EVALUATION OF THE EFFECT OF NUCLEOTIDES ON INTESTINAL FUNCTION IN JUVENILES OF MEAGRE (*Argyrosomus regius*) FED ON HIGH PLANT PROTEIN DIETS.

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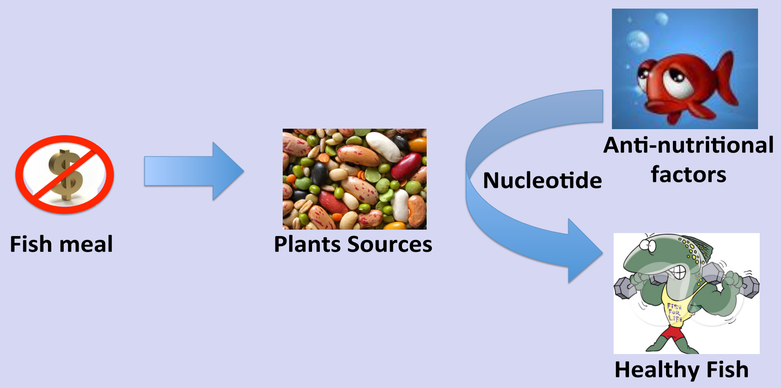
INTRODUCTION

Two major problems have been associated to a high level of vegetable protein incorporation in the diets, resulting in growth depression:

- Presence of anti-nutritional factors
- Intestinal epithelial damage

Inclusion of nucleotides in aquafeeds enhanced intestinal epithelium functionality of marine fish species, leading to a better growth performance (Lin *et al*., 2007).



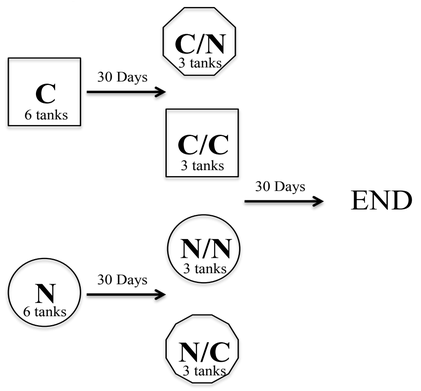
OBJECTIVE: Evaluate the effect of dietary supplementation with nucleotide on intestinal physiology of meagre (*Argyrosomus regius*).

MATERIAL AND METHODS

FISH AND EXPERIMENTAL DIETS

- 30 juveniles (37,2± 0.8 g) allocated in 12 tanks
- Experimental diets was designed to induce adverse nutritional effects (SPAROS, Portugal)
- Diet was divided in two batches; one was used as control (C) and the other was supplemented with a mixture of 0,1% nucleotides (N) (BIOIBERICA, Spain)

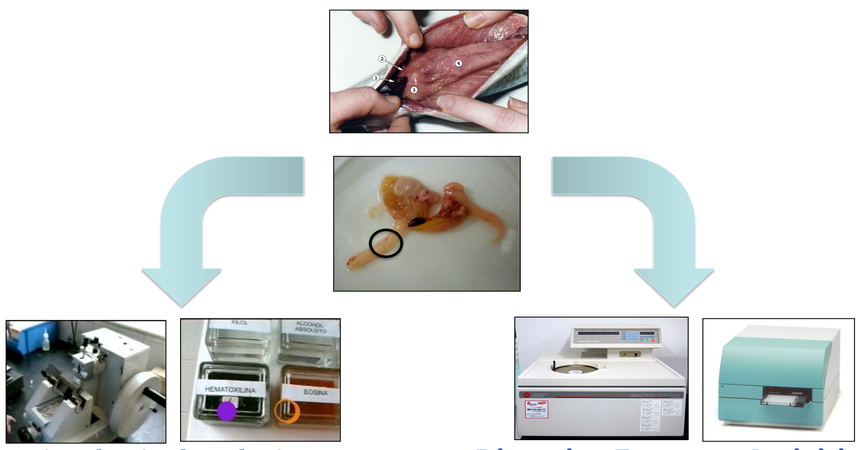
Experimental design: The assay was designed to clarify the action of nucleotide in meagre (N/N) fed diets with high level of fish meal replacement (C/C); on the role of nucleotide on recovery (C/N) and/or preventition (N/C) of growth depression.



Experimental diets for meagre (75 % of the protein was of vegetable origin)

Ingredients (%)	Control	Nucleotide
Fishmeal 65	17,50	17,50
Soycomil PC	10,00	10,00
Corn gluten	16,50	16,50
Soybean meal 48	16,00	16,00
Rapeseed meal	9,00	9,00
Sunflower meal	3,90	3,90
Whole wheat	7,00	7,00
Fish oil	7,50	7,50
Soybean oil	6,30	6,30
NUCLEOFORCE	0,00	0,10

ANALYSIS: Meagre growth performance. At the end of the experiment, three specimens of each tank were sampled for **histological** and **digestive enzyme activities determinations** in meagre intestine.



Histological techniques

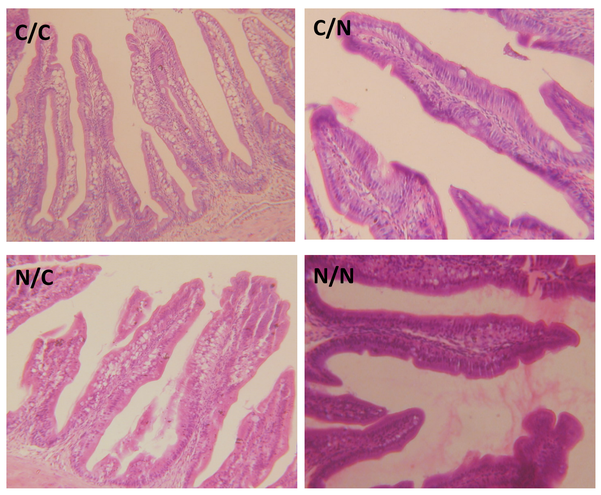
Digestive Enzymes Activities
Bessey et al., 1946 and Pfeiderer, 1970

RESULTS

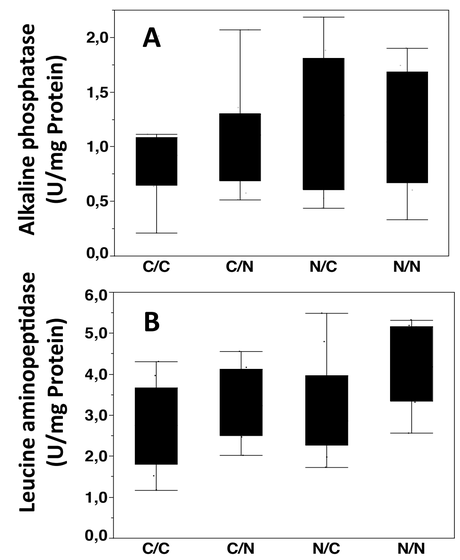
Growth performance of meagre juvenile after 60 days of rearing

	Period 1 (30 days)			
	C		N	
BW (g)	39.9 ± 1.1		41.1 ± 1.0	
RGR (% day^{-1})	0.21 ± 0.09		0.29 ± 0.07	
Survival (%)	100		100	
	Period 2 (60 days)			
	C/C	C/N	N/C	N/N
BW (g)	46.7 ± 2.5^{b}	47.4 ± 1.1^{ab}	46.1 ± 0.7^{b}	48.83 ± 1.3^{a}
RGR (% day^{-1})	0.28 ± 0.05	0.31 ± 0.04	0.26 ± 0.01	0.34 ± 0.01
Survival (%)	98	98	100	100

Significant differences are indicated by different superscripts (P<0.05).



Light microscopy images obtained from proximal intestine of meagre at the end of experimental period.



Alkaline phosphatase (a) and Leucine aminopeptidase (b) activities in the brush border of meagre intestine fed experimental diets. Data are given as means ± SEM (n = 9).

DISCUSSION

- Meagre fed N/N showed higher weight (P < 0.05) than meagre from C/C, compatible with a positive effect of the nucleotide-supplemented diet. Meagre from N/C treatment showed significant lower weight values than N/N treatment whereas meagre from C/N treatment had similar values to N/N treatment.
- Histological sections indicated an improvement of the intestinal morphology of meagre fed diet supplemented with nucleotide; intestinal sections of meagre from N/C and C/C were similar, while C/N was similar to N/N treatment.
- Mean values of leucine aminopeptidase activity were higher in the intestine in N/N treatment. The higher level of activity in the gut of meagre could indicate an increase in the functionality of the enterocytes.

CONCLUSIONS

- **Dietary supplementation with nucleotides showed positive effect when high level of fish meal replacement was used in meagre;**
- **It is seems that dietary nucleotide supplementation might have a recovery but not a preventive effect in fish.**

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