

HANDLING DISEASE IN FISH FARMS – THERAPY VS PROPHYLAXIS

The AQUASOJA solutions

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I - INTRODUCTION

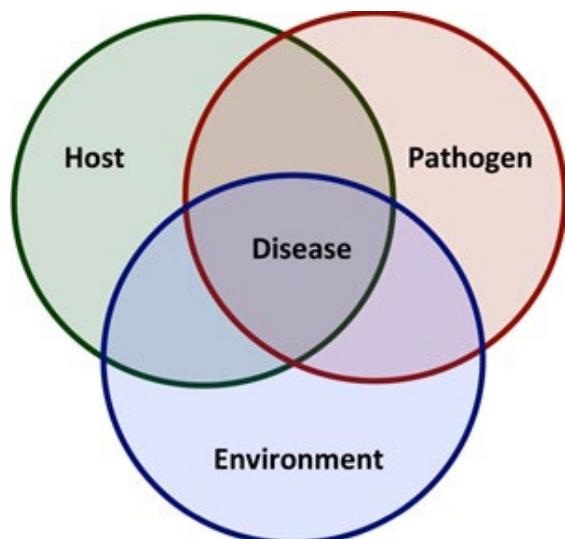
"Aquatic animal diseases are the most significant constraint to the development and management of aquaculture worldwide. As aquaculture is growing rapidly and poised to help in bridging the gap in the global supply and demand of aquatic animal food products, management of health and reducing losses due to disease in aquaculture is gaining high priority" (Subasinghe, R. 2009)





II - APPEARANCE OF DISEASE

Disease is defined as a disturbance in function or structure of any organ or part of the body. When applied to livestock, this definition can be enlarged to include detrimental behavioural changes e.g. in feeding response within a community (FAO).

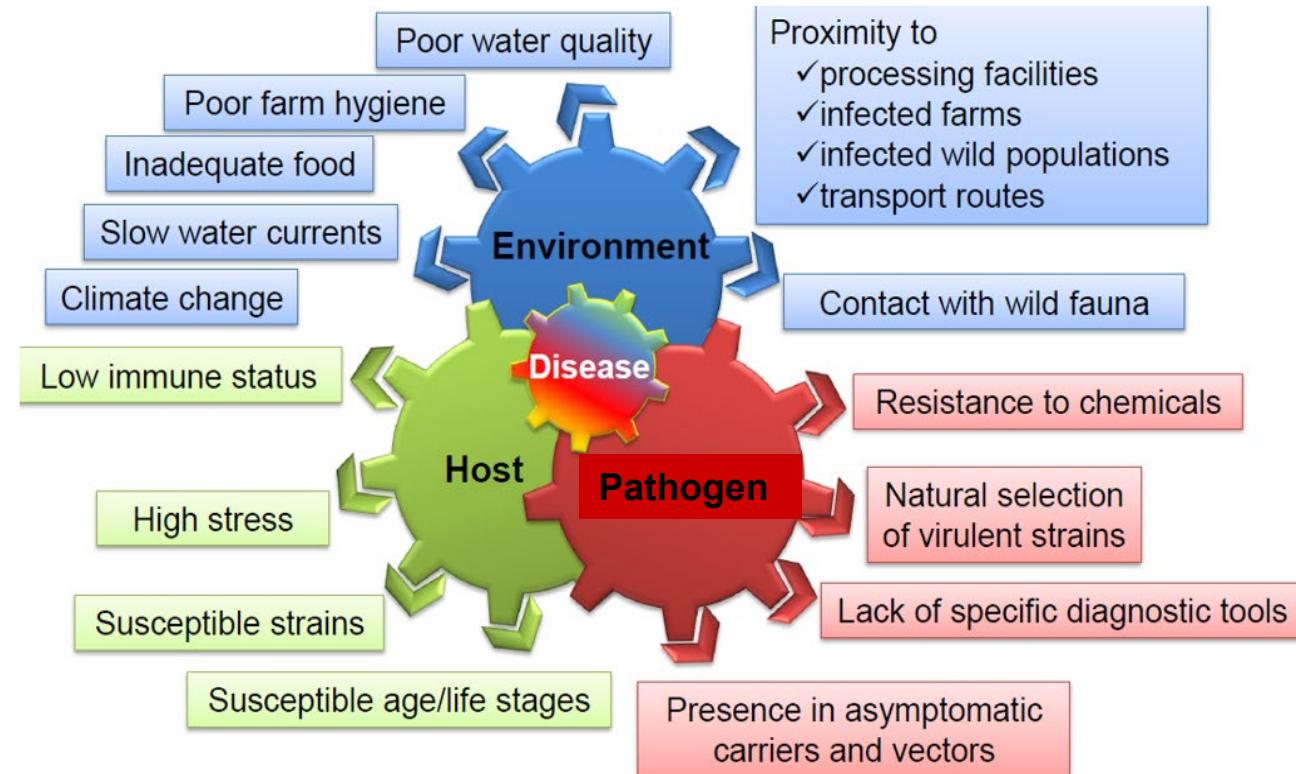
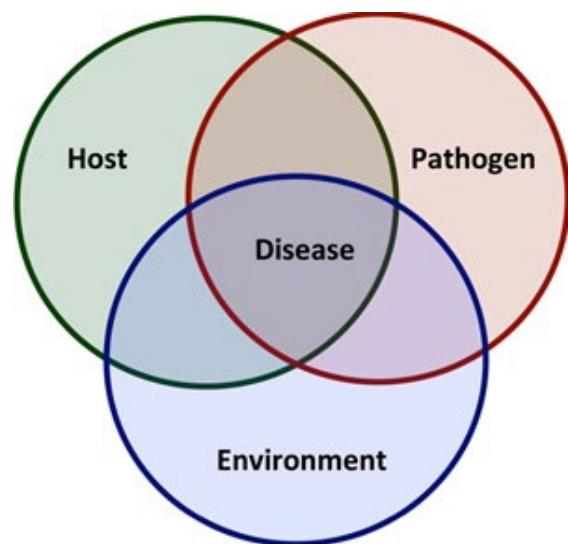


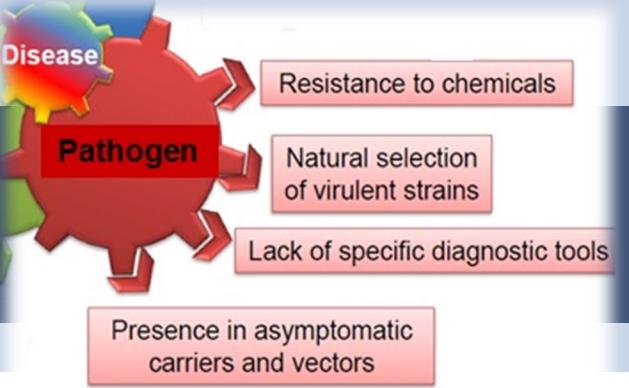
It seems simple but is in fact complex....



II - APPEARANCE OF DISEASE

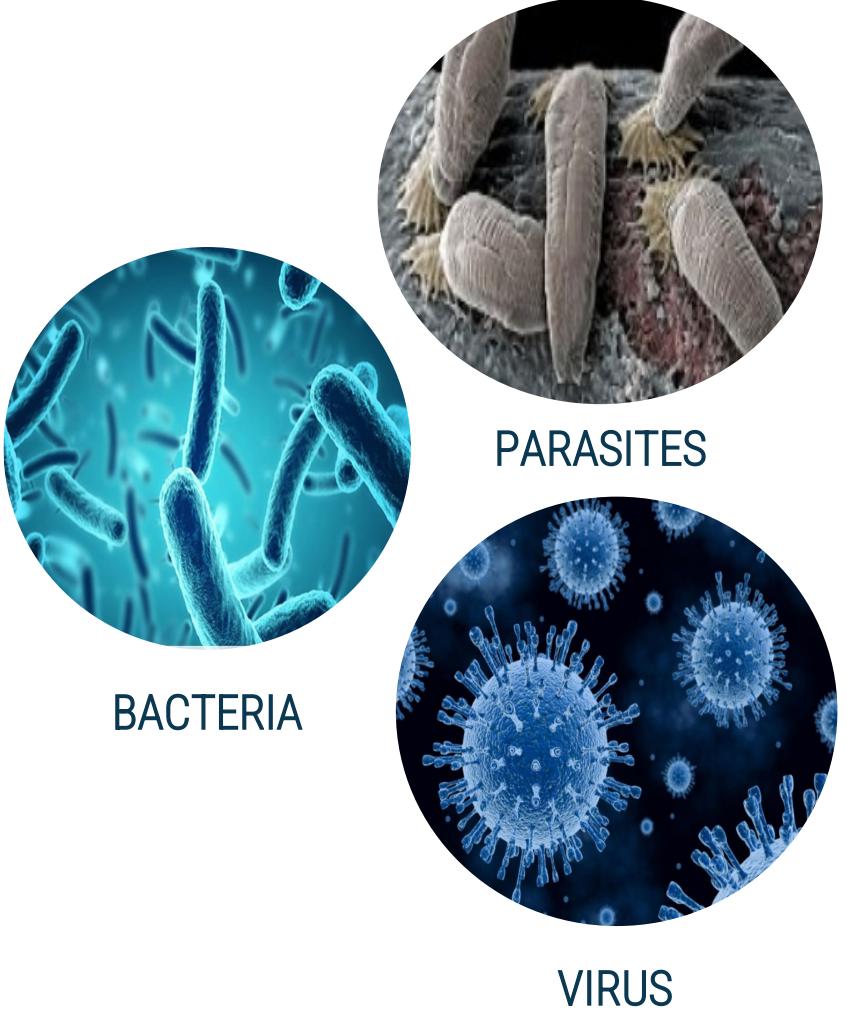
Disease is defined as a disturbance in function or structure of any organ or part of the body. When applied to livestock, this definition can be enlarged to include detrimental behavioural changes e.g. in feeding response within a community (FAO).





II.a - PATHOGENS

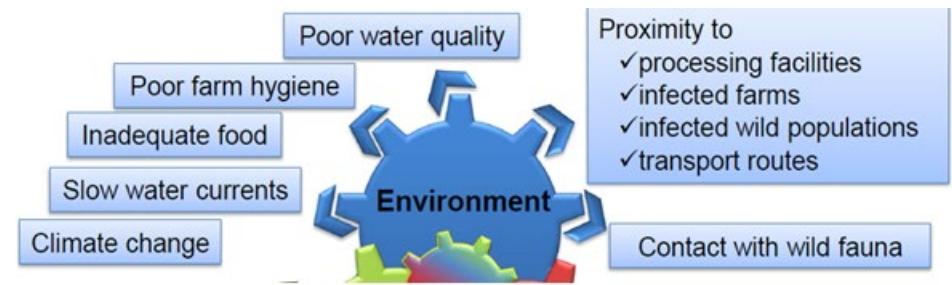
- Pathogens are ubiquitous in the environment but this doesn't necessarily mean the presence of disease!*
- Its development and severity varies according to the strain itself, to the host immune system, to the environmental conditions...*
- Bacteria and parasites are easier to prevent or treat than virus.*





II.b - ENVIRONMENT

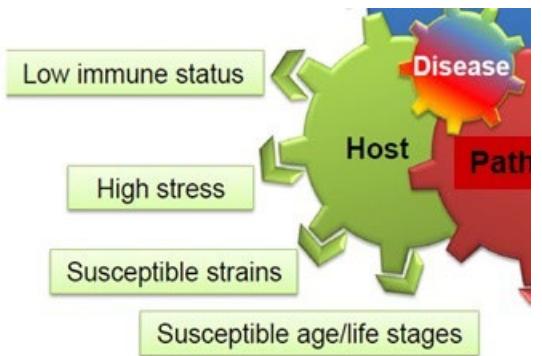
- The environment's own dynamic pretty much influences the fish...
- WATER overall conditions at a certain point can be the main driver for a severe disease.
 - Temperature
 - O₂ available
 - Salinity
 - Organic matter load
- For example, lets consider **trout Spring syndrome**: increasing temperature in Spring greatly impacts on water quality (O₂ available, algae bloom) and on fish metabolism (becomes faster) causing severe losses of this species. And no pathogen is involved...!





II.c - HOST

- The health condition of the host itself is also determinant for the development of a disease;
- Nutritional history plays a major role as it influences the fish immunocompetence and resistance to disease;
- Stress induced by handling, environment or the intensity of cultivation also increases fish susceptibility to disease (acute stress may be interesting in a short term but chronic stress is very detrimental);
- Genetic selection – it is well recognized that the first trait selected is growth, and not necessarily resistance. As such, fast growing fish are usually very sensitive to disease. Selecting for resistance should also be promoted.





III – WHAT IS THE COST OF A DISEASE?

ECONOMIC IMPACTS OF A DISEASE

Direct

- Mortality – (direct biomass loss)
- Therapy – (treatment costs)
- Veterinary services
- Prophylaxy

Indirect

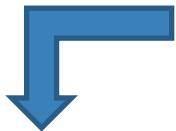
- Reduced growth (indirect biomass loss)
- Increased morbidity



III– WHAT IS THE COST OF A DISEASE?

HOW?

PREVENTION



PROMOTE EFFECTIVE
VETERINARY SURVEY

REACTION

BE AWARE OF
DISEASES

RECOGNIZE AND
AVOID DISEASE
PROMOTING
PRACTICES

IMPLEMENT
PROPHYLATIC
STRATEGIES



FOLLOW-UP

RECOGNIZE THE
SYMPTOMS

TREAT



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III – WHAT IS THE COST OF A DISEASE?

HOW?

PREVENTION

PROMOTE EFFECTIVE
VETERINARY SURVEY

REACTION

FARM MANAGEMENT VIRTUOUS CYCLE

RECOGNIZE AND
AVOID DISEASE
PROMOTING
PRACTICES

IMPLEMENT
PROPHYLATIC
STRATEGIES

RECOGNIZE THE
SYMPTOMS

TREAT



III – PROPHYLAXIS VERSUS TREATMENT

A GRAM OF PREVENTION IS WORTH A KILO OF CURE!

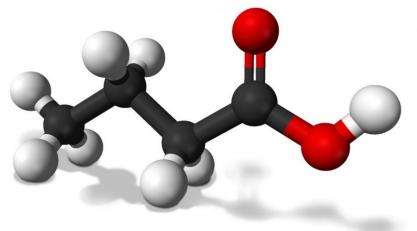
A single disease outbreak has the potential to put a farmer out of the business and in huge financial debt.

Prophylaxys is not a cost but an investment in the future...





IV – HEALTH PROMOTING ADDITIVES (YEASTS, PHITOGENICS, ORGANIC ACIDS)



Yeast Products

- Yeast cell walls – β glucans, MOS
- Yeast extracts - nucleotides
- Autolized yeast – nucleotides, vitamins, peptides

Botanical extracts

- Essential oils, Saponins, Terpenoids, Flavonoids
- Tannins, Mucilages
- Pungent substances, Bitter substances

Organic acids

- Short Chain Fatty acids (SCFA)
- Middle Chain Fatty acids (MCFA)



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V – FUNCTIONALITIES OF HEALTH PROMOTING ADDITIVES

Prevent accumulation of bacterial pathogens



Parasitic control



“Quorum sensing”

Stimulate immune system

Intestinal Health



Inhibit inflammation



Chronic stress control



Antioxidant properties



Improve nutrient absorption

Stimulate appetite

Hepatic function

Support quick removal of toxins from the body





VI – AQUASOJA FUNCTIONAL PRODUCTS – THE SUPPLEMENT

CONCEPT

To establish an efficient prophylactic strategy, the farmer should use a good, sound and well-balanced nutritional solution, that supports a healthy growth. According to necessities, in AQUASOJA we supplement this nutritional baseline with functional additive blends to achieve our Prophylactic goals.

Each supplement was designed to cover a specific set of target:

- a) Pathogen control;
- b) Bacterial control;
- c) Immunostimulant;
- d) Anti-inflammatory and Chronic stress control;



VI – AQUASOJA FUNCTIONAL PRODUCTS – THE SUPPLEMENT CONCEPT

Prevent accumulation of bacterial pathogens
Parasitic control
“Quorum sensing”

Supplement ATIVIA



Stimulate immune system

Supplement ATIVIA



Inhibit inflammation



Chronic stress control



Improve nutrient absorption

Stimulate appetite



Hepatic function



Support quick removal of toxins from the body

Supplement ATIVIA

Antioxidant properties



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ATIVIA

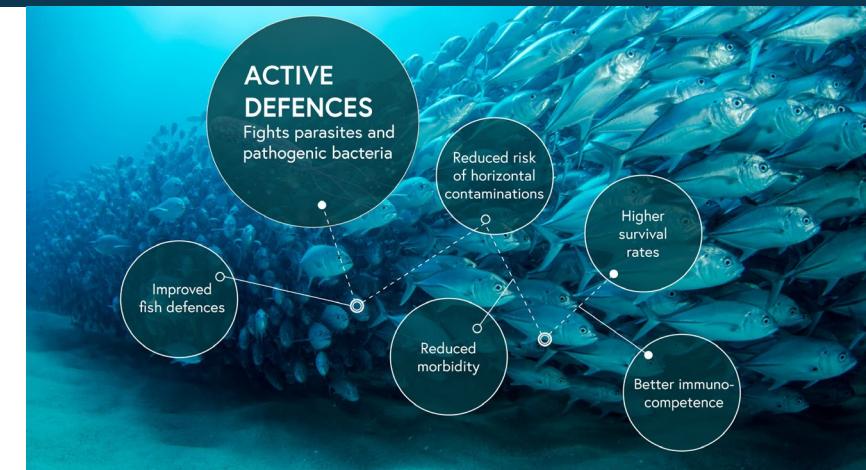
- Launched in 2020;
- Key-words: prevention against bacterioses and parasitoses



FISH SPECIES	FISH SIZE	WHAT IS THE GOAL?	COMPOSITION	FEEDING PROTOCOL	PELLET Ø
ALL	> 25g	<ul style="list-style-type: none">Prevention against endo and ectoparasites and pathogenic bacteria	<ul style="list-style-type: none">Organic acids, essential oils and yeast extracts, vitamins and nucleotides	<ul style="list-style-type: none">Non-continuous protocol = during most critical periodsContinuous protocol = during all the ongrowing cycle	Pellets #3, 4, 6, 8

Field results:

Clients experience low mortality in critical periods of parasitosis and less morbidity as fish is in better health and body condition.





What to expect from ATIVIA?

While preventing and/or mitigating the effect of pathogens, ATIVIA is working towards:

01

**Reduced health risks
(secondary infections)**

02

**Reduced morbidity
(anemia, anorexia,
cachexia)**

03

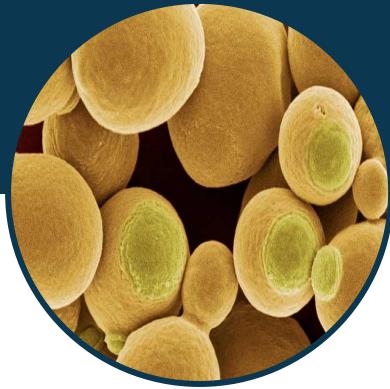
**Reduced risk of
horizontal
contamination**

04

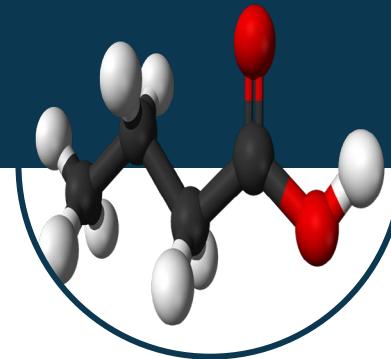
**Higher survival
rates**



How does ATIVIA achieve that purpose?



YEAST EXTRACTS



SHORT- AND MEDIUM-CHAIN
FATTY ACIDS



ESSENTIAL OILS

This supplement includes 100% natural compounds comprising organic acids, essential oils and yeast extracts which can work through multiple mechanisms to reduce the success of pathogen infestations.

How does ATIVIA achieve that purpose?



Internal barrier – Gut

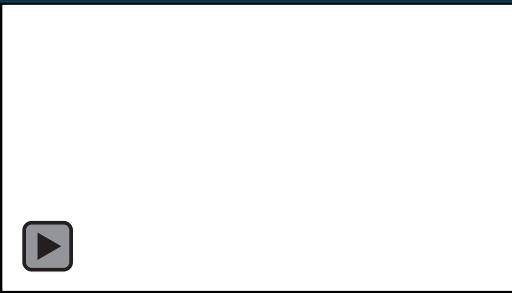
- + Healthier natural barrier
- + Better digestive efficiency
- + Enhanced immune defenses



External barriers – Skin / Gills

- + Pathogen-free gills
- + Enhanced mucus protection capacity and control against 1st and 2nd infections

EFFECT ON PARASITES. How?

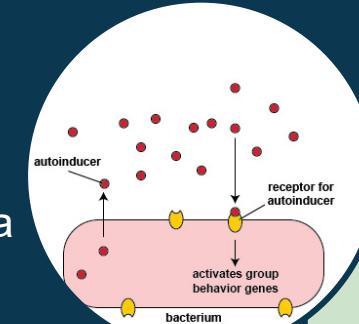


- Endoparasites – Action directly on the gut
- Ectoparasites – Antiparasitic compounds reach the blood (changes in composition and “flavour”?) – Action on skin/gills

EFFECT ON GUT BACTERIA.

How?

- Bactericidal & bacteriostatic action on **pathogenic** bacteria
- Selective pressure for **probiotic** bacterial strains



**Quorum sense inhibition
(virulence ↓)**

- QS is a cell-cell communication among bacteria



**Recognition of /
binding to pathogenic
bacteria**

- The development of opportunistic bacteria is inhibited while probiotic bacteria remain
- Integrity of fish gut tissues is enhanced
- Digestive function is improved
- Immune system is improved

- Alterations on the permeability and integrity of the cell membrane
- Organic acids enter the cell, lowering the pH
- Enzymes are inhibited thus cell metabolism is blocked
- Energy depletion to attain homeostasis (not used to grow and multiply)

EFFECT ON SKIN MUCUS COMPOSITION. How?

- Skin mucus composition is a non-specific defense mechanism
- Skin mucus protection is mostly determined by the composition (defensiveness) and renewal rate



- ↑ antioxidant defenses of skin mucus
- ↑ antibacterial activity
- ↑ detoxification capacity
- ↑ proteolytic activity



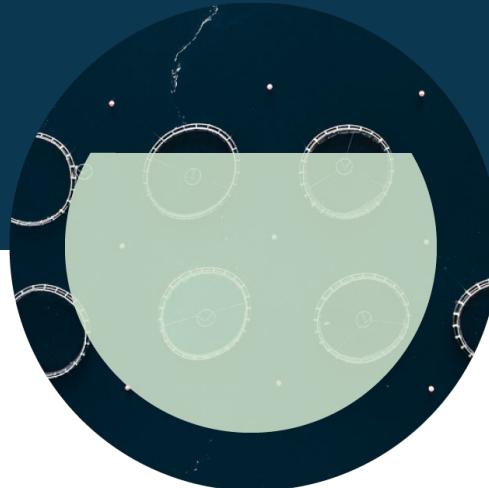
Mode of administration of ATIVIA

WHEN?



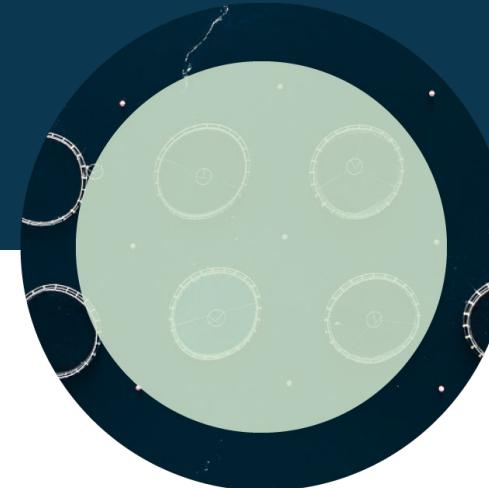
- Continuous protocol
- Non-continuous or seasonal protocol
(in ≥3mm pellet)

FOR HOW LONG?



If only in certain critical periods, we suggest to feed for at least 4w or as long as the threat persists

QUANTITY?



The same of a regular feed

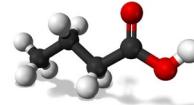


It is important to note that in case of disease/infestation already, the efficacy of ATIVIA is dependent on the prevalence and intensity of the problem, meaning that it should not be faced as a treatment tool but instead as a preventive one.



VI – AQUASOJA FUNCTIONAL PRODUCTS

Prevent accumulation of bacterial pathogens



Parasitic control



“Quorum sensing”

Stimulate immune system



Intestinal Health



Inhibit inflammation

Supplement E

Chronic stress control

Antioxidant properties

Supplement E

Improve nutrient absorption



Stimulate appetite



Hepatic function

Support quick removal of toxins from the body



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Supplement E

- Generic anti-inflammatory effects
- Launched in 2019;
- Key-words: skin inflammations (like Red Mark Syndrome)



FISH SPECIES	FISH SIZE	WHAT IS THE GOAL?	COMPOSITION	FEEDING PROTOCOL	PELLET Ø
ALL	>25g	<ul style="list-style-type: none">• Meant to help fish handling with skin diseases (like RMS)	<ul style="list-style-type: none">• Natural product with anti-inflammatory and anti-stress effects• Reinforced in zinc for a better skin regeneration• Include immune response promoters• Palatability reinforcement	<ul style="list-style-type: none">• For at least 3wk, after the first signs of disease appear	Pellets #3, 4, 6, 8, 10

Field results:

Very good results in decreasing Red Mark Syndrome in Rainbow Trout



VI – AQUASOJA FUNCTIONAL PRODUCTS

Prevent accumulation of bacterial pathogens

Parasitic control

Supplement B

“Quorum sensing”



Inhibit inflammation



Chronic stress control



Antioxidant properties

Supplement B

Stimulate immune system

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FISH SPECIES	FISH SIZE	WHAT IS THE GOAL?	COMPOSITION	FEEDING PROTOCOL	PELLET Ø
ALL	>25g	<ul style="list-style-type: none">• Prevention against pathogenic bacteria	<ul style="list-style-type: none">• Organic acids, essential oils	<ul style="list-style-type: none">• Non-continuous protocol = during most critical periods• Continuous protocol = during all the ongrowing cycle	Pellets #3, 4, 6, 8

Field results:

Very good results in decreasing high temperature Enteric disease n Rainbow Trout



VI – AQUASOJA FUNCTIONAL PRODUCTS

Prevent accumulation of bacterial pathogens



Parasitic control



“Quorum sensing”

Inhibit inflammation



Chronic stress control



Antioxidant properties



Supplement Immunoboost



Improve nutrient absorption

Stimulate appetite

Hepatic function

Support quick removal of toxins from the body



Supplement IMMUNOBOOST

- Strong Immunostimulatory effect
- Launched in 2021;
- Key-words: pre-handling, viral diseases



FISH SPECIES	FISH SIZE	WHAT IS THE GOAL?	COMPOSITION	FEEDING PROTOCOL	PELLET Ø
ALL	>25g	<ul style="list-style-type: none">• Increase fish resistance against disease. Promote non-specific immune response.	<ul style="list-style-type: none">• Natural product with β-Glucans, Nucleotides and Vitamins• Palatability reinforcement	<ul style="list-style-type: none">• Feed no more than 15 days prior to challenge. Repeat each 5 weeks.	Pellets #3, 4, 6, 8, 10

Field results:

Effective against viral and bacterial diseases.



VII – AQUASOJA FUNCTIONAL PRODUCTS – COMPLETE FEEDS

AQUASOJA offers 2 functional product families:

- a) Neo Gold Plus – high performance pre-ongrowing products, with the following targets
 - i. Pathogen control;
 - ii. Immunostimulant;
 - iii. Hepatic and digestion support;
 - iv. Anti-oxidant properties.
- b) YGEIA PLUS - Relaxing and immunostimulant (handling preparation).
 - i. Immunostimulant;
 - ii. Relaxing;
 - iii. Pathogen control;
 - iv. Hepatic and digestion support;
 - v. Anti-oxidant properties.



VI – AQUASOJA FUNCTIONAL PRODUCTS – NEO GOLD PLUS

Prevent accumulation of bacterial pathogens

Parasitic control
NEO GOLD PLUS
“Quorum sensing”



Inhibit inflammation



Chronic stress control



Antioxidant properties

NEO GOLD PLUS



Stimulate immune system

NEO GOLD PLUS
Intestinal Health



Improve nutrient absorption

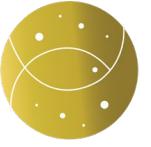
Stimulate appetite
NEO GOLD PLUS
Hepatic function



Support quick removal of toxins from the body



AQUASOJA



NEOGOLD

What to expect from NEOGOLD?

BIGGER

BETTER

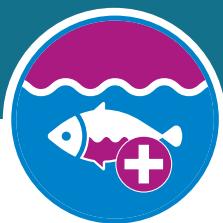
MORE

- HIGHER INTAKE
- BETTER GROWTH AND PERFORMANCE
- HIGHER SURVIVAL

How does NEOGOLD achieve that purpose?

03

CONTAINS HEALTH - & GROWTH – ORIENTED FUNCTIONAL INGREDIENTS



For what?	Benefit?	How?
STIMULATION OF THE IMMUNE SYSTEM	More resistance to stress and pathogens	Nucleotides-rich yeast extracts, macroalgae, shrimp hydrolysate
PREVENTION OF PATHOGENS (BACTERIA AND PARASITES)	Healthier gut, skin and gills	Botanical extracts rich in saponins, SCFA, MCFA, essential oils, yeast extracts
ENHANCEMENT OF LIVER METABOLISM AND FAT DIGESTION	Improved hepatic function and feed digestibility	Artichoke extracts, emulsifiers
CELL PROTECTION	Better resistance of body cells against oxidative stress	Antioxidants (grape polyphenols, vitamins, macroalgae)



VI – AQUASOJA FUNCTIONAL PRODUCTS – YGEIA PLUS

Prevent accumulation of bacterial pathogens

Parasitic control

“Quorum sensing”

YGEIA PLUS



Stimulate immune system

YGEIA PLUS

Intestinal Health



Inhibit inflammation

Chronic stress control

YGEIA PLUS



Antioxidant properties

YGEIA PLUS



Improve nutrient absorption

Stimulate appetite

YGEIA PLUS

Hepatic function



Support quick removal of toxins from the body

YGEIA PLUS



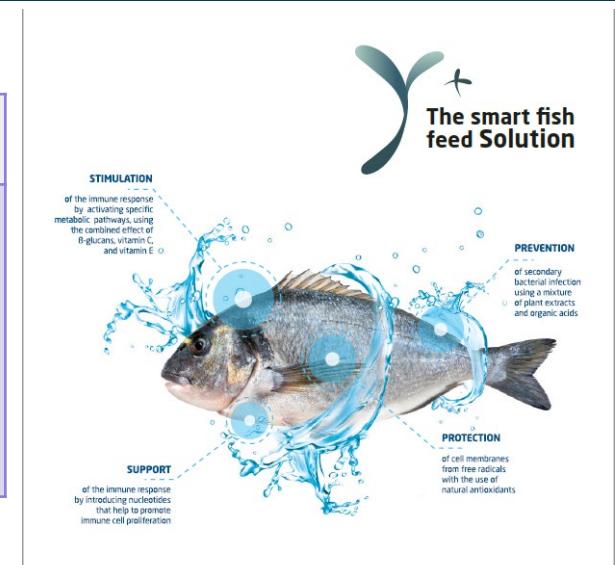
- First product of the Ygeia / Health line
- Launched in 2018;
- Key-words: reduce the stress effects / anxiety, fish welfare, immunestimulation, support of the IS

FISH SPECIES	FISH SIZE	WHAT IS THE GOAL?	COMPOSITION	FEEDING PROTOCOL	PELLET Ø
ALL	>5g	<ul style="list-style-type: none"> • Help fish coping with stress events (transport, vaccination, net changing, etc) • Stimulate and support the immune system • Relax the fish • Prevention against pathogens 	<ul style="list-style-type: none"> • β-glucans, nucleotides, plant extracts, organic acids, high digestible and palatable ingredients 	<p><u>Before a stress event:</u></p> <ul style="list-style-type: none"> • In fish >50g, for 2wk + 1wk after • In juveniles, for 3-5 days + 1 day after 	Pellets #1.5, 2.0, 2.4, 2.8, 4, 6, 8

Field results:

Mostly wanted for pre-vaccination in pre-grower fish (mainly seabass) -> calmer fish, easier handling, higher survival rates, better fish recovery;

In the CIIMAR – PORTO UNIVERSITY, tests are being carried out to demonstrate the effect of the product on the inflammatory response and on the efficiency of vaccination by artificially infecting seabass.



Rainbow trout Gilthead seabream Seabass Meagre





www.aquasoja.pt

Thank you!

