AVAILABILITY OF SUCROSE AND MONOSSACCHARIDES IN CHIME OF NILE TILAPIA *Oreochromis niloticus* FED WITH DIETS CONTAINING ENZYME COMPLEX SSF (SOLID STATE FERMENTATION)

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Enzyme Complex SSF is an alternative exogenous enzyme in fish diets can act by increasing the availability of nutrients that are not normally being used. This enzymatic complex contains in its formula carbohydrases (α-amylase, β-glucanase, cellulase, pectinase and xylanase) plus fungal protease and phytase. Considering this, the effect of Allzyme® SSF on production of sucrose and monosaccharides in chyme of Nile Tilapia were evaluated.

The study included 240 Nile Tilapia with average weight ranging between 70g ± 4.43 in a completely randomized design with four dietary treatments (0, 100, 150 and 200 /tonne enzyme complex) arranged in six replicates and 10 fish per replicate. The diets were the same in all treatments (CP, 32%; CE, 4500 Kcal/Kg; CF, 3.37%), except for SSF levels (Table 1). Every fish ate up the same amount of diet in experimental time (1.5% of biomass from control treatment). The recirculating system contained biological and mechanical filters and automatic temperature control (around 28°C). Dissolved oxygen, pH, ammonia and temperature were monitored weekly.

At every 15 days in the experiment, a tilapia from each experimental unit was removed 50 minutes after the third meal of the day (2pm) and immediately taken to an ice, totaling six samples per treatment. After isolation by ligatures, the medium and posterior intestine were removed and stored in polyethylene flasks. This material was freeze-dried, ground, and frozen at -80°C. The Soxhlet Method was used to extract fat from each sample. After fat extraction, individual soluble sugars (glucose, fructose and sucrose) were quantified by HPLC (Shimadzu series 10A chromatography; column module CTO-10A; RI Detector RID-6A; Windows® software LC-10 version 2.2). A supelcosil™ LC-NH_2 was used to separate sugars according to molecule size at a flow rate of 0.7mL/minute, the mobile phase formed by a mixture of acetonitrile-water (80:20 v/v) at 35°C. A quadratic effect ($p<0.05$) was observed for sucrose and glucose and linear effect ($p<0,05$) for fructose as a function of treatment (Table 2). The inclusion of 150g Allzyme®SSF/tonne in tilapias diets increase the bioavailability of nutrients.

Table 1. Composition of the experimental diet

Ingredient (%)	Treatments (g/Ton)					
	0	50	100	150	200	250
Soybean meal, 45%	45.80	45.80	45.80	45.80	45.80	45.80
Corn grain	35.09	35.09	35.09	35.09	35.09	35.09
SSF(1)	0	0.005	0.010	0.015	0.020	0.025
Inert (Caulin)	0.025	0.020	0.015	0.010	0.005	0
Others(2)	19.085	19.085	19.085	19.085	19.085	19.085

(1) Guarantee minimum levels of enzyme activity: α-amylase, 30 FAU/g; β-glucanase, 200 BGU/g; cellulose, 40 CMC/g; fungal protease, 700 HUT/g; pectinase, 4000 AJDU/g; phytase, 300 SPU/g; xylanase, 100 XU/g.
(2) Others: Gluten meal, 60%; Wheat meal; Commercial vitamin and mineral supplement for fish; Dicalcium phosphate; Calcitic lime; soybean oil; Vitamin C; Salt; BHT

Table 2- Levels of sucrose, glucose and fructose per gram of dry chyme of Nile tilapia fed diets containing enzyme complex SSF

Carbohydrates	Treatments (g/t)				CV (%)
($mg.g^{-1}$)	0	100	150	200	
Sucrose[1]	30.047	37.886	37.891	33.492	8.217
Glucose[2]	15.576	16.207	17.066	16.451	3.873
Fructose[3]	10.423	10.758	10.927	10.895	7.120

[1]Quadratic effect ($p<0.05$): $Y= 30.041 + 0.1396X - 0.000617X^2$; $R^2= 0.99$ / [2]Quadratic effect ($p<0.05$): $Y= 15.53 + 0.01425X - 0.00004439X^2$; $R^2= 0.99$ / [3]Linear effect ($p<0.05$): $Y= 10.463 + 0.00256X$; $R^2= 0.90$

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