

Evaluation of lipid-extracted algae meal in diets of juvenile red drum *Sciaenops ocellatus*

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A feeding trial was conducted to evaluate the potential replacement of fishmeal and soy protein concentrate in the diets of juvenile red drum (*Sciaenops ocellatus*) with lipid-extracted algae meal (LEA) from *Chlorella* sp.. Algae were cultured in ponds and processed via continuous extraction, resulting in a product containing 21.26% crude protein (CP), 4.59% crude lipid (CL) and 34.1% ash. Five test diets were formulated to contain 40% CP and 10% CL. In the reference diet, all of the CP was equally contributed by Special Select menhaden fishmeal and soy protein concentrate. In the experimental diets, LEA replaced 5, 10, 20, and 25% of the CP in the reference diet. Ash content of each diet was balanced by adding diatomaceous earth.

The feeding trial was conducted with juvenile red drum in 110-liter glass aquaria connected as a recirculating system maintained at brackish (~7 ppt) salinity. Each dietary treatment was randomly assigned to triplicate groups of 22 fish per aquaria. Fish were fed twice daily at the same rate which was initially 6% of body weight and gradually reduced to 4% by the end of the 7-week trial.

Weight gain, feed efficiency (FE), survival, and protein efficiency ratio (PER) were significantly ($P<0.05$) affected by some dietary treatments, with substitution levels of 20 and 25% causing significant reductions in various responses. Protein and energy retention, hepatosomatic index (HSI; liver wt. $\times 100$ /body wt.), muscle ratio (fillet wt. $\times 100$ /body wt.), intraperitoneal fat (IPF) ratio (IPF wt. $\times 100$ /body wt.) and whole-body proximate composition values were not significantly affected by the dietary treatments. Based on the results of this experiment, incremental replacement of fishmeal and soy protein concentrate with LEA reduced the weight gain and feed utilization of red drum but replacement of up to 10% of dietary protein with LEA was possible without causing substantial reductions in fish performance.

Table 1. Performance indices of red drum fed various amounts of LEA

Dietary Treatment	Weight gain (%)	Survival (%)	FE (g gain/g feed)	PER (g gain/ g protein fed)	HSI (%)	IPF ratio (%)	Muscle ratio (%)
Reference	580	77.3	0.76	1.73	1.82	0.29	28.8
5% LEA	517	81.8	0.73	1.67	1.92	0.22	29.0
10% LEA	496	66.7	0.69	1.53	2.08	0.13	29.7
20% LEA	271	62.1	0.46	1.01	2.14	0.18	29.0
25% LEA	254	51.5	0.41	0.91	1.54	0.17	29.3
P-value	< 0.0001*	0.0087*	< 0.0001*	< 0.0001*	0.203	0.6297	0.8689

- significant P-values denoted by *

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