# Impact of Replacing Fishmeal with Empyreal® 75 in *Seriola lalandi* on Growth and Production

**BACKGROUND:** The Yellowtail Kingfish (*Seriola lalandi*) is a marine fish commonly produced in Pacific regions. However, development of this species as an alternative to other marine species in aquacultures is on a rise globally. Empyreal® 75 is a proven value-added option to replace other protein ingredients in the diet. Replacement of common protein sources in Yellowtail diets with Empyreal® 75 is beneficial to understand application of this technology.

**OBJECTIVE:** Test the production performance of Yellowtail Kingfish using Empyreal® 75 in place of fishmeal.

## MATERIALS AND METHODS:

- Treatments consisted of two diets containing either fishmeal or Empyreal® 75, with the later diet supplemented to balance the amino acid profile (Table 1).
- Each treatment group had 100 Yellowtail Kingfish, weighing approximately 324g, divided into four replicates with 25 fish per replicate.
- Feed response was measured at the end of 12 weeks with Yellowtail counted and weighed to determine: weight gain, survival and feed conversion ratio.

## RESULTS:

- Although the control diet, containing fishmeal, had higher growth production, this was not significantly different from the Empyreal® 75 diet (Table 2).
- Empyreal® 75-fed Yellowtail had a slightly better feed conversion ratio.
- As noted in the below figure, muscle coloration was not affected by feeding Empyreal® 75 and the Empyreal®-fed fish had a "wild caught" nature due to coloration on the tail.

## CONCLUSIONS:

- Based on this research, Empyreal® 75 can replace fishmeal in Yellowtail Kingfish diets. However, total replacement may not be optimal.
- Based on other research, up to 15% replacement may be optimal to achieve equivalent or improved growth.
- Reduction in other proteins that may not be sustainable, or contain anti-nutritional factors, can be beneficial to production.

**TABLE 1.** Composition of basal diet and Empyreal® 75 diets.
Diets formulated to contain 36% protein and 8% lipid.

| | Control | Empyreal® 75 |
|---|---|---|
| Fishmeal | 60.0 | - |
| Empyreal® 75 | - | 55.0 |
| Soybean Meal | 28.5 | 25.0 |
| Tapioca Starch | 10.0 | 10.0 |
| Taurine | - | 3.0 |
| Lysine | - | 2.5 |
| Methionine | - | 0.5 |
| Calcium Phosphate | - | 2.5 |
| Vitamin Premix | 1.0 | 1.0 |
| Mineral Premix | 0.5 | 0.5 |

**TABLE 2.** Production response in Yellowtail Kingfish to Empyreal® 75 fed over 12 weeks

| Diet | Initial Weight (g) | Final Weight (g) | SGR | Feed Conversion Ratio | Survival (%) |
|---|---|---|---|---|---|
| Control | 328.0 | 451.0 | 0.37 | 5.7 | 100 |
| Empyreal® 75 | 321.0 | 421.2 | 0.32 | 5.5 | 99 |

**CONTROL DIET:**

**EMPYREAL® 75:**