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ABSTRACT (Aquaculture America Proceedings):

670 **Effects Of Dietary Supplementation Of A Novel Xylanase-Direct-Fed Microbial Feed Additive On The Growth Performance, Whole Body Nutrient Retention, And Nutrient Digestibility Of Juvenile Nile Tilapia *Oreochromis Niloticus* Fed Practical Diets With Reduced Energy Density**

James Tyus*, Jorge Dias and Jeng-Jie Wang BioResource International, Inc. Durham, North Carolina

In an effort to reduce the overall cost of production, livestock producers look to reduce feed costs by utilizing alternative feed ingredients or by replacing expensive nutrients via supplementation of various feed additives. One reformulation strategy that is gaining attention in aqua production is the reduction of dietary energy, coupled with supplementation of carbohydrases and/or direct-fed microbials (DFMs), additives that may improve the nutritive value, digestibility and utilization of feed. The combinational use of xylanase and DFMs has been shown to improve gut function and nutrient digestibility in poultry and swine, allowing for improved production performance and feed costs savings. Similar effects have not yet been fully elucidated in fish. Therefore, the aim of the present study was to evaluate the effect of an optimized blend of endo-xylanase and multistrain *Bacillus spp.* DFMs (EP), on growth performance, whole body nutrient retention and nutrient digestibility in juvenile Nile tilapia.

600 juvenile tilapia, with mean initial body weight (BW) of 12.3 ± 0.7 g, were randomly assigned to 1 of 3 dietary treatments, with 4 replicate tanks of 50 fish per treatment, and raised to 61 days of age in 500L recirculating freshwater tanks. A standard energy (positive control, PC) practical diet was formulated to 4326 kcal/kg gross energy (GE), 32.8% crude protein and 8.6% crude fat. In a second treatment (NC), dietary energy was reduced by 120 kcal/kg GE (2.1% reduction in crude fat), compared to the PC. In a third treatment, NC diets were supplemented with 100 g/MT xylanase-DFM blend (NC+EP). All diets contained fishmeal (5% of the diet) and plant-based ingredients as protein and fiber sources. Fish were hand-fed to satiety 3 times/day.

After 61 days, supplementing NC diets with EP significantly improved ($P < 0.05$) final BW, specific growth rate, feed conversion ratio, protein efficiency, whole-body retention of protein and energy, and apparent digestibility of energy. At 100 g/MT, EP supplemented to NC diets appears to improve growth performance, feed efficiency and digestibility of key nutrients at a rate similar to, or exceeding, standard-energy PC diets and can therefore compensate for at least 120 kcal/kg GE in practical juvenile tilapia diets.

TABLE 1. Calculated analysis of experimental diets

	PC	NC	NC+EP
Crude Protein, %	32.8	32.8	32.8
Crude lipid, %	8.6	6.5	6.5
Gross energy (kcal/kg)	4326	4206	4206
Total Phosphorus, %	1.11	1.08	1.10
Xylanase Activity (U/g)	-	-	10.0
Bacillus spp. (CFU/g)	-	-	1.0×10^5

TABLE 2. Tilapia growth performance, whole-body nutrient retention and apparent digestibility of energy after 61 days feeding. Means within rows with different letters differ significantly (P<0.05)

Metric	PC	NC	NC+EP
Final body weight, g	70.1 b	63.9 a	72.0 b
Specific growth rate, %/d	2.86 b	2.70 b	2.89 b
Feed conversion ratio	1.07 a	1.18 b	1.08 a
Protein efficiency ratio	2.85 b	2.59 a	2.82 b
Protein retention, %	39.5 b	35.8 a	38.9 b
Energy retention, %	30.5 b	28.3 a	30.7 b
App. Dig. Of energy, %	87.8 a	87.1 a	89.3 b