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## Mixed probiotics stimulate the tilapia growth by intestinal development

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**Statement of the Problem:** Probiotic additives in aquaculture are in consolidation due to the large number of contradictory results. These are associated with the type of microorganism strains, fish species, and management conditions, among others. Most studies have focused on health aspects indirectly associated with improved weight gain, but do not describe aspects related to fish growth. The objective of this study was to evaluate the effect of mixed probiotic additive in tilapia growth, assessing the effect in intestine in the morphology of crypts.

**Methodology & Theoretical Orientation:** Tilapia fingerlings of approximately 1.5 g were cultivated in recirculation systems containing 15 water tanks of 0.25 $m^3$ each at 28°C, with biological filter and UV system at 80 fish/$m^3$. The fish are fed three times a day, with the same feed, using the mixed probiotic additive supplied by biomart animal nutrition (0.0, 0.1 and 0.2% of inclusion): *Bacillus subtilis, Bifidobacterium bifidum, Enterococcus faecium, Lactobacillus acidophilus, Lactobacillus casei, Lactobacillus lactis, Lactobacillus plantarum, Pediococcus acidilactici* ($1.0x10^9$ $UFCg^{-1}$). The probiotic was homogenized in 2% soy oil and sprinkled over the feed. The intestinal tissue samples were fixed in formaldehyde and subsequently embedded in historesin. Cross sections of 5 µm were stained in Hematoxylin-Eosin and prepared on microscopy slides for further morphological analysis. The slides of intestinal tissue were analyzed for quantity, height and villi area. It was proceeded ANOVA and Tukey test at 5%.

**Findings:** Final fish weight at day 90th were 165.62 (14.16), 186.73 (12.58) and 183.66 (16.39) to control and 0.1 and 0.2 probiotic level, respectively, and they were different ($P<0.05$). It was observed that fish fed diets containing probiotics at 0.2% had a higher amount of villi (58.11±5.49) compared to those that did not receive the probiotic (48.50±5.02). No differences were found in villi height and area (medium 401.35 µm and 36,928.67 $µm^2$, respectively).

**Conclusion & Significance:** The mixed probiotic used in this experiment should be diffused in aquaculture as it stimulated growth by increasing the number of intestinal villi, ensuring greater absorption and utilization of the nutrients provided in the diet.

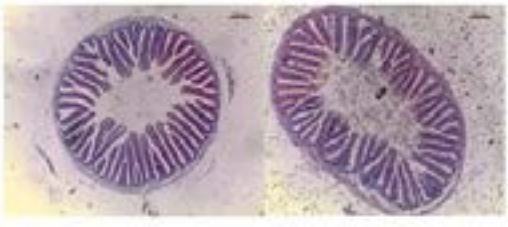


Figure 1: Histological sections of the intestine of Nile tilapia fed with feed containing probiotic. A) control group without probiotic inclusion; B) 0.2% inclusion. Scale bar = 300 µm.

### Recent Publications

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**Biography**

Vander Bruno dos Santos has completed his PhD from Federal University of Lavras in Animal Production field in 2007. He holds a specialization in Environmental Matters from UNESP of Presidente Prudente (2009). In 2010 he completed Postdoctoral studies in Cellular and Structural Biology at UNESP. He has experience in the area of animal science, with emphasis on fish farming, acting mainly on the following subjects: agricultural residue, animal growth, compensatory growth, tissue growth, muscle fibers, adipocytes, tilapia, PACU, Piracanjuba, morphometry, allometry, chemical composition and expression of regulatory myogenic factors.

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**Notes:**