


Sandra Zaremba

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# Detection of *Listeria monocytogenes* in Norwegian fish farming

A photograph of a salmon swimming in clear blue water. The water is filled with many small, bright blue, glowing particles, possibly representing bacteria or light. The salmon is positioned horizontally across the middle of the frame, facing left. The background is a deep blue with a bokeh effect of the glowing particles.

# *L. monocytogenes*

- Pathogenic bacteria
- Psychrotrophic, facultative anaerobic
- High-risk foods
- Can develop infection listeriosis
- Pregnant, older people
- immunocompromised



# The purpose of the master thesis

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- Investigate the presence of *L. monocytogenes* in Norwegian fish farming
  - *Listeria*- species found in water contaminated by humans and animals
  - Salmon products as a potential source of infection with *L. monocytogenes*
  - *L. monocytogenes* as a production hygienic problem
  - Full automated method that processes the fish at the individual level

# Sample collection

- From September 2017 to January 2018
- 4 different fish farming
- Season variations



# Sample collection

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- Water samples
- Skin samples
- Gill samples
- Collect samples: gill- and skin samples of three fish
- Cross section of muscle and skin: 10g
- Together 117 samples



# Sample preparation

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- All water samples were filtered, 500 ml per filter (0,45 µm)
- Muscle and skin samples were homogenized in 120-180 sec in Half Fraser
- Gill (swabs) samples were centrifuged and added Half Fraser
- All samples were incubated at 37 degrees C for 24 hours

# NMKL136-Method

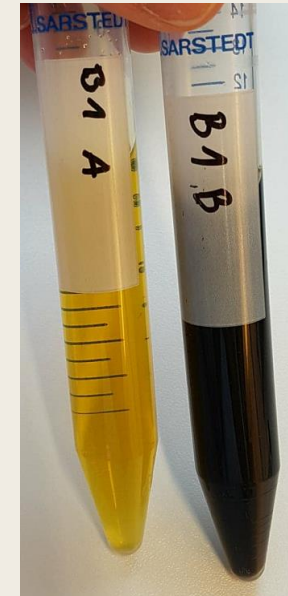
## Fraser Broth Supplement

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- Two-step selective enrichment
  - Half Fraser – half-strength
  - Full Fraser – full-strength
- Detection limit 2-20 cfu/L
- Listeria Brilliance agar plate



Bilde nr. 1 Den primære oppformeringskulturen i Half Fraser. s7 viser negativ reaksjon. s8 viser positiv reaksjon.



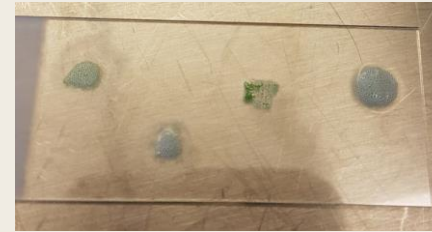
Bilde nr. 2. Den sekundære oppformeringskulturen i Full Fraser. B1A viser negativ reaksjon. B1B viser positiv reaksjon.



Bilde nr.3 Listeria Brilliance skål.  
Grønne kolonier kan være potensielle *Listeria monocytogenes*

# Catalase test and *API Listeria*

- Catalase test
- Microscope
- *API Listeria*
- PCR



Bilde nr.4 Katalase test.



Bilde nr. 5 API kit. Positive og negative reaksjoner i testbrønner for *Listeria monocytogenes*



Bilde nr. 6. API kit. *Listeria monocytogenes*



Bilde nr. 7. API kit. Prøve s9 som eksempel på ikke *Listeria monocytogenes*



## Results from 4 different plants

- All tested samples for *Listeria monocytogenes* were below detection limit

Plants	Water samples	Cross section of muscle and skin	Skin samples	Gill samples	Collect samples
A	Negative	Negative	X	X	X
B1	Negative	X	Negative	Negative	X
C	Negative	Negative	Negative	Negative	X
B2	Negative	X	Negative	Negative	Negative
D	Negative	X	Negative	X	X

- PCR performed for water samples from plant D - negative
- Plant A – *Listeria welshimeri*

# Comparison of results

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Plants	My results from plants	Results from slaughterhouse
<b>A</b>	1 sample (muscle with skin) – <i>Listeria welshimeri</i>	X
<b>B1</b>	0	Many positive
<b>C</b>	0	0
<b>B2</b>	0	0
<b>D</b>	0	0

# Summary

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- 4 visited plants
- 117 analyzed samples
- Method with good detection capability (2-20 cfu/L)
- No *Listeria monocytogenes* was detected
- One sample with *Listeria welshimeri* was detected