

Digestibility of Empyreal[®] 75 in *Oncorhynchus mykiss*

BACKGROUND

The digestibility of Empyreal[®] 75 was determined at the USDA-ARS Fish Technology Center in Bozeman, MT as part of the Trout Grains Project to evaluate current and emerging ingredients for use in farmed trout diets. Although performance in use of an ingredient is our primary metric for valuation of Empyreal[®] 75, this ingredient was evaluated.

OBJECTIVE

To determine the digestibility of Empyreal[®] 75 in *Oncorhynchus mykiss* (trout).

MATERIALS AND METHODS

- A complete reference diet meeting or exceeding all known nutritional requirements was blended with the test ingredients (Empyreal[®] 75) in a 70:30 ratio (dry-weight basis) to form test diets. Yttrium oxide was included in the diets as an inert marker.
- Ten fish weighing 700g each were stocked in triplicate 500L tanks. Fish were fed by hand to apparent satiation and fecal samples collected via manual stripping.
- Apparent digestibility coefficients of each nutrient in the test diet and ingredients were calculated according to the following equations (Kleiber 1961, Forster 1999).

RESULTS

Apparent Digestibility Coefficient	(%)
Dry Matter	95
Fat	92
Crude Protein	89
Alanine	91
Arginine	92
Aspartic Acid	87
Glutamic Acid	90
Glycine	85
Histidine	87
Isoleucine	88
Leucine	91
Lysine	88
Methionine	92
Phenylalanine	91
Proline	91
Serine	91
Threonine	86
Tyrosine	92
Valine	88

$$ADCN_{diet} = 100 - 100 \left\{ \frac{\% Yt \text{ in diet} \times \% \text{ nutrient in feces}}{\% Yt \text{ in feces} \times \% \text{ nutrient in diet}} \right\}$$

$$ADCN_{ingredient} = \{(a+b) ADCN_t - (a) ADCN_r\} b^{-1}$$

where,

$ADCN_{ingredient}$ = apparent digestibility coefficient of the nutrient in the test ingredient

$ADCN_t$ = apparent digestibility coefficients of the nutrient in the test diets

$ADCN_r$ = apparent digestibility coefficients of the nutrient in the reference diet

$a = (1-p) \times$ nutrient content of the reference diet

$b = p \times$ nutrient content of the test ingredient

$p =$ proportion of test ingredient in the test diet

CONCLUSIONS

- Overall, dry matter, fat and crude protein exhibited good digestibility as measured in this project.
- Empyreal[®] 75 amino acid digestibility averaged 89% digestibility.
- Based on available amino acids and high protein content, Empyreal[®] 75 is a flexible ingredient suitable for many diets.