AQUACULTURE

NUTRIENT DIGESTIBILITY OF ALTERNATIVE FEED INGREDIENTS BY CHANNEL CATFISH

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KNOWING NUTRIENT DIGESTIBILITY/ AVAILABILITY OF VARIOUS FEED INGREDIENTS IS ESSENTIAL IN FORMULATING COST-EFFECTIVE CATFISH FEEDS TO ENSURE ALL NUTRIENT AND ENERGY REQUIREMENTS ARE MET FOR OPTIMUM FISH PERFORMANCE.

Traditional catfish feeds are typically comprised of soybean meal, cottonseed meal, corn, wheat middlings, and small amounts of animal proteins and fats, as well as vitamin and mineral supplements. Nutrient and energy digestibility for these ingredients have been determined for channel catfish, and values have been widely used in commercial feed formulations. Recently, with the dramatic increase in prices of traditional feed ingredients, such as soybean meal and corn, alternative feedstuffs, such as corn gluten feed, and corn germ meal, are being used to partially replace traditional ingredients in catfish feeds. Research has shown these alternative feedstuffs are good sources of protein and energy that can be used, up to a certain level, without affecting catfish performance.

	Corn gluten feed	Corn germ meal	Distillers grains	Canola meal	Soybean meal
Crude protein	74.6 c	83.7 b	86.9 b	76.9 c	94.2 a
Crude fat	92.8	91.9	93.8	92.4	96.8
Energy	52.3 b	57.0 b	58.5 b	52.2 b	79.2 a
Lysine	67.1 c	77.6 b	72.1 bc	78.9 b	93.8 a
Methionine	69.1 c	80.0 b	84.8 ab	82.6 b	89.2 a
Cystine	72.9 c	78.4 b	81.7 b	79.7 b	91.1 a

*Means in a row followed by different letters are significantly different at a 5% probability level.

Table 1: *Apparent digestibility coefficients* (%) of protein, fat, and energy, and apparent availability coefficients (%) of the most limiting essential amino acids lysine, methionine, and cystine of test ingredients for channel catfish.*

Since feed cost currently accounts for nearly 60% of the total variable cost in catfish production, knowing the nutrient and energy digestibility/availability of these emerging alternative feedstuffs is essential to more precisely formulate cost-effective feeds that not only meet catfish nutrient requirements, but also maximizes feed utilization and improves profit. A study was conducted to determine apparent digestibility coefficients of protein, fat, and energy, and apparent availability coefficients of essential amino acids for corn gluten feed, corn germ meal, distillers grains, and canola meal for channel catfish. Soybean meal was included as a test ingredient for the comparison purpose.

Catfish during a typical feeding regimen.

Channel catfish averaging 0.32 pound per fish were stocked in 30-gallon cylindro-conical digestibility tanks and reared at optimum temperature (86ºF). Fish were fed test diets containing chromium oxide as a marker. Fecal samples were collected by sediment method. Results show the apparent digestibility/availability coefficients of protein, essential amino acids, and energy in the alternative protein feedstuffs tested were generally lower than those in soybean meal by channel catfish (Table 1). Apparent digestibility coefficients of protein ranged 75–87% and those of energy ranged 52–59% for alternative feedstuffs. Lysine in alternative feedstuffs was 67–79%, methionine was 69–85%, and cystine was 73–82% available to channel catfish. Apparent digestibility/availability coefficients determined in this study can be useful in formulating cost-effective catfish feeds using these alternative feedstuffs to ensure that all nutrient and energy requirements are met for optimum fish performance.