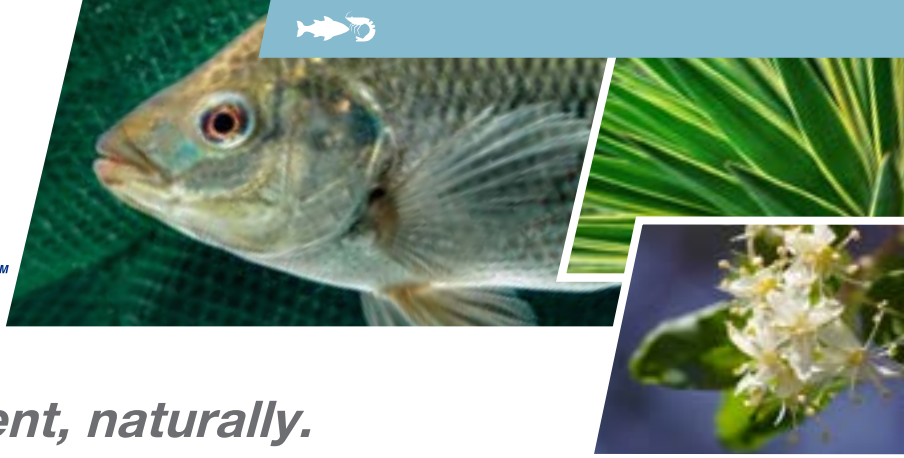


PAQ-Protex™

It all starts with a healthy gut

Protecting your investment, naturally.

PAQ-Protex™ nutritional speciality product is a natural feed additive especially designed for aquaculture.

PAQ-Protex contains a proprietary blend of saponins and polyphenols from *Yucca schidigera* and *Quillaja saponaria* plants proven to improve gut health and immunity in fish.

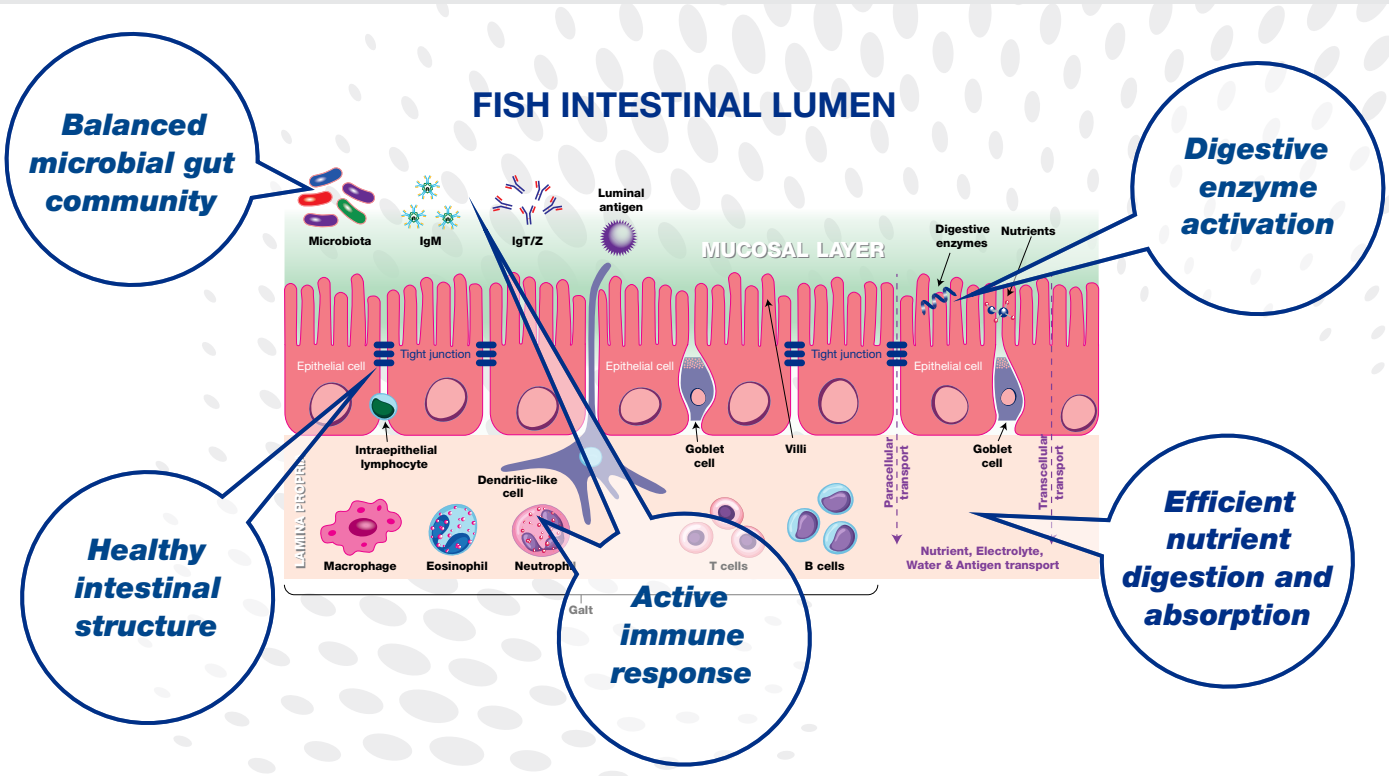
A healthy gut is the foundation for superior production performance.

What is optimal gut health?

- A stable and beneficial microbial community
- Optimal intestinal structure and morphology
- Efficient production of digestive enzymes
- Efficient digestion and absorption of nutrients
- A balanced immune response

The benefits of a healthy gut can be:

- Improved FCR and yield
- Better growth performance
- Higher survival rates
- Lower mortality due to disease challenges
- Effective pathogen elimination

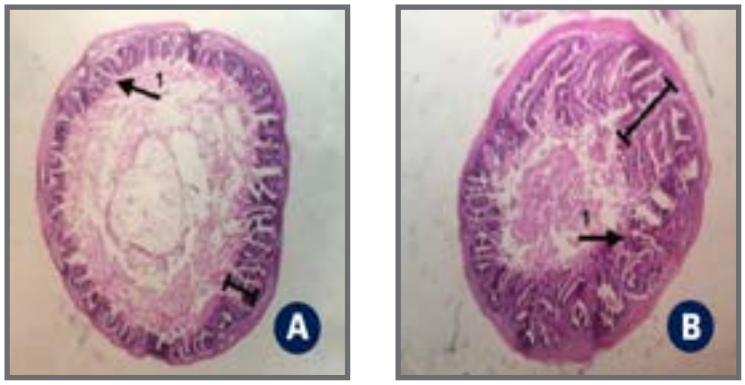


Optimal intestinal health can have positive benefits on the performance and yield of your aquaculture operation.

PAQ-Protex has consistently demonstrated improved gut health and immune response across all major aquaculture regions in the world, and is scientifically proven to support gut health for fish producers.

Healthy Intestinal Structure:

A study conducted in Red tilapia (*Oreochromis* sp.) of 10g initial mean weight, in six replicates of control groups not fed PAQ-Protex, and treatment groups fed 0.2kg/MT feed with PAQ-Protex, showing increased size and density of villi in the middle intestine when fed PAQ-Protex (Phibro internal data).

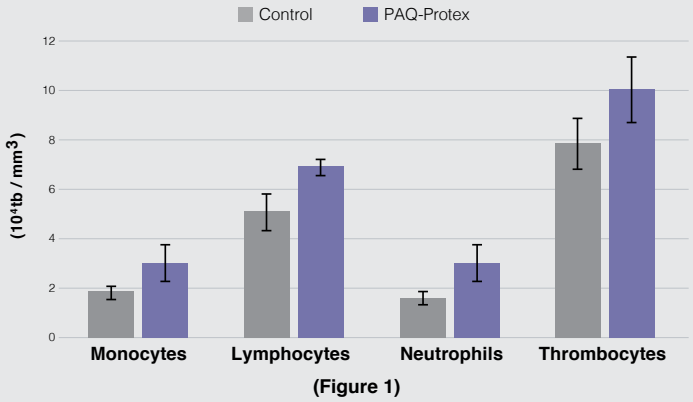


Control (No PAQ-Protex) PAQ-Protex (0.2kg/MT Feed)

Active Immune Response:

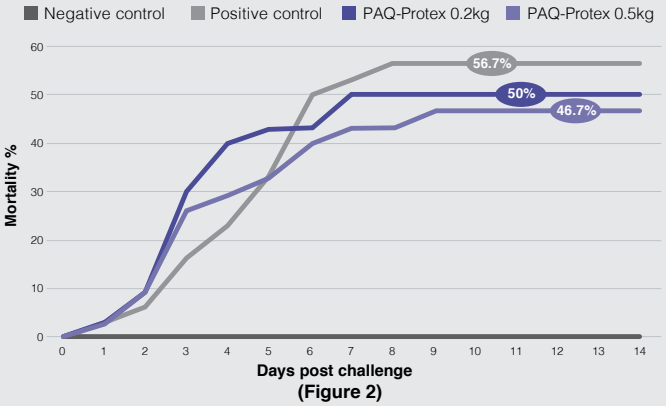
A study conducted in Red tilapia (*Oreochromis sp.*) of 10g initial mean weight, in six replicates of control groups not fed PAQ-Protex, and treatment groups fed 0.5kg/MT feed with PAQ-Protex, showing increased levels of important immune cells (Figure 1), and up to 10% reduction in mortality rates after *Streptococcus agalactiae* infection (Figure 2) when fed PAQ-Protex (Phibro internal data)

Immune parameters of Red tilapia when fed with PAQ-Protex



(Figure 1)

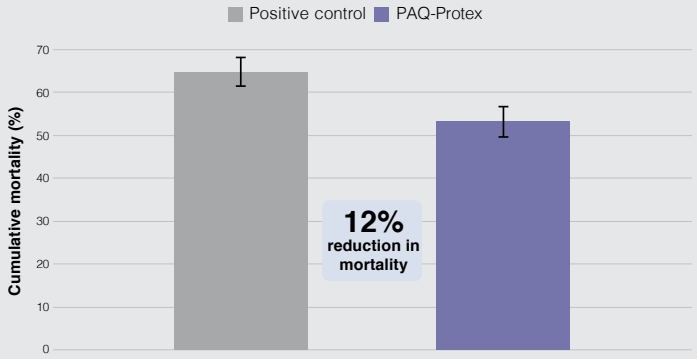
Mortality rates of Red tilapia when fed with PAQ-Protex after *Streptococcus* infection



(Figure 2)

A study conducted in Nile tilapia (*Oreochromis niloticus*) of 79.6g initial mean weight, in five replicates of control groups not fed PAQ-Protex, and treatment groups fed 2kg/MT feed with PAQ-Protex, showing improved survival after *Francisella orientalis* challenge when fed PAQ-Protex (*Phibro internal data*).

Cumulative mortality of Nile tilapia when fed with PAQ-Protex after *Francisella* infection

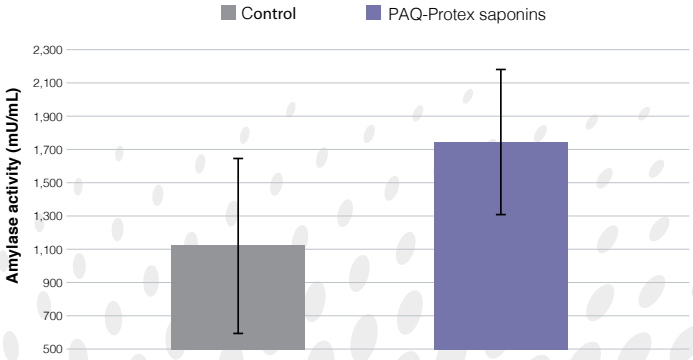


(Figure 3)

Digestive Enzyme Activation:

A study conducted in Sea bream (*Sparus aurata*) of approximately 22g mean weight, in four replicates of control groups not fed PAQ-Protex saponins, and treatment groups fed 2.0kg/MT feed with PAQ-Protex saponins, showing increased amylase activity when fed PAQ-Protex saponins *(Phibro internal data)*.

Amylase activity in Sea bream when fed with PAQ-Protex saponins

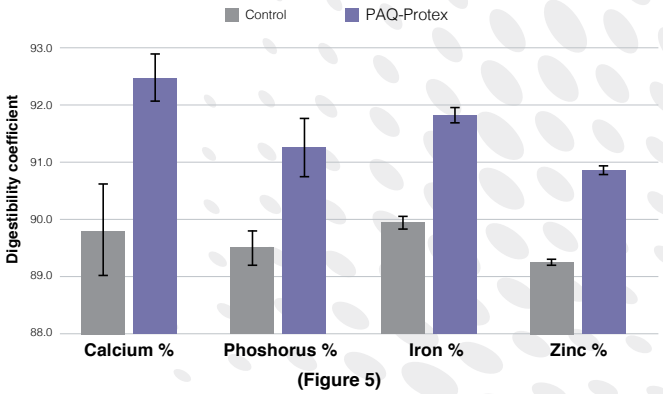


(Figure 4)

Efficient Nutrient Digestion and Absorption:

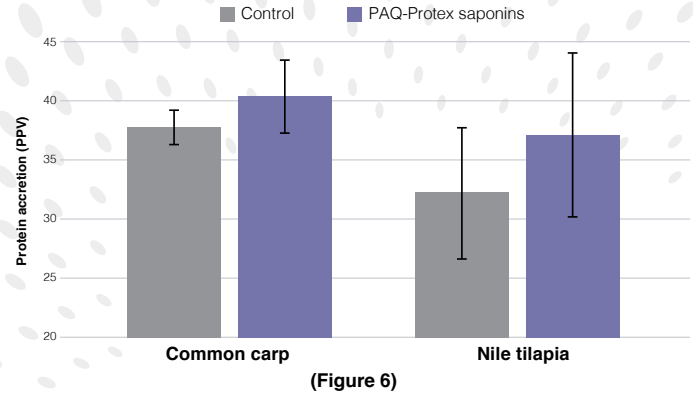
A study conducted in Nile tilapia *(Oreochromis niloticus)* of approximately 80g mean weight, in ten replicates of control groups not fed PAQ-Protex, and treatment groups fed 0.5kg/MT feed with PAQ-Protex, showing increased digestibility of minerals when fed PAQ-Protex (Phibro internal data).

Digestibility of minerals in Nile tilapia when fed with PAQ-Protex



(Figure 5)

Protein accretion in fish when fed with PAQ-Protex saponins

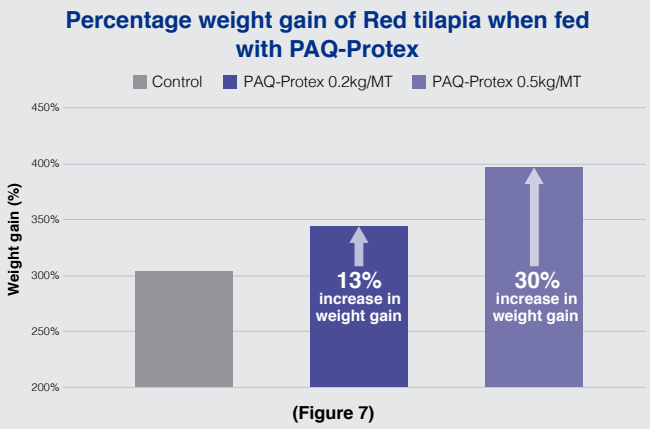


(Figure 6)

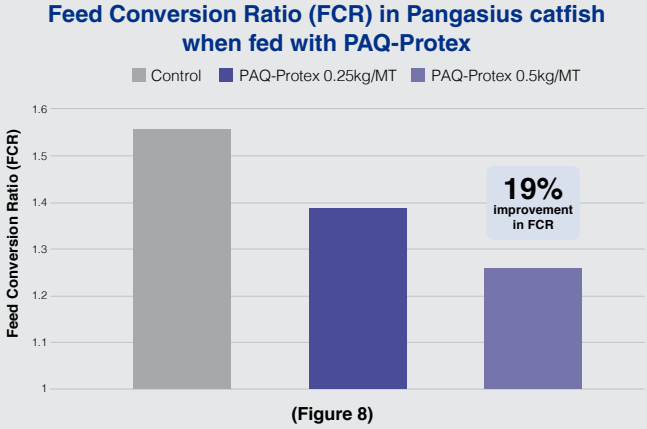
A study conducted in Nile tilapia (*Oreochromis niloticus*) and Common carp (Cyprinus carpio) showing elevated protein retention when fed PAQ-Protex saponins (*Francis et al 2001*). (Figure 6)

Improved gut health and immunity leads to better performance when using PAQ-Protex:

A study conducted in Red tilapia (*Oreochromis sp.*) of 10g initial mean weight, in six replicates of control groups not fed PAQ-Protex, and treatment groups fed 0.2kg/MT and 0.5kg/MT feed with PAQ-Protex, showing increased percentage weight gain when fed PAQ-Protex (Phibro internal data)



(Figure 7)



(Figure 8)

A study conducted in Pangasius catfish, in three replicates of control groups not fed PAQ-Protex, and treatment groups fed 0.25kg/MT and 0.5kg/MT feed with PAQ-Protex, showing a dose-related improvement in Feed Conversion Ratio (FCR) when fed PAQ-Protex (*Phibro internal data*) (Figure 8).

PAQ-Protex, supporting fish gut health and immunity in aquaculture operations around the world.

Active Immune Response

Triggers lysozyme activity and innate and adaptive immune systems.
Promotes parasite and bacterial pathogen elimination.
Promotes antioxidant, free-radical and anti-inflammatory activity.

Healthy Intestinal Structure

Increases villi numbers and folding.
Increases villi height and width.
Improves gut cell wall permeability.

Digestive Enzyme Activation

Enhances lipase, amylase and protease activity.
Improves digestibility of fatty acids.
Elevates total protein levels.
Increases protein synthesis.

Better Performance

Improves FCR, total biomass, survival and growth performance of fish.

Efficient Nutrient Digestion

Higher cell membrane permeability.
Greater protein and lipid accretion.

Scan for more information

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