Istituto Zooprofilattico Sperimentale dell'Umbria e delle Marche "Togo Rosati"

Alesund - September 3-5 2025

World Organisation for Animal Health
Founded as OIE

Vaccination: sustainability and strategy

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SUMMARY

1. PRELIMINARY CONSIDERATIONS (3)
2. VACCINATION SUSTAINABILITY (3)
3. VACCINATION STRATEGIES (6)
4. DISCUSSION (5)
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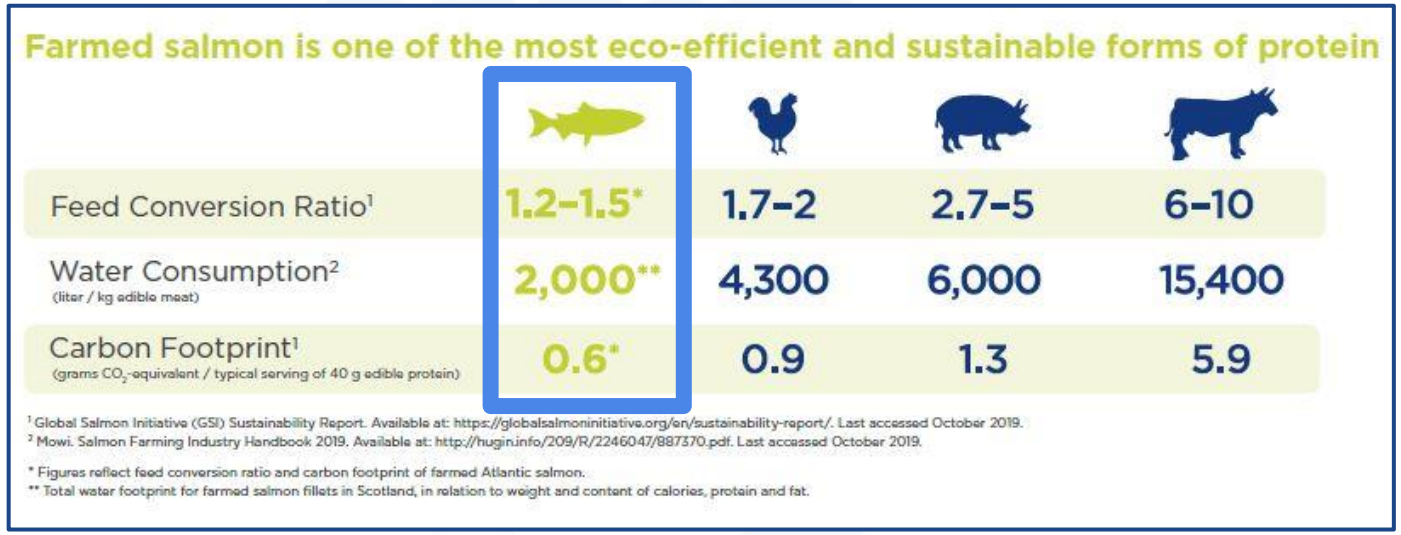
1/3 - PRELIMINARY CONSIDERATIONS:

- Demand for **“blue foods”** from aquatic sources is expected to double by 2050.

- Aquaculture will play a **key role** in boosting supplies of **nutritious** and healthy food for billions of consumers around the world.

2/3 - PRELIMINARY CONSIDERATIONS:

- The growing world population is increasing the demand for food.
- The food required must be nutritious and **climate-friendly**.
- Meeting this growing demand in more sustainable ways is a major challenge.



3/3 - PRELIMINARY CONSIDERATIONS:

- Potential solutions are in the planet's waters.
- Blue foods, which come from oceans, rivers, and lakes, are the most traded food products in the world.
- FAO predicts that aquaculture will continue to drive growth in global fish production.
- Aquaculture reaching 106 million tons in 2030 with a 32% increase over 2020 levels.

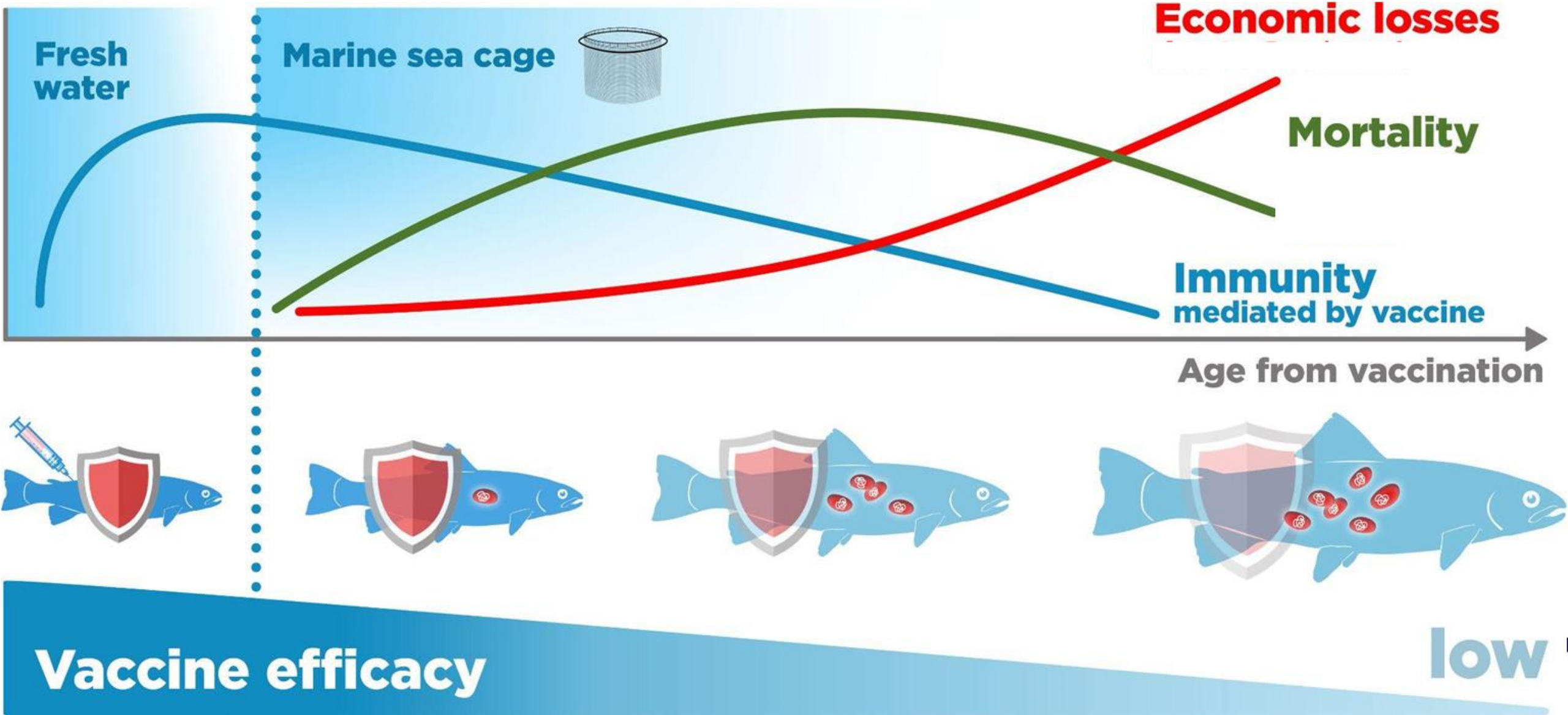
1/3 - VACCINATION SUSTAINABILITY:

- Vaccination in aquaculture is a crucial disease prevention strategy that involves administering vaccines to fish to protect them from various pathogens.
- This practice enhances their immune systems, reducing the risk of infections and improving overall health and productivity.

2/3 - VACCINATION SUSTAINABILITY:

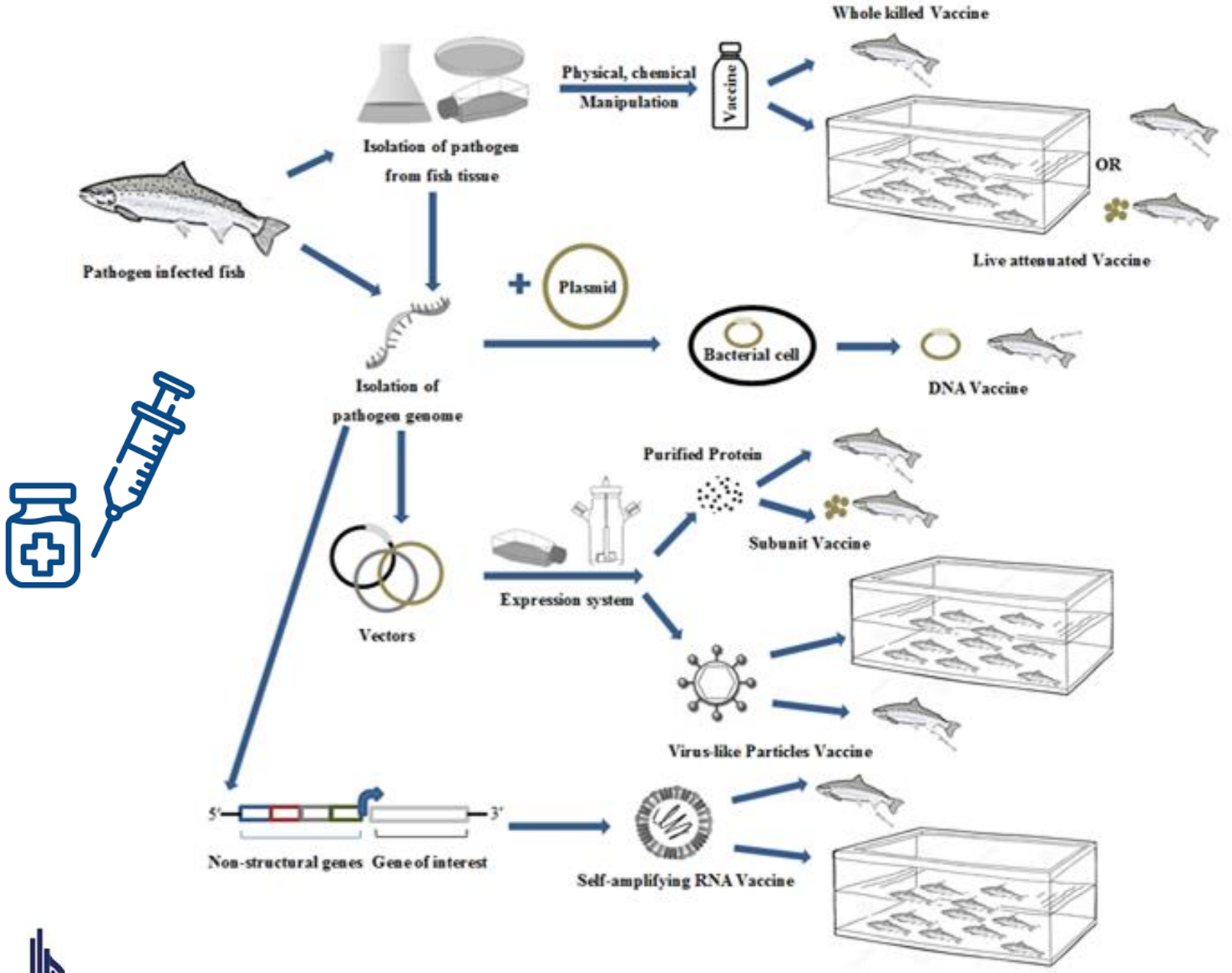
- Fish immunization has been carried out for over 50 years and is generally accepted as an effective method for preventing a wide range of bacterial and viral diseases.
- Vaccination efforts contribute to environmental, social, and economic sustainability in global aquaculture.

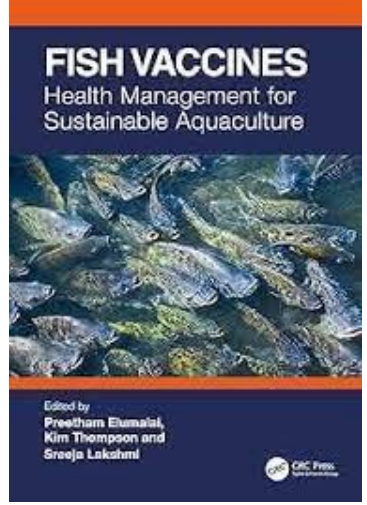
3/3 - VACCINATION SUSTAINABILITY:

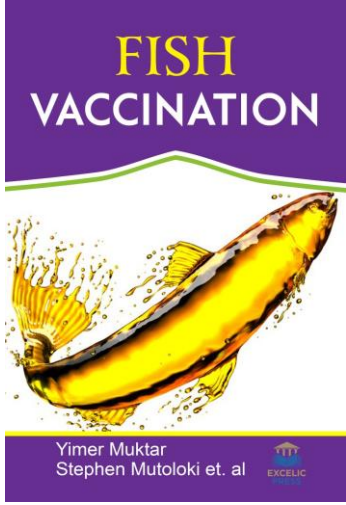


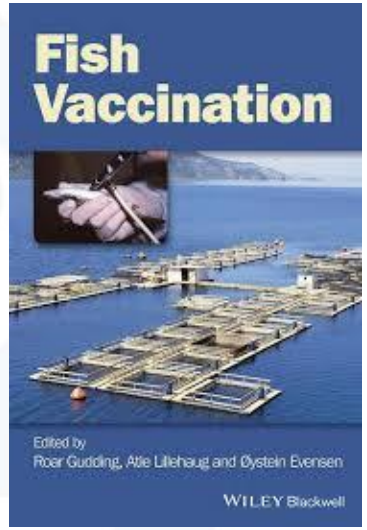
1/6 - VACCINATION STRATEGIES:

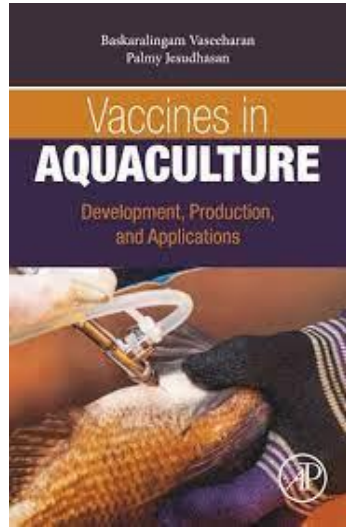
- Vaccine type and administration method need to be tailored to the specific pathogen and species.
- Immunity duration can vary and requiring booster vaccinations.
- Advances in vaccine technology are continually improving efficacy and delivery methods.

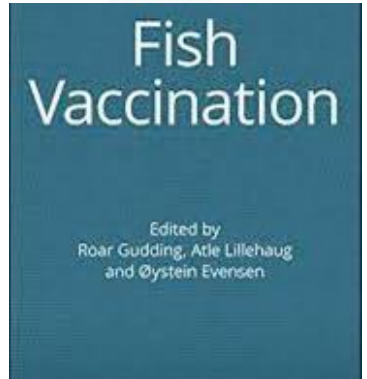


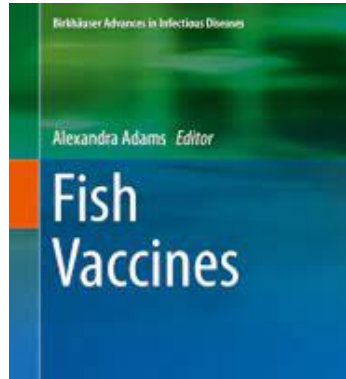












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Vaccination: sustainability and strategy

3/6 - VACCINATION STRATEGIES

Types of Vaccines:

- **Inactivated Vaccines:** These are commonly used, requiring adjuvants to boost the immune response and are often administered via injection.
- **Live Attenuated Vaccines:** These are more efficacious as they mimic natural infection and can be administered through immersion or oral routes.
- **Subunit/Recombinant Vaccines:** Modern technologies focus on targeting specific pathogen components, offering potential for enhanced immunity.

4/6 - VACCINATION STRATEGIES

Administration Methods:

- **Injection:** A common method for inactivated vaccines, but can be labor-intensive and stressful for fish.
- **Immersion:** Fish are immersed in a vaccine solution, allowing antigens to be absorbed through the skin, gills, or gut.
- **Oral:** Vaccines are incorporated into feed, offering a less stressful and easier method of administration.

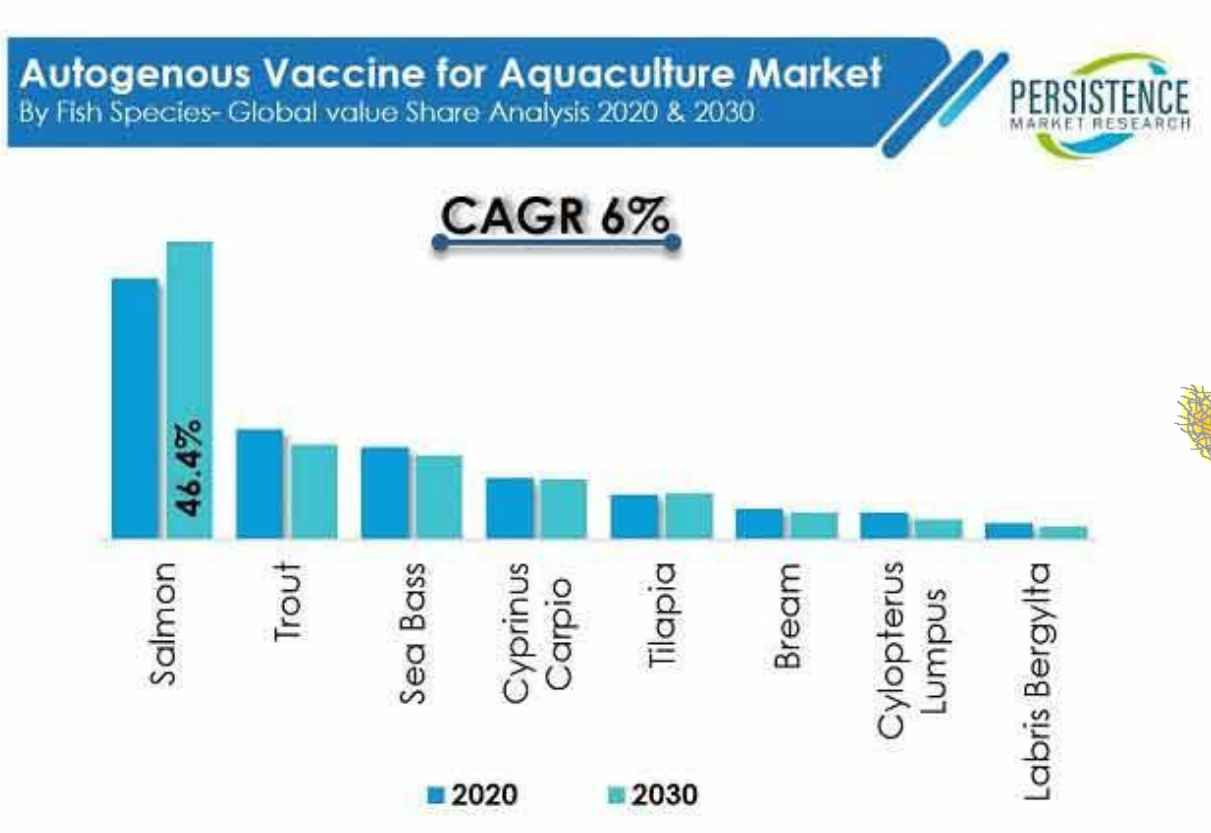
DEFINITION

5/6 - VACCINATION STRATEGIES

Autogenous vaccine

Autovax is a veterinary immunological drug prepared with pathogens and/or antigens isolated from a specific fish farm and used to treat animals from the same farm or epidemiologically related farms (epidemiological link).

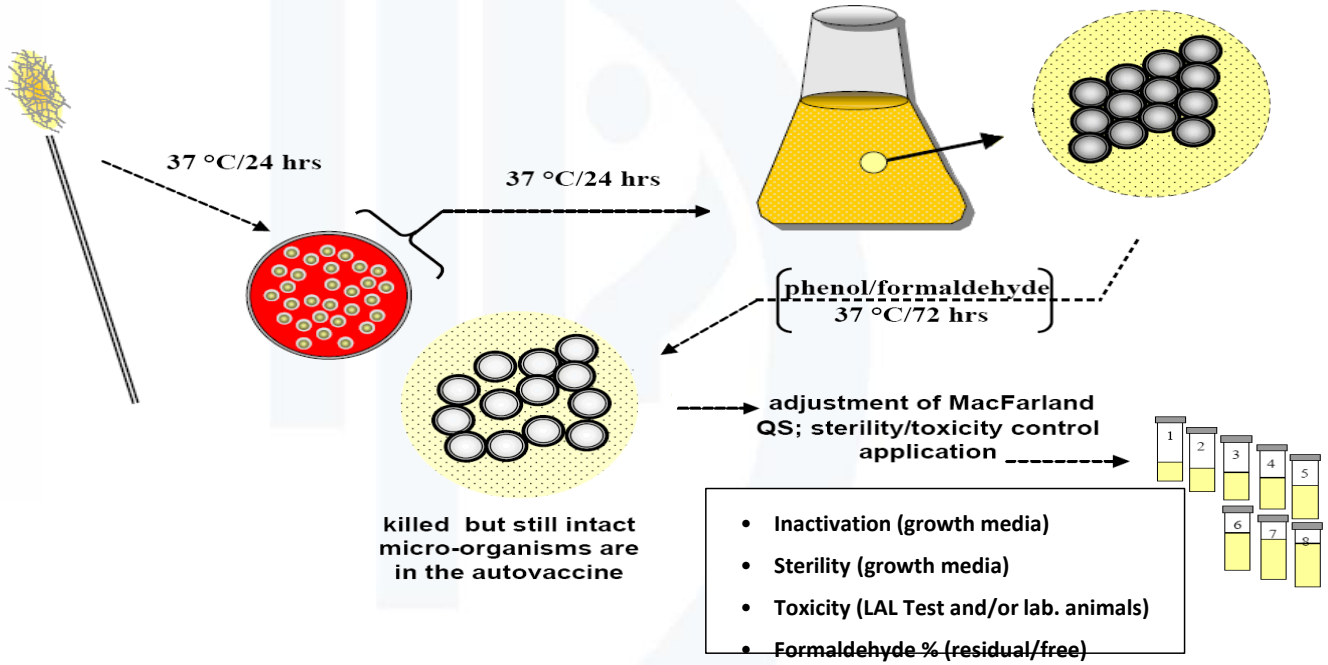
6/6 - VACCINATION STRATEGIES - AUTOVAX



CMDv
Co-ordination Group for Mutual Recognition and Decentralised Procedures – Veterinary

London, 20 March 2017
EMA/CMDv/452656/2016
REC-002-01

Recommendations for the manufacture, control and use of inactivated autogenous veterinary vaccines within the EEA



- Inactivation (growth media)
- Sterility (growth media)
- Toxicity (LAL Test and/or lab. animals)
- Formaldehyde % (residual/free)

1/5 - DISCUSSION

Vaccination Benefits:

- Reduced dependence on antibiotics.
- Improved fish health and survival rates.
- Increased aquaculture production and sustainability.

2/5 - DISCUSSION

CLASSICAL VACCINOLOGY
growing pathogens

virus

bacterium

parasite

fermentation

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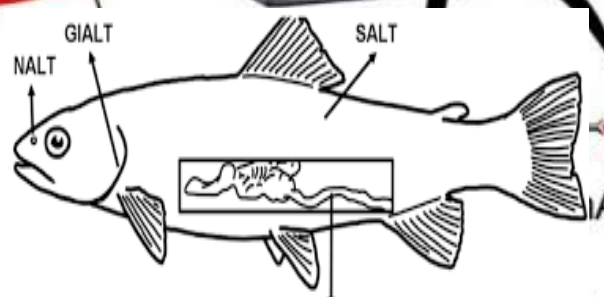
AUTOVAX

REVERSE VACCINOLOGY
design from information

genome

proteome

structure



Ab

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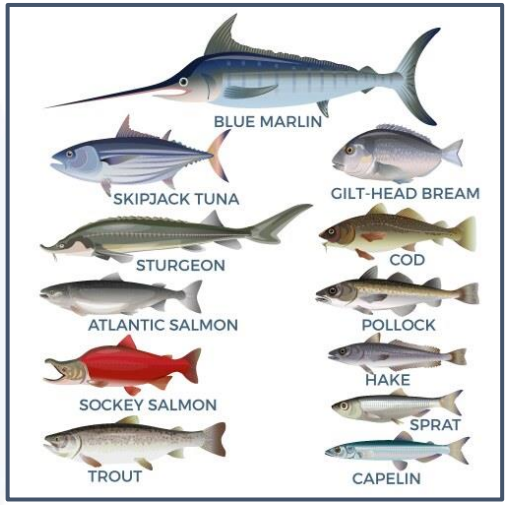
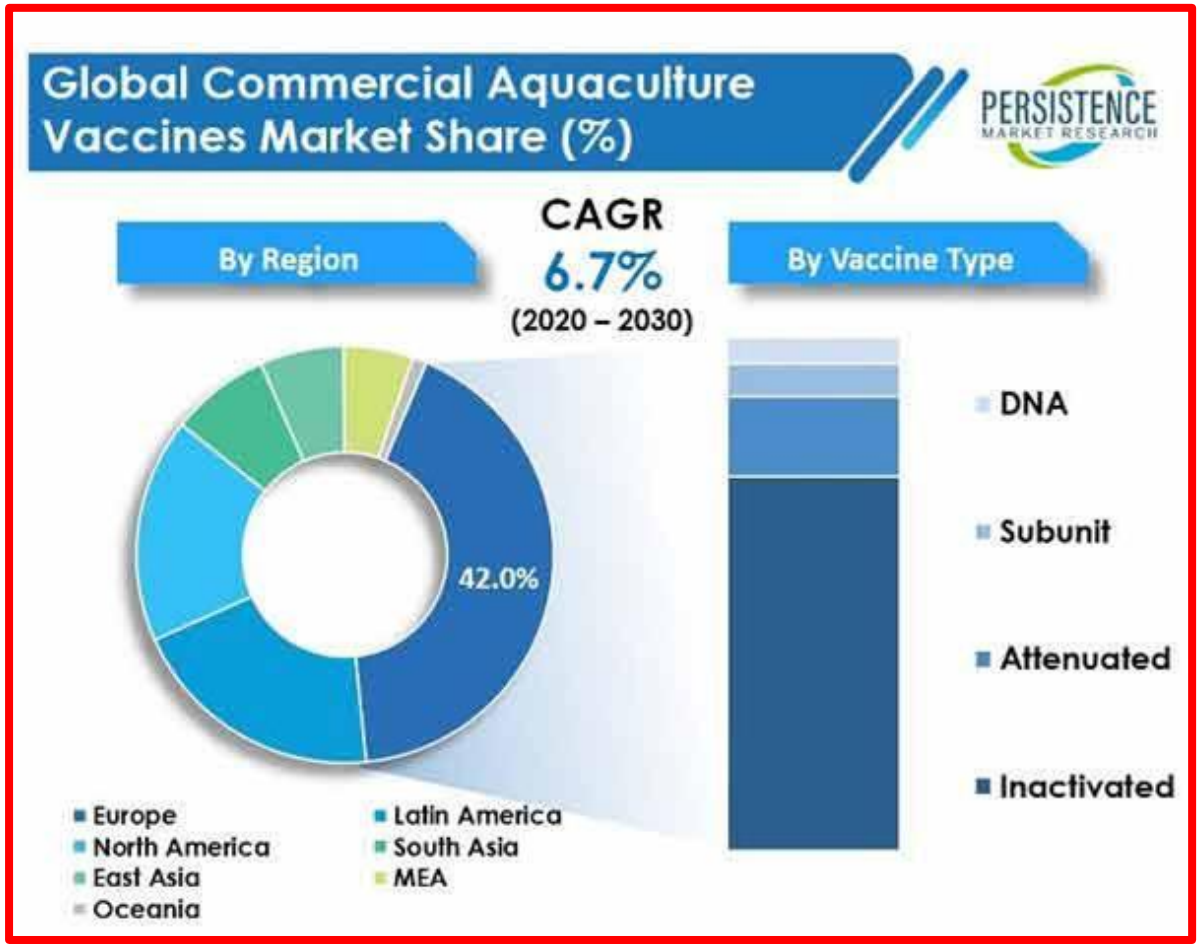
3/5 - DISCUSSION

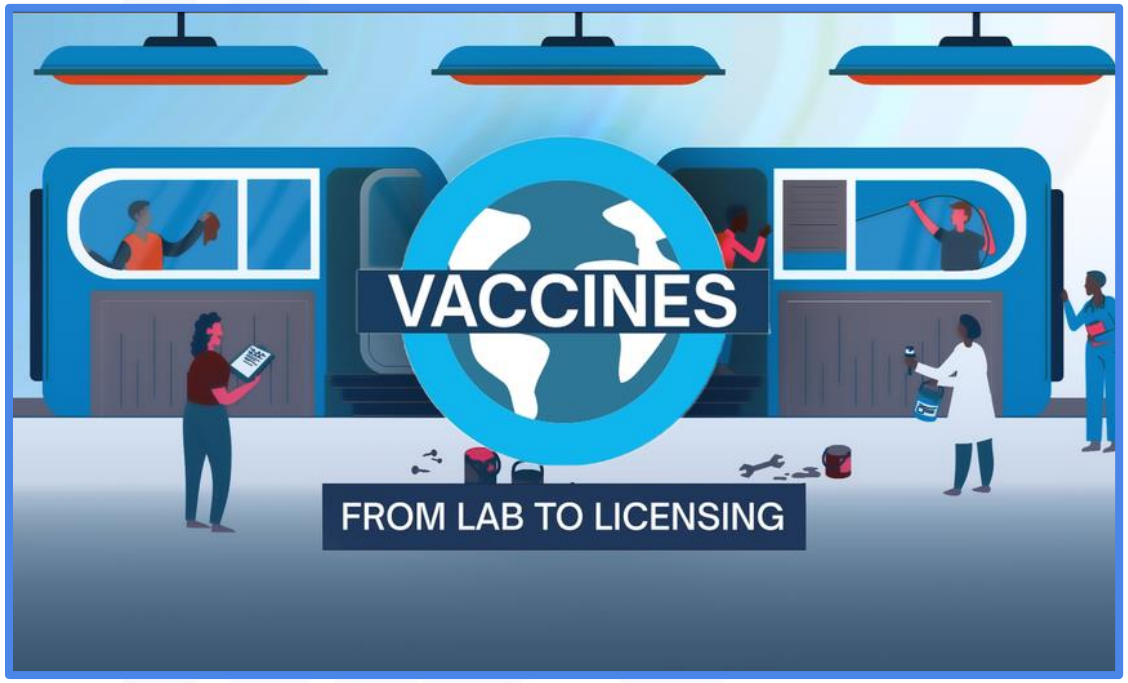
Commercial Vaccines Limits:

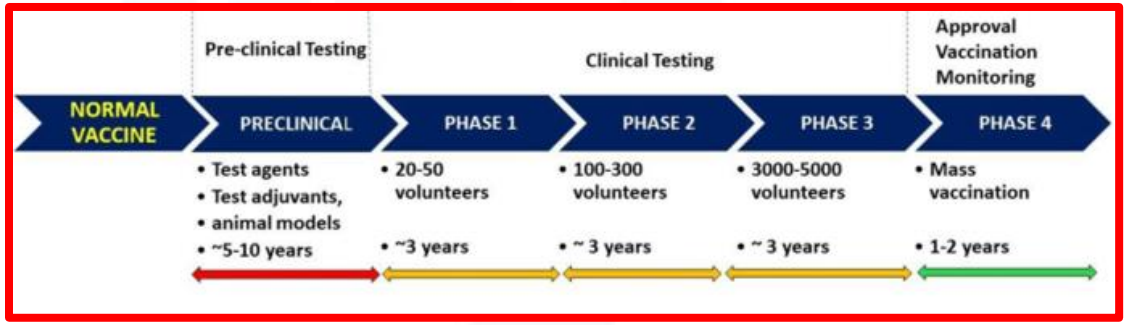


- NO vaccines available for all pathogens.
- NO vaccines available for all fish species.
- R&D and Reg. TIMES for new vaccines.
- COSTS

4/5 - DISCUSSION







5/5 - DISCUSSION

Autovax strategy is able to overcome the limits

- **FAST**
- **SAFE**
- **SPECIFIC**
- **EFFECTIVE**
- **CHEAP**

1/3 - CONCLUSION

In summary, vaccination plays a strategic role in modern aquaculture, providing a sustainable and effective means of disease control, improving fish health, contributing to the overall growth and productivity of the industry, reducing antibiotic use and antimicrobial resistance (AMR).

2/3 - CONCLUSION

In the next years, in food production, livestock farming, and aquaculture, we will need to seriously reflect not only on the cost-benefit ratio, but also, and above all, on the harm-benefit ratio when making global strategic decisions (not just profit-driven strategies). In short, we need to adopt a true, comprehensive, and shared "**One Health**" approach.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Thank you!
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