

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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