



# SafMannan

Predictable performance



## Safmannan®

Advanced management in fish and shrimp industry

[phileo-lesaffre.com](http://phileo-lesaffre.com)

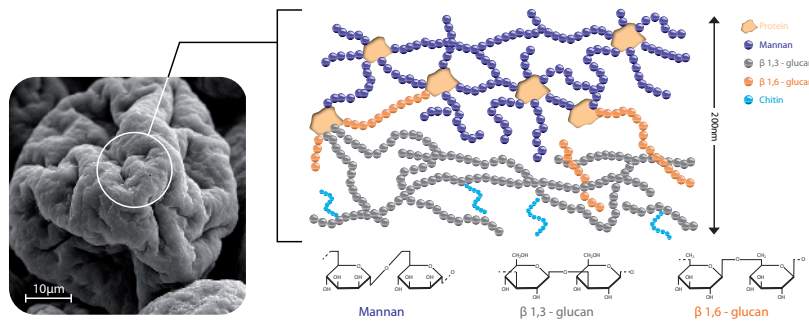


**Phileo**  
by Lesaffre

## Premium yeast fraction

### • Safmannan® premium quality

Rich in mannan-oligosaccharides (MOS) and  $\beta$ -Glucans [1,3 and 1,6], **Safmannan®** is obtained by autolysis of *Saccharomyces cerevisiae* proprietary bakery strains. Batch-to-batch consistency and high concentrations of active ingredients enable **Safmannan®** to achieve repeatable excellent performance.



### • Safmannan® meets the highest standards

**Safmannan®** premium yeast fraction meets the highest standards of ingredients and consistency, yielding significantly better benefits than other yeast cell wall products.

#### Yeast cell wall products

##### Origin and Process

##### BY-PRODUCT

- Non selected yeast strains
- Yeast cell wall come from trading

##### Composition

##### NON-UNIFORM PRODUCTS

- No guarantee of component composition
- Basic standard feed analysis: crude protein from 10 to 50%



#### Safmannan®

##### SELECTED YEAST FRACTIONS

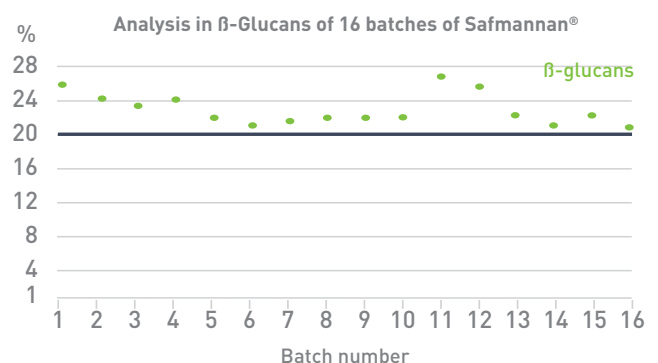
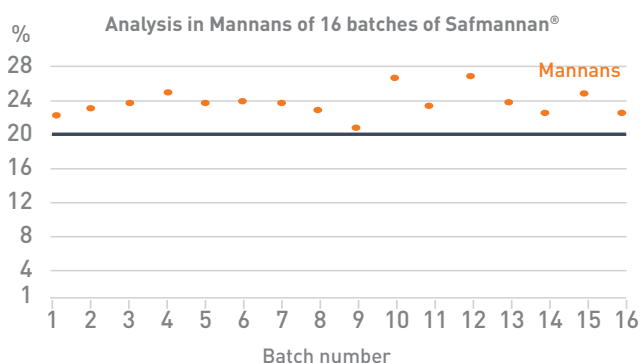
- Exclusive yeast strains
- Full manufacturing process controlled

##### BATCH-TO-BATCH CONSISTENCY

- Consistent concentration of Mannan:  $\geq 20\%$
- Consistent concentration of  $\beta$ -Glucan:  $\geq 20\%$



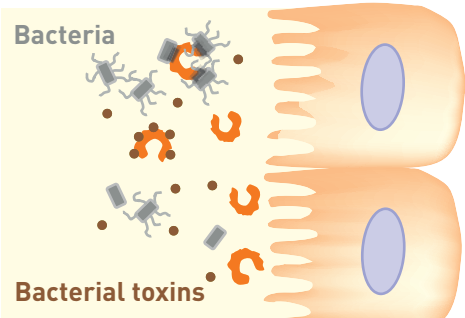
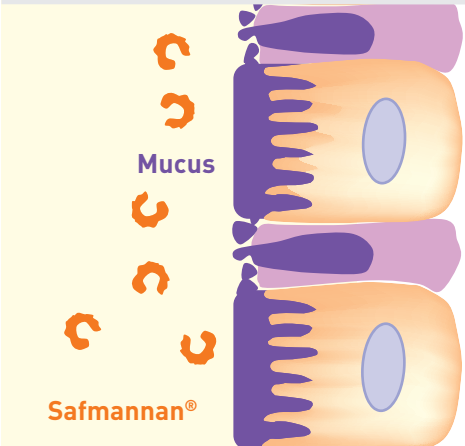
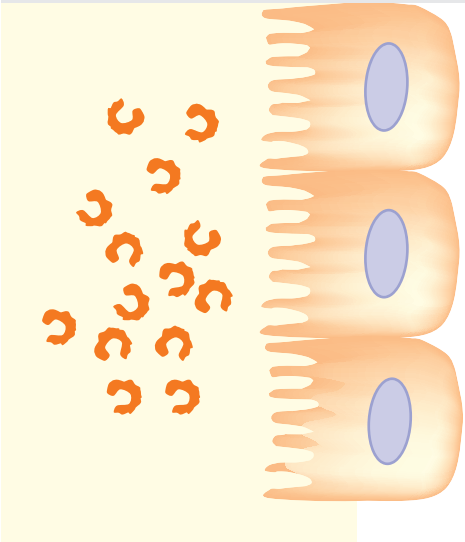
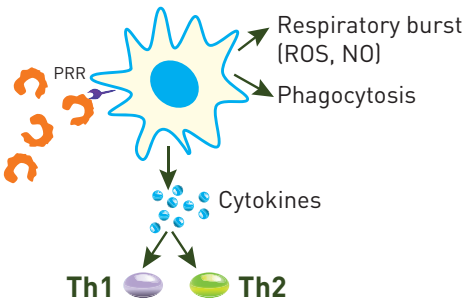
### • Safmannan® batch-to-batch consistency



## Mode of action and key benefits

The benefits of **Safmannan®** have been demonstrated world-wide by recognised independent institutions. The main effects of **Safmannan®** in aquaculture are indicated below. **Safmannan®** helps to:

- Reduce pathogen pressure
- Promote gut function
- Support natural defences

	MODE OF ACTION	KEY BENEFITS
 <p><b>Bacteria</b></p> <p><b>Bacterial toxins</b></p>	<ul style="list-style-type: none"> <li>▶ Pathogen binding</li> <li>▶ Toxin adsorption</li> </ul>	<p><b>Reduction of pathogen pressure</b></p>
 <p><b>Mucus</b></p> <p><b>Safmannan®</b></p>	<ul style="list-style-type: none"> <li>▶ Stronger intestinal mucosal barrier</li> <li>▶ Villi maintenance</li> </ul>	<p><b>Improvement of gut function</b></p>
	<ul style="list-style-type: none"> <li>▶ Enhancement of humoral response (IgM, AMP*)</li> <li>▶ Stimulation of cellular response (phagocytosis, lysozyme activity)</li> </ul> <p><b>Macrophage, Neutrophils</b></p>  <p>PRR</p> <p>Respiratory burst (ROS, NO)</p> <p>Phagocytosis</p> <p>Cytokines</p> <p>Th1 Th2</p>	<p><b>Immunomodulation and regulation of inflammation</b></p>

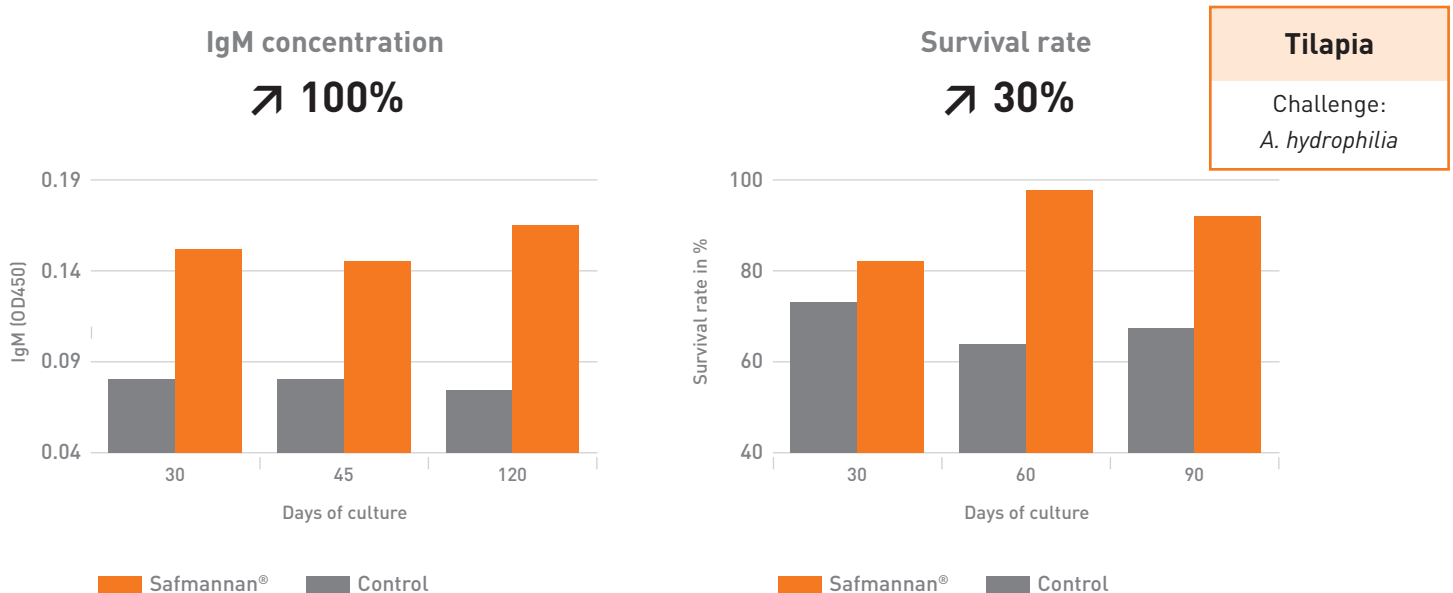
\*Anti-microbial peptides.

## Support natural defences

The main components of **Safmannan®** such as 1,3 and 1,6 beta glucans and mannans can directly stimulate the innate immune system in aquatic species. The animals then have the capacity to respond faster and more efficiently to challenging conditions such as pathogenic infections.

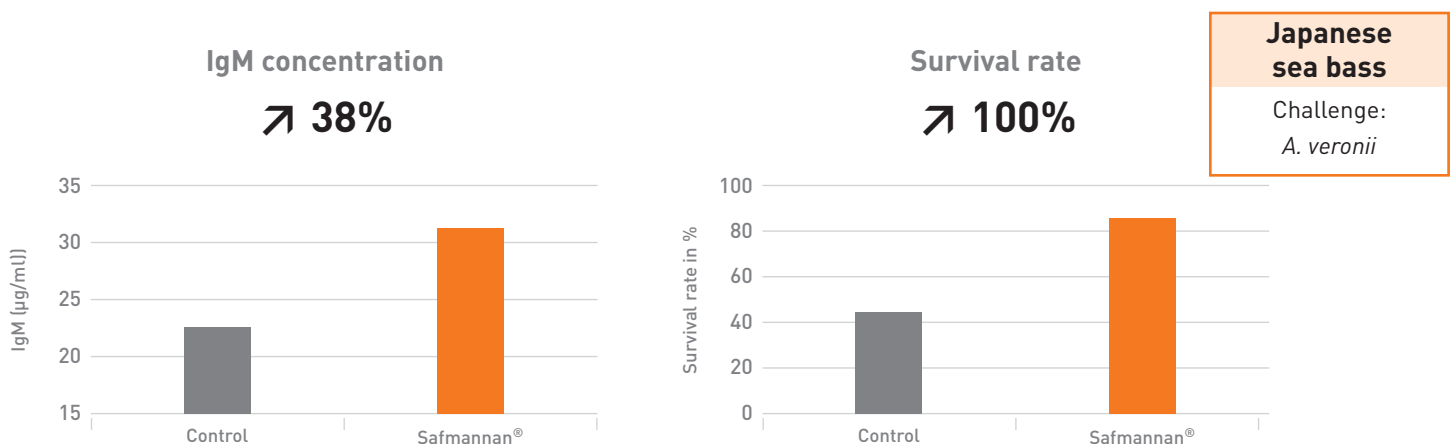
### • **Safmannan®** increases immune capacity and survival

**Safmannan®** (3 kg/T) stimulates IgM production and improves survival rate in tilapia during *Aeromonas hydrophilia* infection (Mexico).



### • **Safmannan®** increases immune capacity and survival

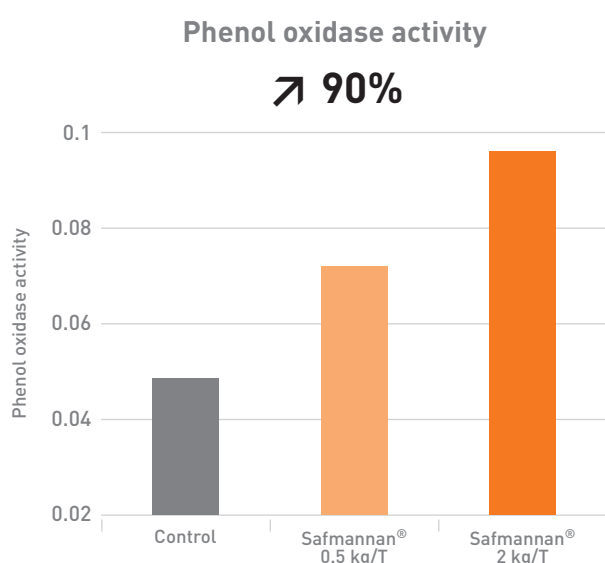
**Safmannan®** fed during 10 weeks at 0.5 kg/T increases significantly the production of IgM and improves the survival of Japanese sea bass during infection with *Aeromonas veronii* ( $P < 0.05$ ) (Yu *et al.*, 2014).



## Support natural defences

### • Safmannan® increases immune capacity

Supplementing the diet with 2 kg/T of **Safmannan®** is the most effective way to significantly increase phenoloxidase activity in whiteleg shrimp infected with *Vibrio parahaemolyticus* (strain responsible for acute hepatopancreatic necrosis syndrome (AHPND/ EMS)) after 2 weeks of feeding (University of Can Tho, Vietnam).

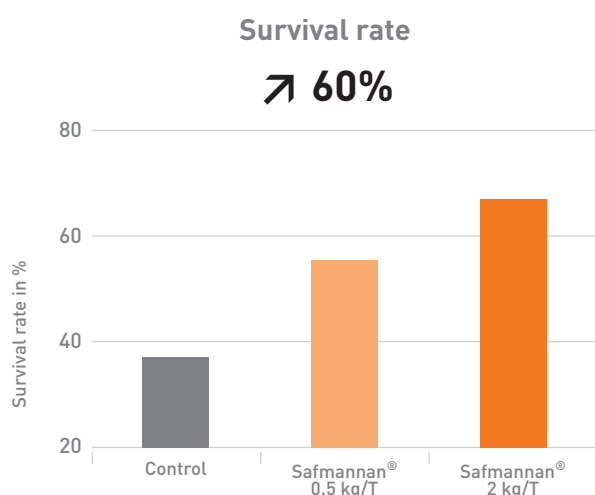


**Shrimp**  
Challenge:  
*V. parahaemolyticus*



### • Safmannan® increases survival rate

**Safmannan®** (2 kg/T) significantly increases phenoloxidase activity and subsequently improves survival rate in whiteleg shrimp infected with *Vibrio parahaemolyticus* (strain responsible for acute hepatopancreatic necrosis syndrome (AHPND/ EMS)) after 2 weeks of feeding (University of Can Tho, Vietnam).



**Shrimp**  
Challenge:  
*V. parahaemolyticus*



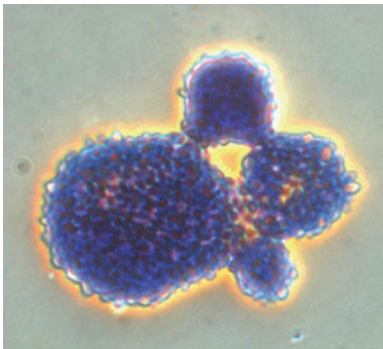


## Reduce pathogen pressure

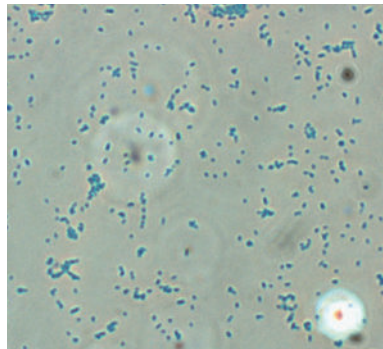
**Safmannan®** contains a high concentration of mannans. These compounds have the capability to bind to lectin molecules at the surface of pathogens, trap invading microbes and then prevent them from colonising the intestinal tract of aquatic animals.

### • **Safmannan® binds pathogen**

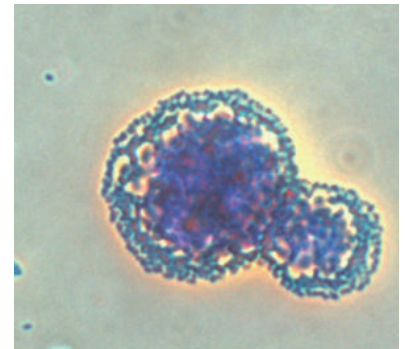
*In vitro* studies show that **Safmannan®**, premium yeast fraction, is able to bind *Vibrio campbelii*, a major pathogen in shrimp hatcheries, after only 30 minutes of contact.



Safmannan®



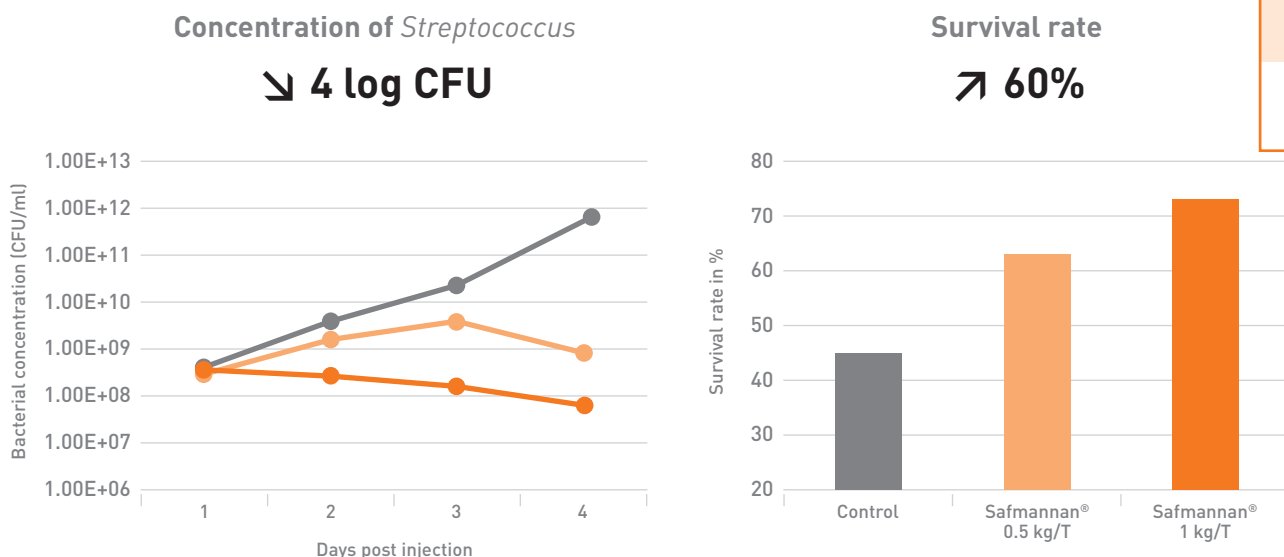
*Vibrio campbelii*



Safmannan®  
+ *Vibrio campbelii*

### • **Safmannan® improves survival, by reducing pathogen pressure**

**Safmannan®** fed during 90 days (0.5 – 1 kg/T) decreases pathogen load in the intestine and improves survival rate during a *Streptococcus agalactiae* challenge in tilapia (Chulalongkorn University, Thailand).

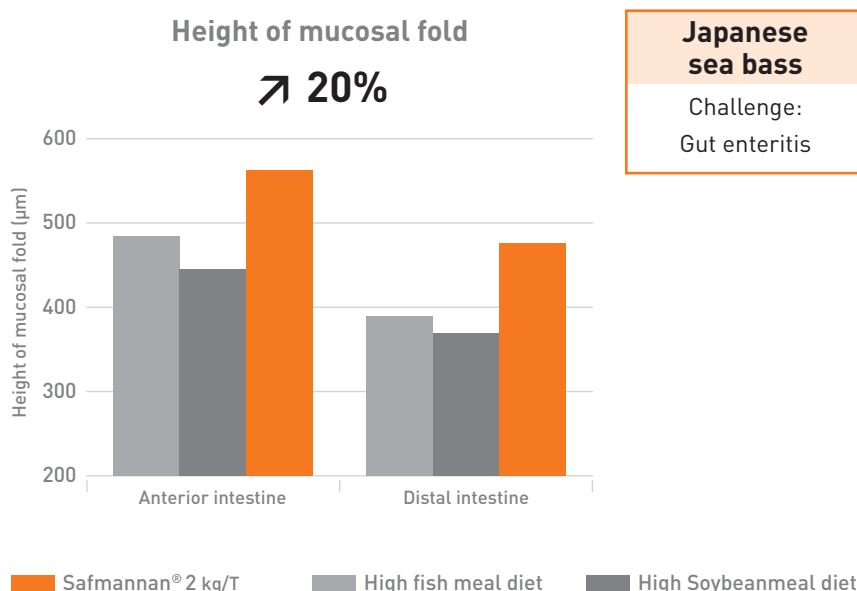


## Promote gut function

Safmannan® can improve gut morphology and integrity. Aquatic animals then have a better capacity to absorb nutrients, and to face challenging environmental conditions.

### • Safmannan® improves the height of mucosal fold

Safmannan® included at a rate of 2kg/T of feed enhances the mucosal folds of Japanese sea bass fed for 10 weeks with a feed containing 20% Soybean meal (Yu *et al.*, 2014).



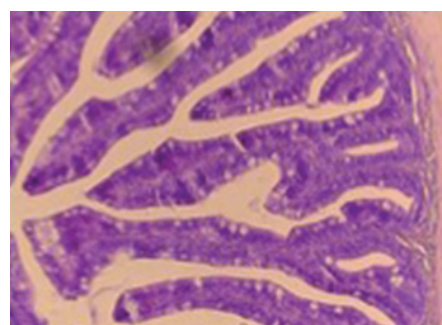
**Japanese sea bass**  
Challenge:  
Gut enteritis



High fish meal



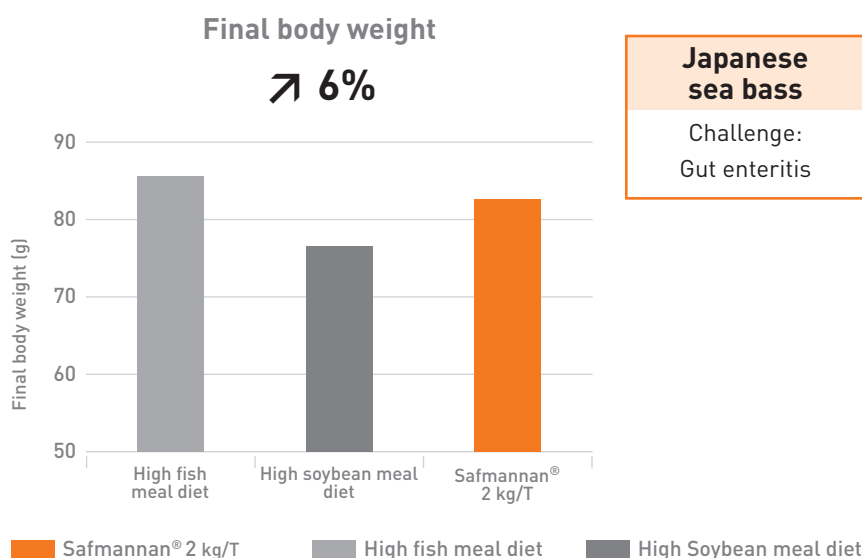
High soybean meal



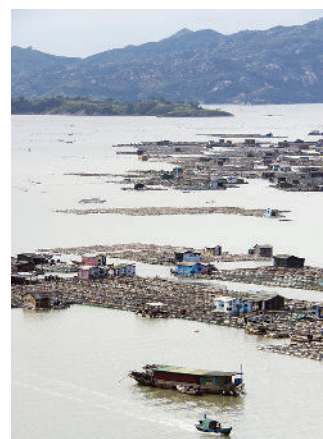
Safmannan® at 2kg/T

### • Safmannan® increases body weight

Safmannan® included at a rate of 2kg/T of feed increases the final body weight of Japanese sea bass fed for 10 weeks with a feed containing 20% Soybean meal (Yu *et al.*, 2014).



**Japanese sea bass**  
Challenge:  
Gut enteritis



# SafMannan

Predictable performance



- ✓ Support natural defences
- ✓ Reduce pathogen pressure
- ✓ Promote gut function

➤ Resistance

➤ Performance

Species	Intended purpose	Dosage in feed			
		Hatchery Larvae-fry	Grow out farm		
			Starter	Grower	Finisher
Shrimp	Immunity enhancement, stress relief	1 to 2 kg/T			
	Immunity enhancement		2 kg/T	1 kg/T	0.5 kg/T
Freshwater fish, tilapia	Immunity enhancement, stress relief	1 to 2 kg/T			
	Immunity enhancement		1 kg/T	0.5 kg/T	0.5 kg/T
Marine fish	Immunity enhancement, stress relief	1 to 2 kg/T			
	Immunity enhancement		0.5 kg/T	0.5 kg/T	0.5 kg/T
	Fish meal replacement (feed with 15-20% soybean meal)*		2 kg/T	2 kg/T	2 kg/T

\* Dosage can be adapted to the feed composition.

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