

Chinnapat Samrongpan 2010: Effect of Mannan-oligosaccharide on Growth, Immunity and Disease Resistance of Nile Tilapia (*Oreochromis niloticus*, Linn.). Master of Science (Aquaculture), Major Field: Aquaculture, Department of Aquaculture. Thesis Advisor: Associate Professor Nontawith Areechon, Ph.D. 132 pages.

Supplementation of mannan-oligosaccharide (MOS) in diet of Nile tilapia (*Oreochromis niloticus* Linn.) fry (average weight of 0.013 gm) at 0, 2, 4 and 6 gm per kg feed and mixed with 60 mg per kg 17  $\alpha$ -methyl testosterone was conducted for 21 days in glass tank holding 80 liters of water with stocking rate of 100, 200 and 300 fry per tank. The study on growth indicated that the 4 and 6 gm MOS tilapia fry had significantly higher weight and length than the control at all stocking rate ( $P < 0.05$ ), however these MOS levels could significantly enhance the average daily growth (ADG) of 100 fry per tank only. For feed conversion rate (FCR), it was found that only 4 and 6 gm per kg MOS for 200 fry per tank and 6 gm per kg MOS for 300 fry per tank did show significantly better FCR than other treatments. However, supplementation of MOS at all concentrations and stocking rates did not have any significant impact on the survival rate of tilapia fry after 21 day feeding trial. Histopathological study revealed that tilapia fry fed with 4 and 6 gm per kg MOS for 21 days had better development of microvilli in the intestine and higher amount of fat accumulation in the liver. Supplementation of MOS at all levels did significantly enhance the resistance against pathogenic *Streptococcus agalactiae* of tilapia fry at 100 fry per tank while at 200 and 300 fry per tank, it required 4 and 6 gm MOS to achieve the same resistance level ( $P < 0.05$ ). The study on the effect of MOS on specific immune response of juvenile tilapia with average weight of 60 gm indicated the significant improvement of secondary immune response in fish fed with 6 gm MOS in term of antibody titer and time of response. However, MOS did not have significant impact on some hematological parameters and phagocytic-related activities. The study on cytokine gene expression including Transforming Growth Factor  $\beta 1$ , Interleukin 1  $\beta$ , Interleukin 8 and Tumor Necrosis Factor  $\alpha$  from spleen and anterior kidney did not show a clear pattern of improvement of gene expression after MOS treatment for one month. This might be due to the different period of expression of each gene.

This study clearly indicated the benefits of MOS at 4 gm per kg which could significantly enhance the growth and disease resistance of tilapia fry after 21 days of feed supplementation. However, the supplementation of MOS in juvenile tilapia diet did not show a significant improvement of immunity for both non-specific and specific immune response.

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Thesis Advisor's signature