Determining Vaccination Frequency in Farmed Rainbow Trout Using Vibrio anguillarum O1 Specific Serum Antibody Measurements - DTU Orbit (12/08/2019)

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Background
Despite vaccination with a commercial vaccine with a documented protective effect against Vibrio anguillarum O1 disease outbreaks caused by this bacterium have been registered among rainbow trout at Danish fish farms. The present study examined specific serum antibody levels as a valid marker for assessing vaccination status in a fish population. For this purpose a highly sensitive enzyme-linked immunosorbent assay (ELISA) was developed and used to evaluate sera from farmed rainbow trout vaccinated against V. anguillarum O1.

Study Design
Immune sera from rainbow trout immunised with an experimental vaccine based on inactivated V. anguillarum O1 bacterin in Freund’s incomplete adjuvant were used for ELISA optimisation. Subsequently, sera from farmed rainbow trout vaccinated with a commercial vaccine against V. anguillarum were analysed with the ELISA. The measured serum antibody levels were compared with the vaccine status of the fish (vaccinated/unvaccinated) as evaluated through visual examination.

Results
Repeated immunisation with the experimental vaccine lead to increasing levels of specific serum antibodies in the vaccinated rainbow trout. The farmed rainbow trout responded with high antibody levels to a single injection with the commercial vaccine. However, the diversity in responses was more pronounced in the farmed fish. Primary visual examinations for vaccine status in rainbow trout from the commercial farm revealed a large pool of unvaccinated specimens (vaccination failure rate = 20%) among the otherwise vaccinated fish. Through serum analyses using the ELISA in a blinded set-up it was possible to separate samples collected from the farmed rainbow trout into vaccinated and unvaccinated fish.

Conclusions
Much attention has been devoted to development of new and more effective vaccines. Here we present a case from a Danish rainbow trout farm indicating that attention should also be directed to the vaccination procedure in order to secure high vaccination frequencies necessary for optimal protection with a reported effective vaccine.

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Contributors: Holten-Andersen, L., Dalsgaard, I., Nylén, J., Lorenzen, N., Buchmann, K.
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