

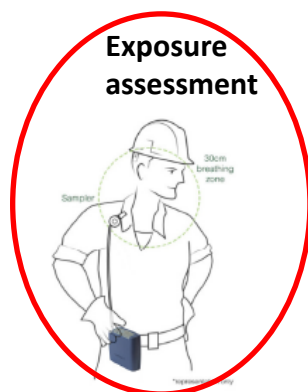
Bioerosol exposure among Norwegian salmon processing workers

- **INTERNATIONAL FISHING INDUSTRY SAFETY & HEALTH CONFERENCE (IFISH) 6**
- **JAN 8TH-12TH 2024, ROME**

Marte R Thomassen, Anje Christina Höper, Maja Linchausen, Berit Bang, Miriam Grgic, Anna Nordhammer, Hans Thore Smedbold, Jorunn Kirkeleit, Magne Bråtveit, Bjørg Eli Hollund



Study timeline (one year)



Personal (and stationary) measurements

Health assessment



Exposure assessment

Total protein
Endotoxin
Allergens
Enzyme activity

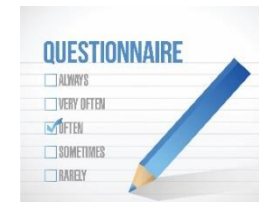
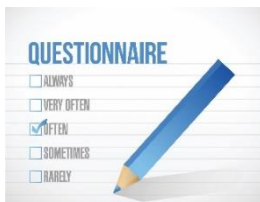


Exposure assessment



Personal (and stationary) measurements

Health assessment



Objective

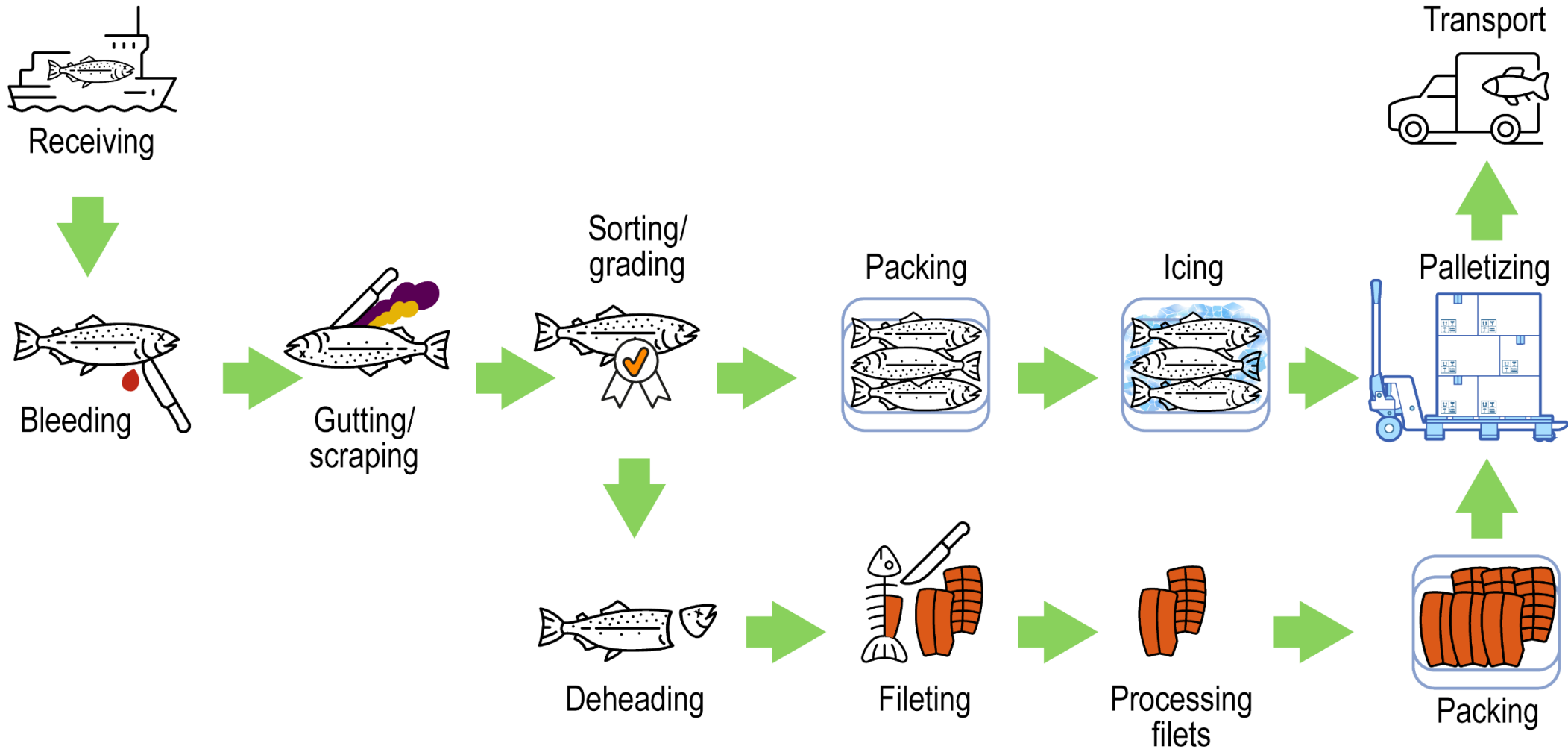
We aimed to characterize **personal exposure** to inhalable **total proteins** and total **endotoxins** across plants, departments and work tasks in the Norwegian salmon processing industry.



9 participating plants at 3 locations

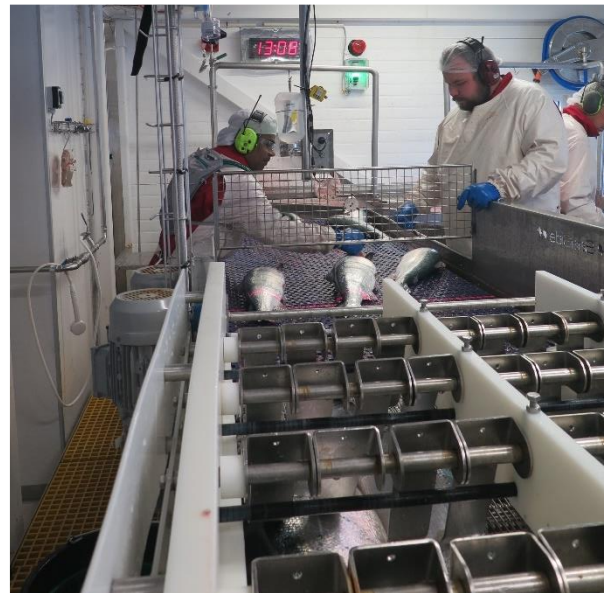


Work tasks



Divided into three main areas

- Slaughtering department



pictures: SHInE group, field photos taken with consent



Divided into three main areas

- Filleting department



pictures: SHInE group, field photos taken with consent

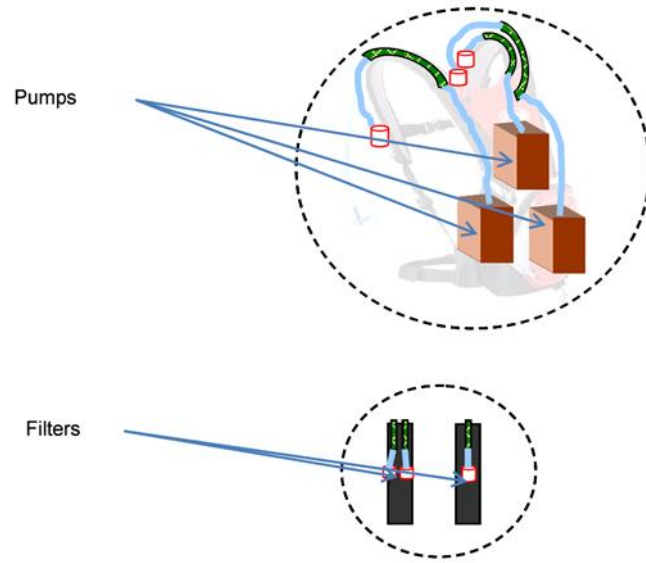


Divided into three main areas

- Other (supporting work tasks to processing)



Personal samplers

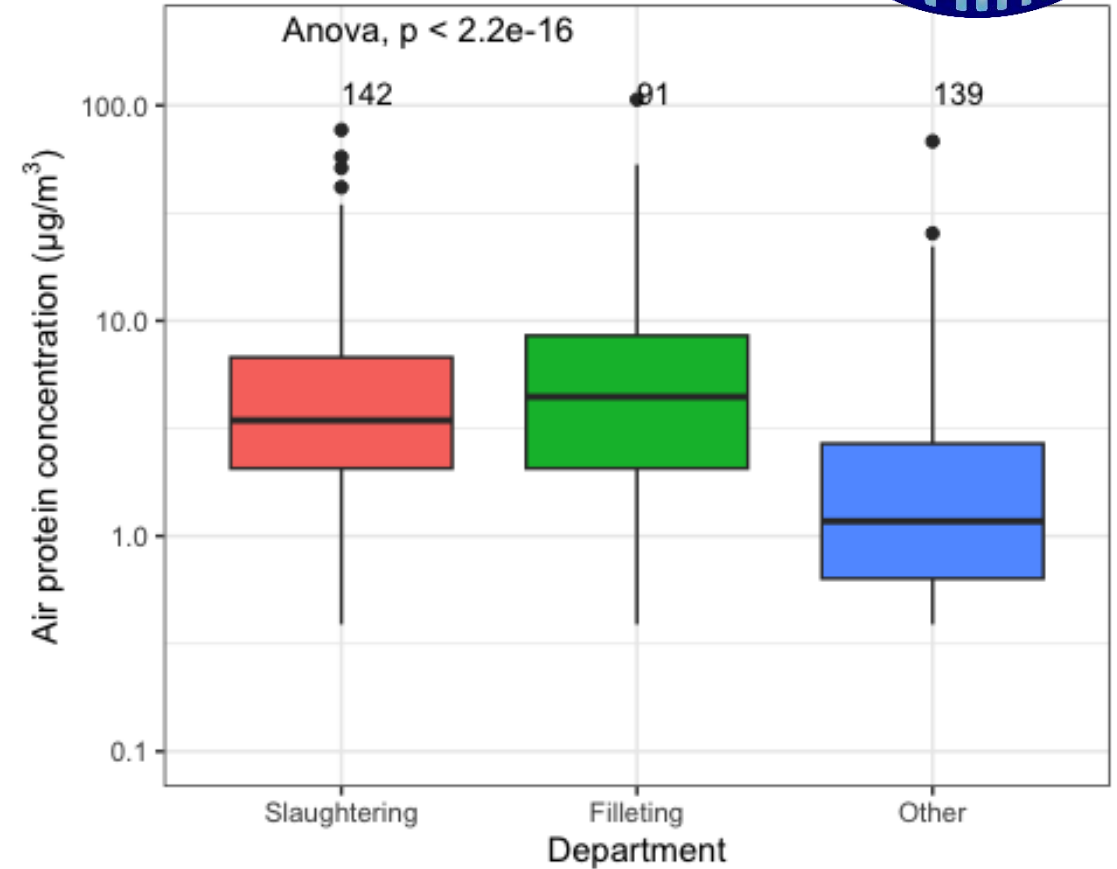
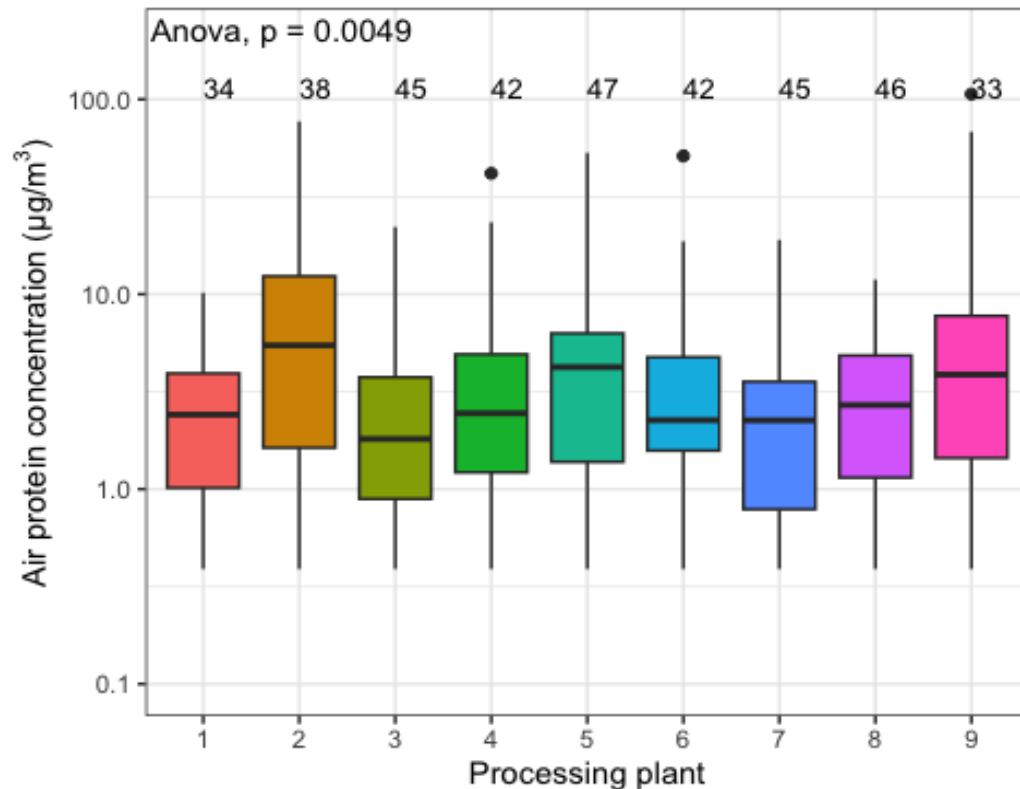


pictures: SHInE group, field photos taken with consent



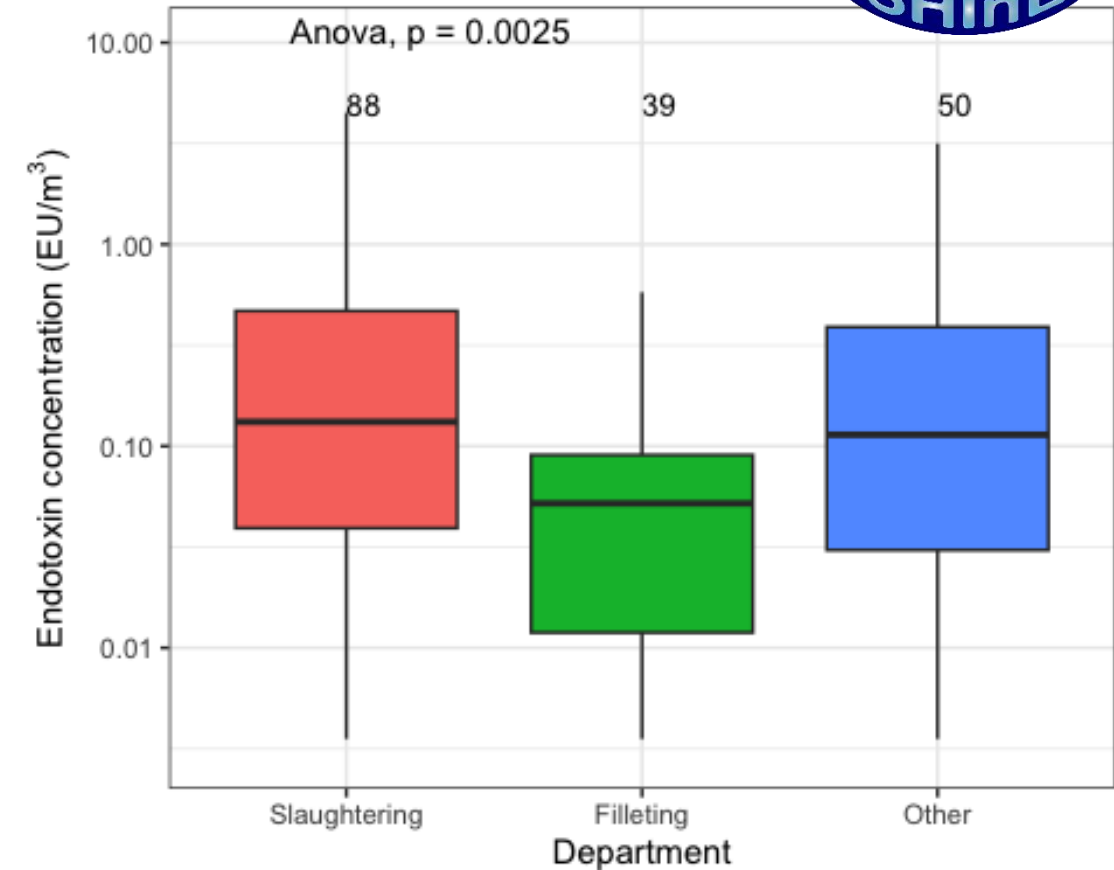
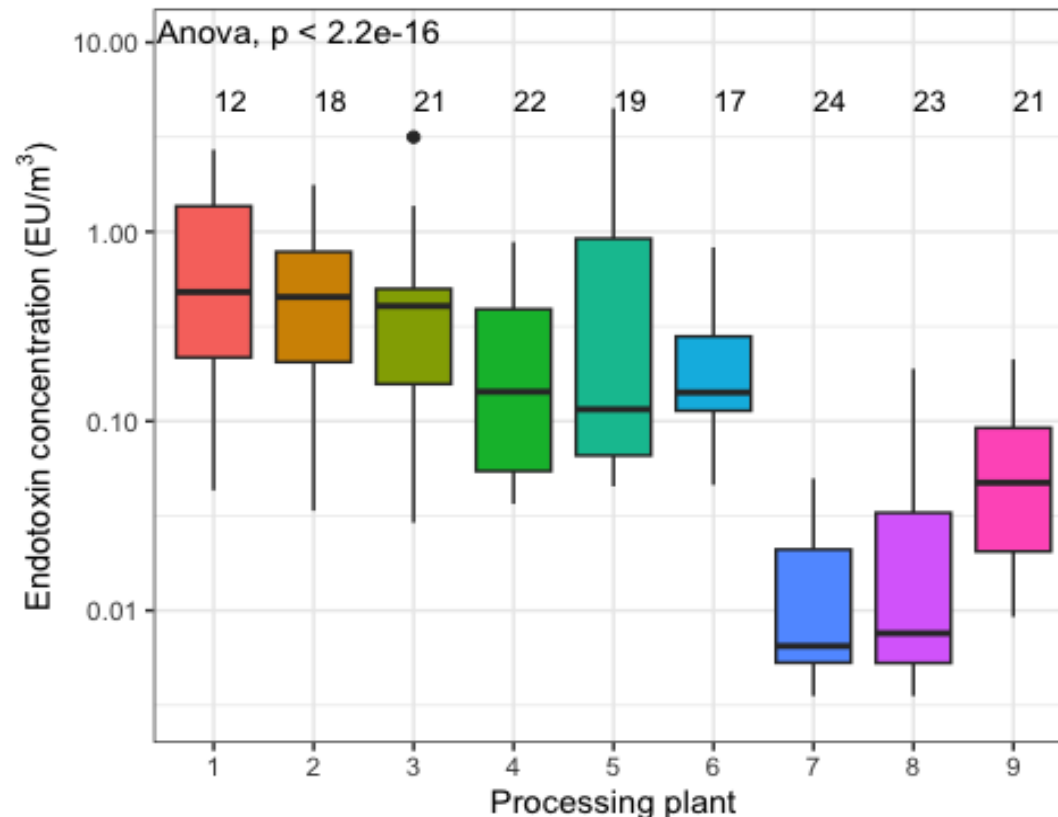
Results total protein (n= 379)

- Analysed using BCA assay
- Differences between work tasks and plants

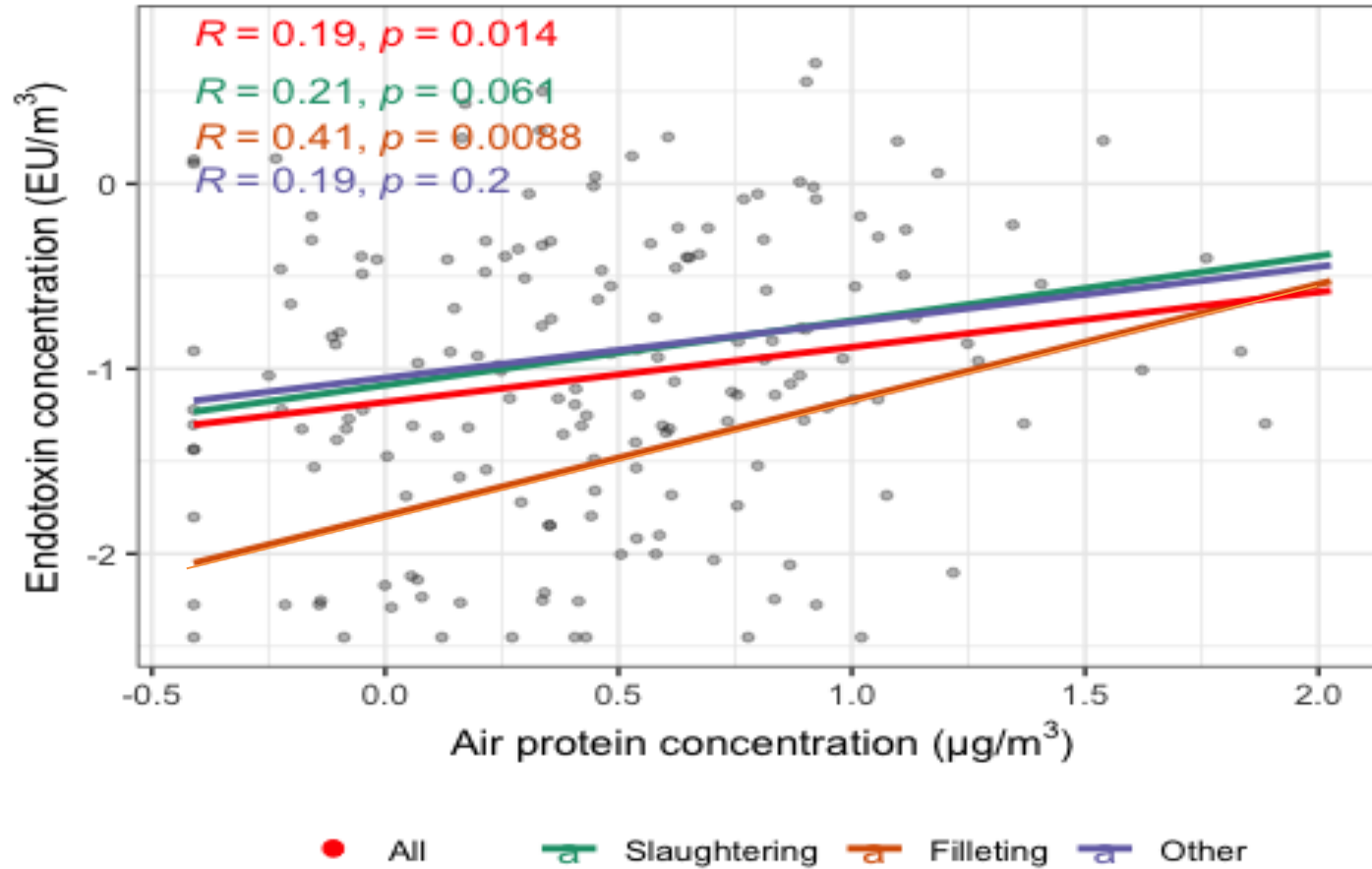


Results endotoxin (n=177)

- Analysed using rFC assay
- Differences between work tasks and plants



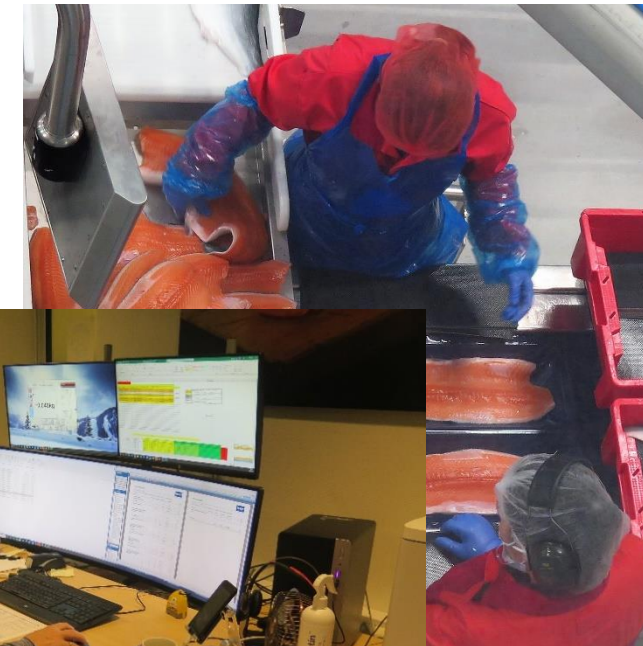
Correlations



Exposure to total protein

- Highest during
 - Slaughtering: Gutting (n=49) GM 3.95 $\mu\text{g}/\text{m}^3$
 - Filleting: Deheading (n=12) GM 4.57 $\mu\text{g}/\text{m}^3$

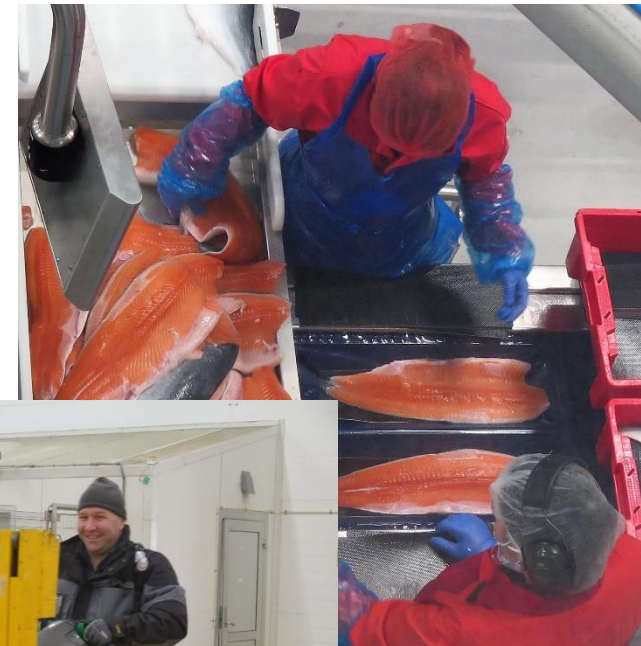
- Lowest during
 - Slaughtering: Sorting (n=11) GM 2.58 $\mu\text{g}/\text{m}^3$
 - Filleting: Packing fillets (n=10) GM 3.58 $\mu\text{g}/\text{m}^3$
 - Other: Office (n=13) GM 0.94 $\mu\text{g}/\text{m}^3$



Exposure to endotoxin

- Highest during
 - Slaughtering: Sorting (n=7) GM 0.20 EU/m³
 - Filleting: Deheading (n=5) GM 0.11 EU/m³

- Lowest during
 - Slaughtering: Bleeding (n=12) GM 0.05 EU/m³
 - Filleting: Packing fillets (n=5) GM 0.05 EU/m³
 - Other: Cold storage/trucks (n=16) GM 0.07 EU/m³



Conclusions



- Exposure levels differed significantly across plants and departments for proteins and endotoxins
- Highest exposure in deheading (both), gutting (TP) and sorting (endotoxin)
- Lowest exposure in packing fillets (both), office work (TP) and cold storage (endotoxin)
- Further analyses should be performed to identify sources of exposure where preventive/exposure reducing measures can be implemented and reduce health problems among workers in salmon processing plants.

Thanks to all participating plants and staff



 **UNIVERSITETSSYKEHUSET NORD-NORGE**
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