



Innate immunity and survival improvements in Japanese sea bass after bacterial challenge

Objective: To evaluate the effects of Safmannan® supplementation on innate immunity and survival rate in Japanese sea bass when challenged with *Aeromonas veronii*.

Trial design

Comparative experimental study.
Location: Chinese Academy of Agricultural Sciences, Beijing, China.

Species/life stage

Juvenile Japanese sea bass.

Main criteria

IgM level and survival rate.

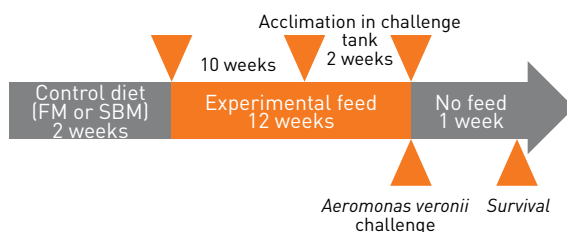
Reference

Yu *et al.*, Aquaculture, 2014.

Protocol

	Fish meal content	Soybean meal content
Fish meal diet (FM)	38.5%	0%
Soybean meal diet (SBM)	25.0%	20.0%

	FM control group	SBM control group	Safmannan® +SBM group
Fish/tank	30	30	30
Tanks/group	6	6	6



Conclusion

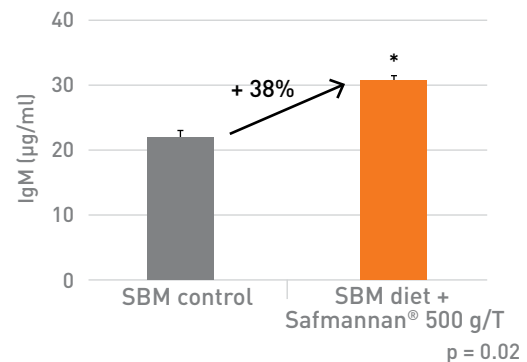
Supplementing a soybean meal diet with Safmannan® at 500 g/T significantly increases IgM production and improves the survival of Japanese sea bass when challenged with *Aeromonas veronii*.

Main results

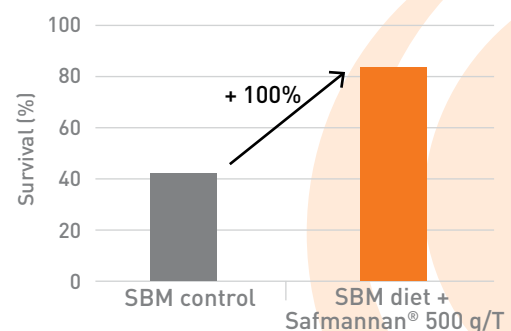
Key Benefits:

- ↑ IgM production: + 38%
- ↑ Survival rate: + 100%

IgM production after challenge



Survival rate 7 days after challenge



Introduction

Bacterial disease can cause major economic losses for fish farms throughout the world. Sea farms are no exception. Due to the difficulties of implementing strict biosecurity measures and an efficient treatment programme, the use of the appropriate feedstuffs to prevent pathogens is of critical importance. Improving immune response is an efficient way of reducing the impact of bacterial disease on fish stocks. The premium yeast fraction, Safmannan®, contains β -glucans that can directly act on innate immune mechanisms. It also contains mannans that are able to keep bacteria from attaching to the gut epithelium. This combination is an efficient way to fight against pathogens in aquaculture.

Material & methods

Juvenile Japanese sea bass were acclimatised in laboratory conditions and fed soybean meal (SBM) or fish meal (FM) control diets for two weeks before beginning the experimental study.

Fish (initial body weight 18.30 ± 0.01 g) were selected and distributed into 280 L tanks after 24 h starvation with 30 fish per tank, and six tanks per treatment. Water temperature was maintained at $26 \pm 1^\circ\text{C}$, pH = 7 - 8, dissolved oxygen (DO) > 6 mg/L and $\text{NH}_4\text{-N} < 0.5$ mg/L. Aeration was supplied to each tank 24 h per day and photoperiod (darkness/light) was 12D:12L.

The treatments were as follows:

- **Fish meal (FM) control group:** 38.5% fish meal, no soybean meal.
- **Soybean meal (SBM) control group:** 25% fish meal and 20% soybean meal.
- **Safmannan® group:** Soybean meal diet supplemented with Safmannan® at 500 g/T.

Feeding method

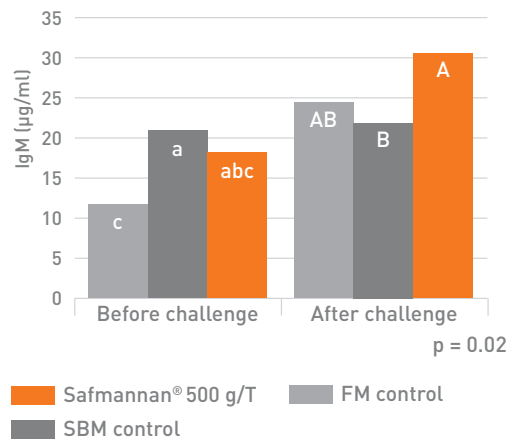
Fish were fed to apparent satiation twice daily at 8.00 am and 3.00 pm for 10 weeks.

At the end of the growth trial, 4 fish from each tank were sampled and haematological parameters were measured. Afterwards, the remaining 20 fish from each tank were transferred into a still water system with the temperature set at $27 \pm 1^\circ\text{C}$, and allowed to recover from weighing and sampling stress by a 2-week acclimatisation. The fish from each treatment were fed as before, and were then challenged by intramuscular injection with *Aeromonas veronii* (CGMCC No. 4274) at 8×10^4 cells/100 g body weight. Samples from ten fish were then collected for plasma immune parameters 2 days after this challenge and the others were recorded for 7-day cumulative survival rate without any food. No fish death was recorded 24 h after injection, meaning no fish died because of injection stress.

Results and discussion

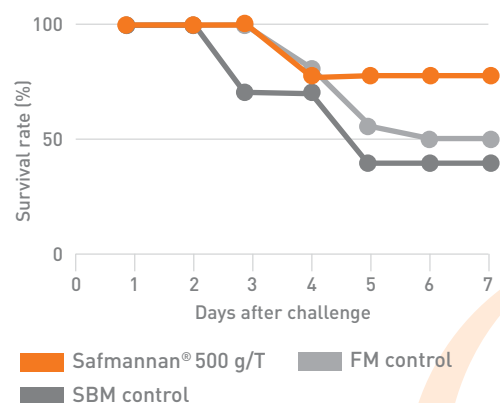
IgM levels were significantly increased after the challenge for those given either the fish meal diet or Safmannan® treatment (500 g/T), both showing a strong immune stimulation: + 74% of IgM production. Compared to FM group, SBM groups had significantly higher IgM levels before the challenge. This study shows that there is the possibility of a pathological problem when feeding the soybean meal diet alone.

IgM production



The survival of Japanese sea bass decreased for the control groups (SBM or FM), but not for Safmannan® group. In this group, fish survival rate was 85% compared to 42% in SBM control group. This reflects the improved immune stimulation seen in this group.

Survival rate



Keywords Safmannan®, Japanese sea bass, *Aeromonas veronii*, bacterial challenge, IgM level, survival.

Reference Yu H.H., Han F., Xue M., Wang J., Tacon P., Zheng Y.H., Wu X.F., Zhang Y.J., 2014. Efficacy and tolerance of yeast cell wall as an immunostimulant in the diet of Japanese seabass (*Lateolabrax japonicus*). *Aquaculture* 432, 217–224.