

COMPARATIVE EVALUATION OF THREE METHODS FOR ANALYSIS OF DIETARY FIBER

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Nowadays, the definition of dietary fiber considers chemical and physiological patterns, consisting in the edible parts of plants or analogous carbohydrates that are resistant to digestion and absorption in the human small intestine with complete or partial fermentation in the large intestine. Dietary fiber includes polysaccharides, oligosaccharides, lignin, and associated plant substances. The enzymatic-gravimetric and enzymatic-chemical fiber methods are the currently applied for analysis of fiber in human nutrition, and gradually have been applied in the nutrition of monogastric animals. These methods isolate the fiber fraction by an enzymatic treatment, allowing the distinction of soluble and insoluble fibers and providing results closer to the actual concept of fiber.

This study comparatively evaluated the enzymatic-gravimetric method and the most commonly used methods in fish nutrition – the crude fiber and neutral detergent fiber methods. The three methods were tested over the same feed samples (Table 1). All samples were run in duplicate within each procedure.

The crude fiber method underestimated results since it washes out structural polysaccharides and lignin, thus measuring a small fraction of feed fiber. The neutral detergent fiber procedure provided more satisfactory results in comparison to crude fiber method, and can be a more practical and economical alternative to the enzymatic-gravimetric procedure. However, it also allows a reasonable loss of non-starch polysaccharides, especially the soluble ones, as observed for citrus pulp – rich in soluble fiber. More studies should be carried out to better correlate lab methods to real fiber digestibility by fishes since plant ingredients inclusion to fish feeds tends to increase.

Table 1. Dietary fiber determination in feed samples using three distinct methods (dry matter basis).

	Feed sample	Dietary Fiber	Neutral Detergent Fiber	Crude fiber
High fiber feed	Sugar cane bagasse	90.39±0.51	86.13±0.43	52.75±3.62
	Soybean hulls	76.63±0.11	69.75±0.05	47.13±0.22
Medium fiber feed	Cassava meal	48.04±0.09	33.70±0.22	22.04±0.32
	Wheat meal	46.96±0.50	40.71±0.35	16.73±0.03
	Citrus pulp	46.25±0.44	20.00±0.32	15.92±0.29
Low fiber feed	Ground corn	11.23±0.30	10.46±0.18	3.45±0.05
	Broken rice	1.98±0.02	1.58±0.09	0.91±0.20