

AQUACULTURE

USING ALTERNATIVE PROTEIN SOURCES TO REPLACE SOYBEAN MEAL IN CATFISH FEEDS

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"AMONG ALL PLANT-PROTEIN SOURCES, SOYBEAN MEAL HAS THE BEST PROTEIN QUALITY, AND IT CAN MEET ALL AMINO ACID REQUIREMENTS FOR CHANNEL CATFISH. HOWEVER, SOYBEAN MEAL IS MORE EXPENSIVE THAN MOST OTHER PLANT PROTEIN SOURCES. USING ALTERNATIVE PROTEIN SOURCES TO REPLACE SOYBEAN MEAL WITHOUT AFFECTING FISH GROWTH WOULD REDUCE FEED COST FOR CATFISH PRODUCTION."

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Soybean meal has been the main protein source for catfish because of its high-quality protein and excellent amino acid balance. However, soybean meal prices have increased dramatically in recent years and have reached over \$500 per ton at times. Using less expensive alternative protein sources to replace soybean meal would reduce feed cost. Research in the Mississippi Agricultural and Forestry Experiment Station with channel catfish and hybrid catfish has generally shown about half of the soybean meal can be replaced by using cottonseed meal along with one of the corn milling by-products (corn gluten feed or corn germ meal) in the



diet without negatively affecting fish growth. In one pond study, scientists found a combination of cottonseed meal and corn distillers dried grains with solubles (DDGS), another corn milling by-product, could replace all soybean meal in the catfish feeds. Even if diets without soybean meal may not be suitable for

maximum growth of catfish for an entire growing season, they may have short-term applications at times when soybean meal prices are too high.

A pond trial was initiated to look at the use of two or three alternative protein sources to replace soybean meal in channel catfish feeds. The trial tested six

diets (28% protein) with different combinations of alternative protein sources including cottonseed meal, DDGS, corn germ meal, peanut meal, and pork meat and bone meal. We stocked channel catfish stockers (193 pounds per 1,000) in thirty 0.1-acre ponds at 6,000 fish per acre, and fed them once a day to all they would eat for a growing season.

There were no statistical differences in total amount of feed fed, net yield, weight gain, survival, carcass

yield, fillet yield, or fillet proximate nutrient composition in fish fed various diets (Table 1). Results show it is possible to replace all soybean meal by two or three high-protein alternative feedstuffs in the diet without significantly affecting fish growth. The data provide flexibility in formulating cost-effective catfish feeds. These alternative diets may be used to feed catfish during food fish grow out, especially during periods of high soybean meal prices.

Table 1. Production and processing characteristics, and fillet proximate nutrient composition of channel catfish fed experimental diets for 183 days.

Diet #	Protein Feedstuffs ¹	Amount of Feed Fed (lb/ac)	Net Yield (lb/ac)	Weight Gain (lb/fish)	Feed Conversion (feed/gain)	Survival (%)	Carcass Yield (%)	Fillet Yield (%)	Fillet Protein (%)	Fillet Fat (%)
1	SBM + CSM	14,544	8,196	1.42	1.77	97.0	64.5	35.0	17.8	6.59
2	CSM + DDGS	14,582	7,951	1.35	1.84	98.4	63.9	34.3	17.5	6.43
3	CSM + DDGS + CGM	14,294	8,056	1.40	1.77	97.4	64.3	34.6	17.3	6.52
4	CSM + PNM	13,565	7,786	1.35	1.74	96.5	63.8	34.2	17.2	6.72
5	CSM + PNM + DDGS	13,838	8,246	1.43	1.68	96.7	64.3	34.6	17.3	6.03
6	CSM + DDGS + PMBM	14,039	8,098	1.41	1.74	96.5	64.1	34.5	17.3	6.57

¹Protein feedstuffs: SBM = soybean meal; CSM = cottonseed meal; DDGS = corn distillers dried grains with solubles; CGM = corn germ meal; PNM = peanut meal; PMBM = pork meat and bone meal