Butirex C4 improves the growth and disease resistance in Nile Tilapia (*O. Niloticus*)

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This trial aimed to verify the effect of Na-butyrate in protected (BUTIREX C4) and unprotected forms at different concentrations on growth performance, hematological parameters and resistance to Aeromonas hydrophila in Nile tilapia.

Method and Material:

The trial was carried out by Aquaculture Department, University of Santa Catarina. Florianópolis (Brazil), 2017.

A total of 2,250 post-larvae (size 13 mm and weight 18 mg) were randomly distributed in 15 tanks of 100 l each until 28 days of age. Diets were based on NRC (2011) of *O. niloticus* juveniles. Experimental diets:

1. Control Group
2. 0.25% not protected sodium butyrate
3. 0.5% not protected sodium butyrate
4. 0.25% Butirex C4
5. 0.5% Butirex C4

At the end of the experiment, were evaluated: biomass gain, survival, feed conversion, yield and hematological analysis.

After 28 days of experiment, for *A. hydrophila* challenge, 10 animals from each experimental unit (30 per treatment) were immersed in an aquarium containing the bacterial inoculum (10^7 CFU mL-1). Dead animals were autopsied to confirm the infection.

Results: Protected Butirex C4 at 0.5% had a significant increase in final biomass and yield, and the best feed conversion rate; also, Butirex C4 showed better survival (table 1)

Table 1: Zootechnical parameters of Nile tilapia (*Oreochomis niloticus*) at 28 days.

Parameter	*Control*	*NaBut 0.25%*	*NaBut 0.5%*	*Butirex C4 0.25%*	*Butirex C4 0.5%*
Final Biomass (g)	93,57^{b}	95,69^{ab}	96,34^{ab}	96,93^{ab}	100,06^{a}
Survival (%)	89,83	88,66	89,00	93,78	92,44
Feed conversion	0,85^{a}	0,84^{ab}	0,85^{ab}	0,83^{ab}	0,80^{b}
Yield (Kg/m³)	1,17^{b}	1,2^{ab}	1,20^{ab}	1,21^{ab}	1,25^{a}

Haematological parameters results: Fish fed with protected Butirex C4 showed an increase in blood parameters at both inclusion rate compared with Control and not protected butyrate (Table 2), it may indicate a lower stress by high RBC levels and a stimuli of defences.

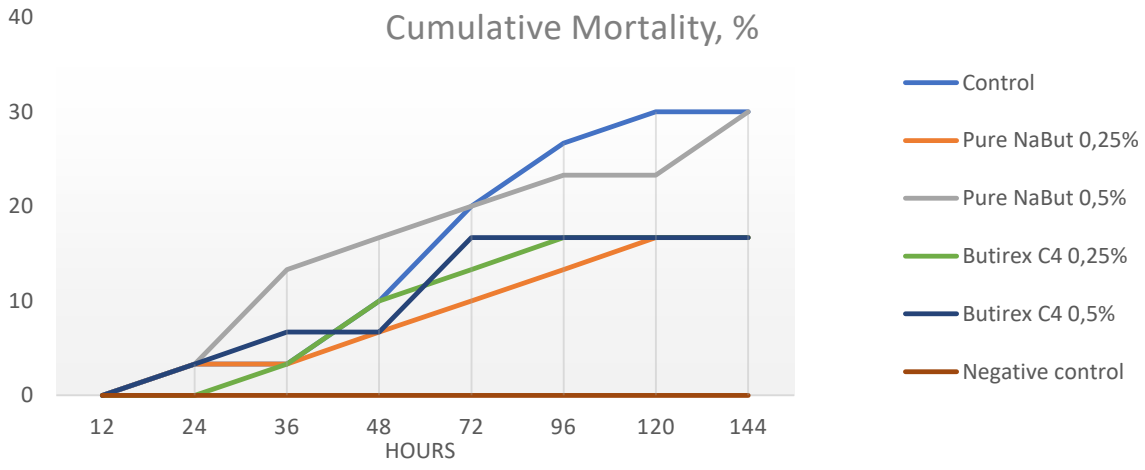
Table 2: Haematological parameters of Nile tilapia at 28 days. *

	Control	NaBut 0.25%	NaBut 0.5%	Butirex C4 0.25%	Butirex C4 0.5%
RBC (106 µL-1)	1.12 b	1.01 b	1.16 b	1.39 ab	1.73a
Thrombocytes (103 µL-1)	4.7	6.7	5.5	6.1	8.7
WBC (103 µL-1)	43.9	47.3	55.6	66.5	57.2
Lymphocytes (103 µL-1)	24.7	23.0	31.6	23.0	31.6
Monocytes (103 µL-1)	22.9 ab	17.1 b	24.9 ab	26.7 ab	32.9 a

*Different superscript letters mean significant differences (P <0.05). RBC: red blood cells; WBC: white blood cells

Experimental Challenge results: First mortalities were verified 24 h after challenge and mortality was stabilized at 144 h (Figure 1). Control and not protected butyrate at 0.5% showed highest mortality (30%), Butirex C4 at two levels and not protected butyrate at 0.25% showed the same mortality rate (15%) and negative Control did not present mortality.

Figure 1: Effects on cumulative mortality of juvenile tilapia, challenged by immersion in an *A. hydrophila* solution.



Conclusions:

The use of BUTIREX C4 (protected sodium butyrate) at 0.5% showed better zootechnical and haematological parameters.

BUTIREX C4 group showed better survival and better antimicrobial effect against the main pathogenic bacteria

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