

THE EFFECT OF EXOGENOUS ENZYMES IN THE DIET OF COMMON CARP (*C. CARPIO*) ON GROWTH PERFORMANCE AND FEED UTILIZATION.

W. Meeus^{1*}, S. Aerts¹, L. Kuterna², E. Vanderbeke², B. Goddeeris³ and P. Bossier⁴

Abstract code: AISFNFoo87

Introduction

When using high inclusion levels of plant based ingredients in fish feed, the presence of Anti-Nutritional Factors (ANF) needs to be taken into consideration. Non Starch Polysaccharides (NSP) are recognized as true ANF, causing impaired growth performance and feed utilization. NSPase could counteract these negative effects by breaking down the NSP.

Objective

to investigate the effect of NSPase in a practical common carp diet on growth



Materials & Methods

The growth trial comprised to consecutive stages:

	Stage 1	Stage 2
Duration (weeks)	9	15
# RAS	1	3
# Tanks	12	12
Tank volume (l)	140	1200

- 37 common carp juveniles / tank
- ABW_{start} = 42.1 ± 0.5g
- 23.3 ± 0.4°C
- 4 treatments in triplicate
- individually tagged
- Feeding ad libitum
- 12L/12D
- Faeces collection for ADC



2 Isonitrogenous and isoenergetic experimental diets (positive control (PC) and negative control (NC) were formulated to contain 24.9% digestible protein and 2375kcal.kg⁻¹ digestible energy. NSPase 1 & NSPase 2 (Aveve Biochem) were coated onto the NC.

	PC	NC
Soybean meal	29,9	27,4
Rapeseed meal	20,0	20,0
Wheat flour	10,0	12,0
Rice bran	10,0	8,0
Fishmeal	6,0	
Corn	8,0	
Corn gluten meal		8,0
Wheat bran	3,9	12,3
Fish oil/soy oil (50/50)	4,7	4,1
Dicalcium phosphate	2,3	2,5
VitMin mix	1,0	1,0
Amino acids	1,3	1,7

Results

	PC	NC	NSPase 1	NSPase 2
ABW (g)	850±67 ^a	645±24 ^c	726±23 ^b	741±29 ^{ab}
SGR (%/d)	2,10±0,04 ^a	1,86±0,06 ^b	2,00±0,04 ^a	2,02±0,01 ^a
FCR	2,45±0,26 ^a	2,90±0,18 ^b	2,90±0,17 ^b	2,92±0,04 ^b

Table 1

	PC	NC	NSPase 1	NSPase 2
DM	69,7±1,2	65,5±1,1	66,6±0,5	67,4±1,5
Protein	90,5±0,4	89,3±0,9	89,7±0,2	90,3±0,6
Fat	90,9±0,4	87,0±1,0	87,5±0,5	86,8±2,4
NFE	68,2±1,5	64,1±1,5	64,9±0,7	66,1±1,7
Energy	82,3±0,7	79,5±0,9	80,0±0,4	80,6±1,0

Table 2

The PC outperformed the NC in terms of ABW, SGR and FCR. Supplementing either NSPase significantly improves ABW and SGR while no statistical difference was found for FCR compared to NC (table 1).

No significant differences were found for ADC of dry matter, protein, fat, carbohydrates and energy (table 2).

Conclusion

Substituting all fishmeal by plant based ingredients affected growth performance and feed utilisation. Supplementation with either NSPase alleviated the negative effects on growth. Feed utilization did not improve, ongoing data analysis might explain these results.

Using NSPase is a promising technique for the development of more sustainable carp feeds.