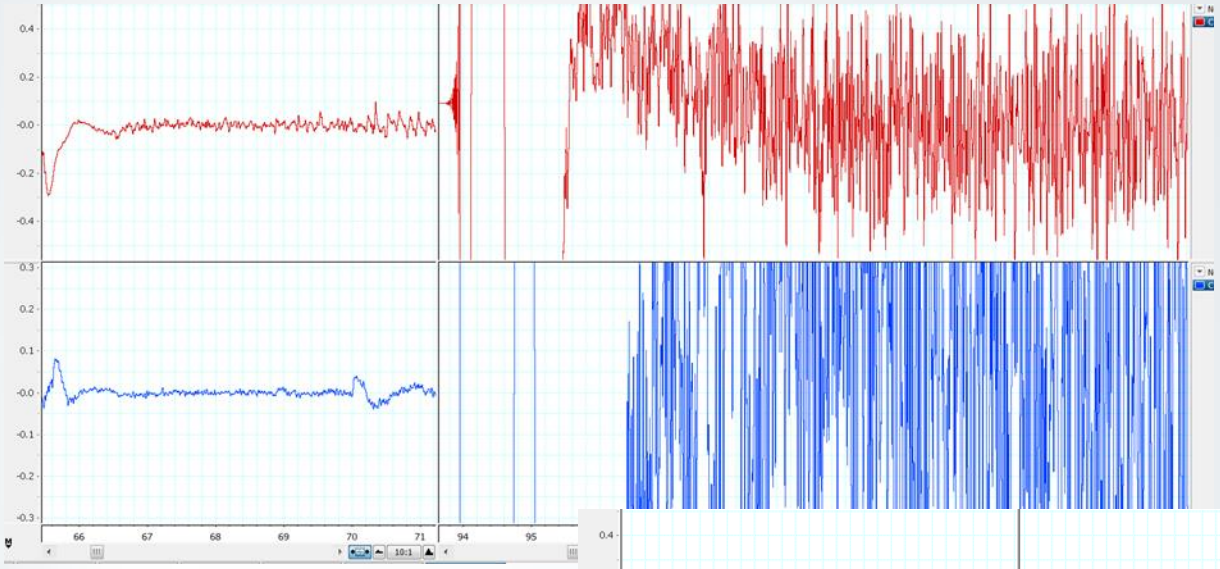


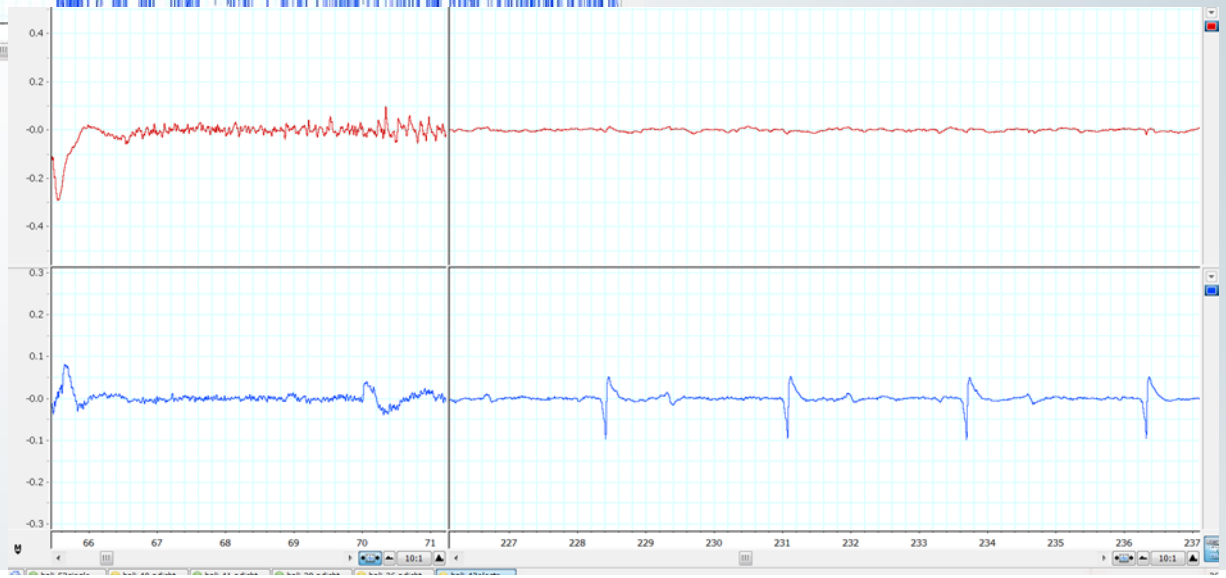






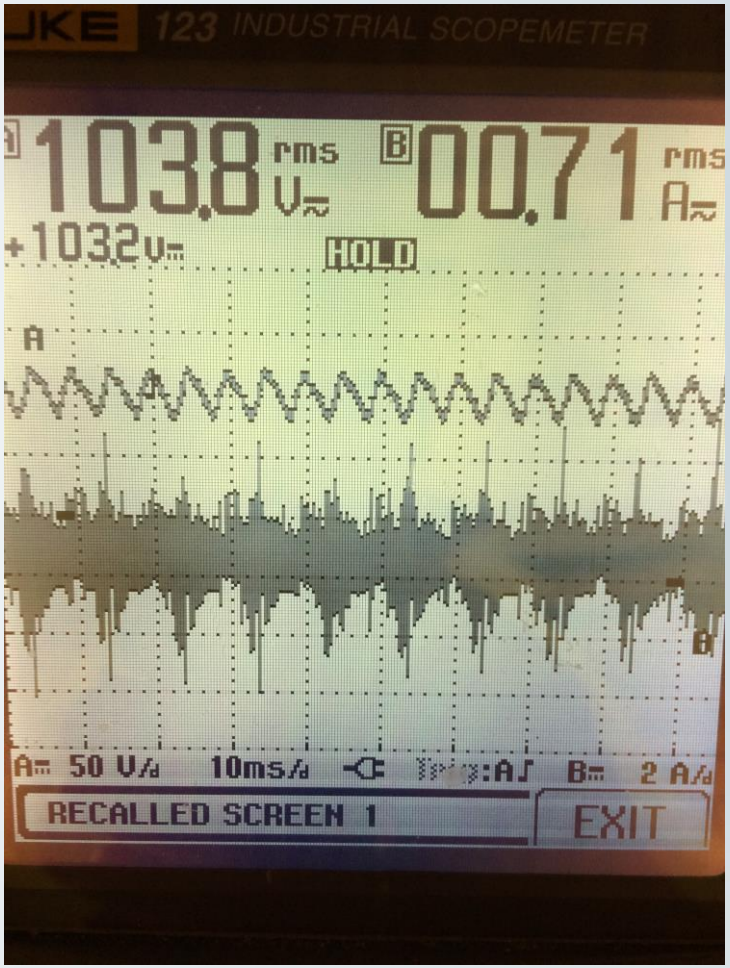
Halibut- Electrical stunning





Clenerfish-Brass (FHF-project)

- Research on all brass species show that they can be stunned within 0.5 s
- 110 V AC+DC (salmonstunners)
- Can be stunned at salmon process facillities
- Should be combined with a mince



Nofima

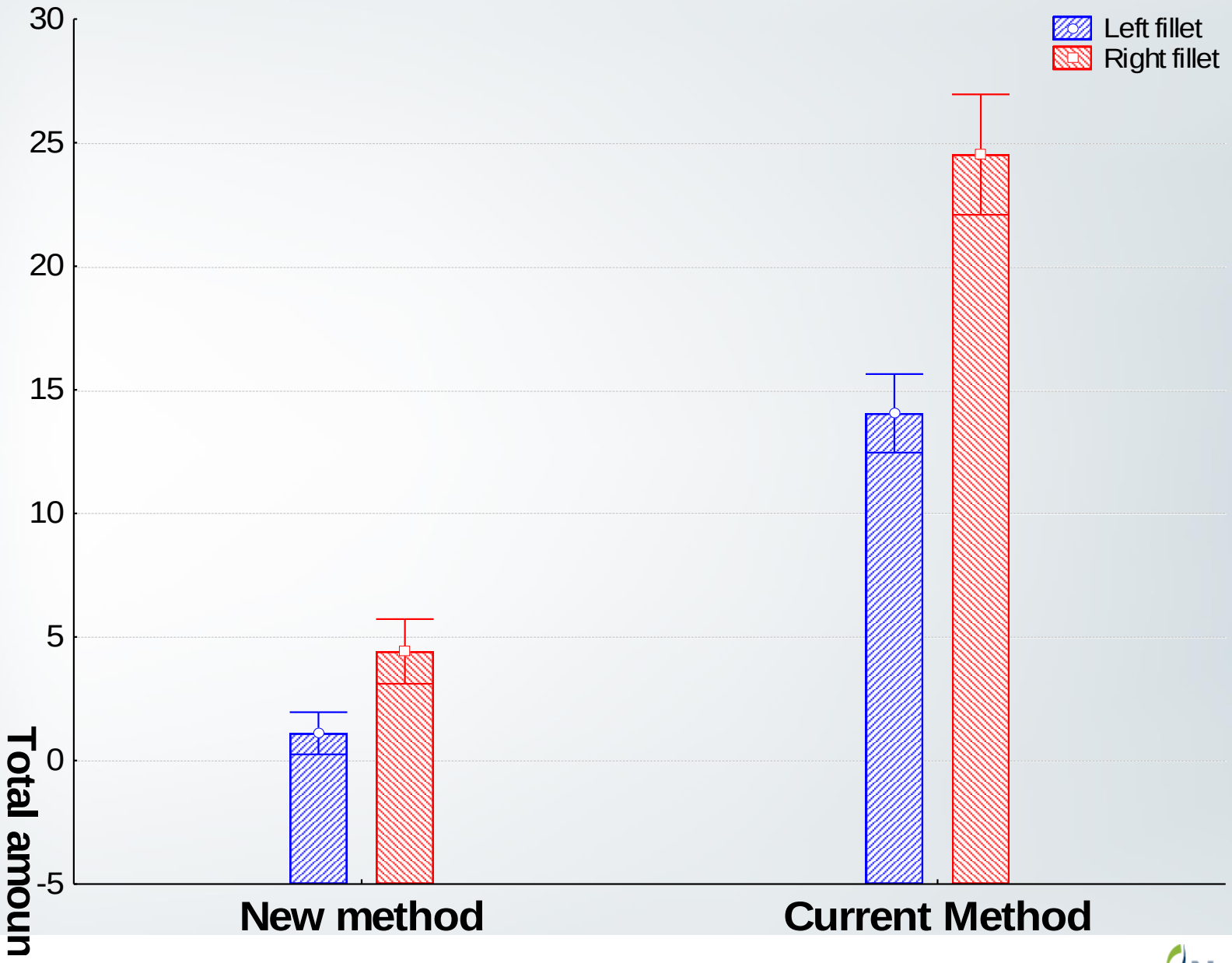
Lumpsucker

- Cannot be stunned med AC+DC
- Cheap technology with 220 V, 50 HZ in 5 s is Ok
  - Stunned within 0.5 s
  - 90 % mortality
- Burnmarks reveals resistance
- Should be combined with a mince

Direct filleting-Blood removal

- For removing blood serveral questions will arise important for the logistics and economy.
- First is how long does it take to empty the fillet for blood by spray washing 1,2… 10 min?
- Do we need to use gravity?
- How much water will the fillets suck-up and of this weight gain, how much will be lost and were?
- Will the proteins denaturate og pigment oxidised in contact with sweet or salt water?
- What are the hygiene risks in such production line?

Nofima


30
25
20
15
10
5
0
-5
Total amoun
Left fillet
Right fillet
New method
Current Method

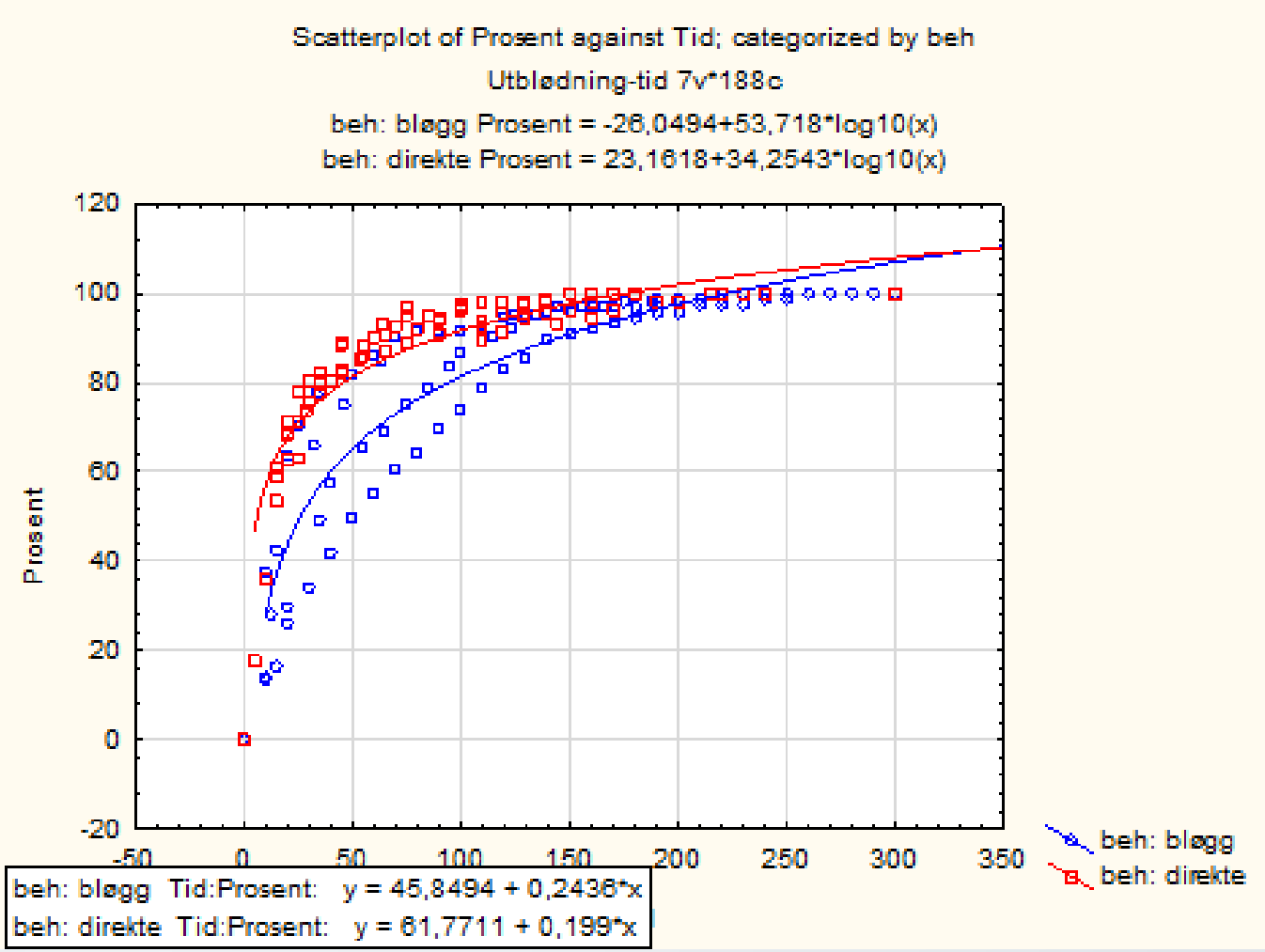
Direct Processing: Can be done!!!

- Electrical stunning in combination with decapetation offers a 100 % killing method according to welfare standards.
- Majority of blood will be removed within minutes.
- Blood from the muscles requires more time, gravity is therefore important, meat down or skin off.
- Fillets can be washed.

Why decapatate after stunning?

- Improved welfare. A 100% kill
- Fish becomes oriented
- New products:
  - Get raw blood 1.7-2 % within the first minute.
  - Salmon head
- Skip gutting machines
- Gravity treatment (Hygiene)
- Space efficient, no tanks
- Hygiene barrier
- Direct filleting

Blood removal- Time



Takk for oppmerksomheten

www.nofima.no