

# Impact of Replacing Fish Meal with Empyreal® 75 in *Seriola Lalandi* on Growth and Production

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**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 fish meal.

## Materials and Methods:

- Treatments consisted of two diets containing either fish meal or Empyreal 75, with the latter diet supplemented to balance the amino acid profile (Table 1).
- Each treatment group had 100 yellowtail kingfish, weighing approximately 324 g, 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.

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

|                   | Control | Empyreal 75 |
|-------------------|---------|-------------|
| Fish Meal         | 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         |

**Results:**

- Although the control diet, containing fish meal, 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.

**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 Diet:



### Conclusions:

- Based on this research, Empyreal 75 can replace fish meal 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.

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