

张荣斌,曹俊明,黄燕华,王国霞,陈晓瑛,严品,周婷婷,孙智武.低聚木糖对奥尼罗非鱼肠道形态、菌群组成和抗嗜水气单胞菌感染的影响[J].上海海洋大学学报,2012,21(2):233-240

### 低聚木糖对奥尼罗非鱼肠道形态、菌群组成和抗嗜水气单胞菌感染的影响

#### Effect of dietary xylooligosaccharides on intestinal histology and microflora of tilapia (*Oreochromis niloticus*×*O.aureus*) and resistance against *Aeromonas hydrophila*

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中文关键词: 低聚木糖 奥尼罗非鱼 肠道组织 肠道菌群 嗜水气单胞菌

英文关键词: xylooligosaccharides tilapia intestine histology intestine microflora *Aeromonas hydrophila*

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中文摘要:

选取960尾初始体重为(5.09±0.12)g的奥尼罗非鱼(〔WTBX〕*Oreochromis niloticus*×*O.aureus*〔WTBZ〕),随机分为6组,分别投喂1种对照饲料和5种添加低聚木糖的试验饲料,添加量分别为0、200、400、600、800、和1 000 mg/kg饲料,记作G0、G200、G400、G600、G800和G1000。饲养期为8周,每两周取样测定肠道双歧杆菌(〔WTBX〕*Bifidobacterium*)、乳酸杆菌(*Lactobacillus*)和大肠杆菌(*E. coli*)数量,4周和8周时取肠道样测定肠道形态。试验结束时注射嗜水气单胞菌(*Aeromonas hydrophila*〔WTBZ〕)进行感染试验,计算96 h内的存活率。结果显示,4周和8周时,各添加组罗非鱼中肠皱襞面积和肌层厚度均显著高于对照组。饲料中添加低聚木糖对罗非鱼肠道双歧杆菌和乳酸杆菌数量有显著影响,与对照组相比,双歧杆菌数量在4周时G600和G800组显著增加(〔WTBX〕P〔WTBZ〕<0.05),在6周时G400和G600显著增加(〔WTBX〕P〔WTBZ〕<0.05);8周时,G800组罗非鱼肠道乳酸杆菌数较对照组有显著增加(〔WTBX〕P〔WTBZ〕<0.05);各添加组肠道大肠杆菌数量随养殖时间延长呈下降趋势,但各组之间在各时间段的差异没有达到显著水平(〔WTBX〕P〔WTBZ〕>0.05)。注射嗜水气单胞菌96 h后,对照组的存活率为26.7%,低聚木糖添加组为78.3%~95.0%。结果表明,饲料中添加低聚木糖能改善肠道形态结构,显著提高奥尼罗非鱼肠道双歧杆菌和乳酸杆菌数量,有降低大肠杆菌数量的趋势,并提高罗非鱼抗嗜水气单胞菌感染的能力,添加600 mg/kg左右最合适。

英文摘要:

This experiment was conducted to investigate the effects of dietary prebiotic xylooligosaccharides (XOS) levels on the intestinal histology, microflora, and disease resistance of the tilapia (〔WTBX〕*Oreochromis niloticus*×*O.aureus*〔WTBZ〕). 960 fishes with an initial weight of (5.09±0.12) g were randomly assigned to 6 groups. The fishes were respectively fed a basal diet and 5 diets supplemented with 200, 400, 600, 800 and 1 000 mg/kg XOS, named G0 (control), G200, G400, G600, G800 and G 1000. During 8 weeks feeding period, the number of intestinal microflora was measured every 2 weeks. Midgut was sampled in 4<sup>th</sup> and 8<sup>th</sup> week for histology analysis. At the end of feeding, the fish were infected with *Aeromonas hydrophila*. During 96 hours of artificial infection, the survival rate (SR) was measured. The results showed that in 4<sup>th</sup> and 8<sup>th</sup> week, compared with G0, the folding area and the muscle thickness of the intestine in the groups with XOS were significantly higher. Dietary XOS affected significantly the number of intestinal *Bifidobacterium* and *Lactobacillus*. Compared with G0, the number of *Bifidobacterium* in G600 and G800 was significantly higher ( $P<0.05$ ) in 4<sup>th</sup> week, in G400 and G600 significantly higher ( $P<0.05$ ) in 6<sup>th</sup> week. In 8<sup>th</sup> week, the number of *Lactobacillus* in G800 was significantly higher than that in G0 ( $P<0.05$ ). The number of *E. coli* in the groups with XOS tended to decrease with the feeding time in creasing, but the difference was not significant ( $P>0.05$ ). After 96 hours of infection by *Aeromonas hydrophila*, SR in G0 was 26.7%, and that in the groups with XOS was from 78.3 to 95.0%. The results suggested that the supplementation of XOS into the practical diet could improve the intestinal histology, promote the intestinal bacteria, *Bifidobacterium* and *Lactobacillus* proliferation, while decrease the number of *E.coli* to some extent, and improve the resistance against *Aeromonas hydrophila* of tilapia (*Oreochromis niloticus*×*O.aureus*).

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