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TEMASEK LIFESCIENCES LABORATORY

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The Auditorium (Level 1)
Hosted by: Prof Yu Hao

An Overview of Major Research Milestones and Advances in Aquaculture Nutrition

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Professor Wing-Keong Ng received his Bachelor of Science degree in Aquatic Biology from Universiti Sains Malaysia. He then obtained his Masters degree in Aquaculture from the Asian Institute of Technology (Thailand), and doctorate in Nutrition at the University of California (Davis, USA). After a post-doctoral fellowship at Mississippi State University (USA), he returned to Malaysia. He has been a Visiting Scientist to the University of Stirling (Scotland, UK) and the University of Tasmania and CSIRO (Australia) under the Commonwealth and Endeavor Fellowships, respectively. Dr. Ng is currently a Professor affiliated with Universiti Sains Malaysia where he started the Fish Nutrition Laboratory and leads a research program aimed at developing a better understanding of nutrients utilization by fish and shrimp. He has focused interests in the evaluation of novel protein and lipid sources in aquafeeds to improve the economic and environmental sustainability of aquaculture operations. Professor Ng has published extensively in the area of aquaculture nutrition and is on the editorial board of several international and regional journals. He is a consultant to various international aquaculture organizations and aquafeed-related companies. Professor Ng is a fellow of the Academy of Sciences, Malaysia.

Aquaculture is currently the fastest growing food production industry in the world. About 50 to 60% of all fish and shrimp consumed globally are sourced from aquaculture. Aquaculture is anticipated to play an increasing critical role in ensuring world food security. The rapid global expansion of aquaculture production is due in large part to the intensification of culture systems made possible with the use of commercial pelleted feeds. Since feeding constitutes the major operating cost of modern farming systems, advances in aquaculture nutrition research is pertinent in ensuring the continued scalability and sustainability of the industry. Using as an overview three of our recently published review papers in “Reviews in Aquaculture” (Wiley-Blackwell), the currently top-ranked aquaculture journal, this presentation will highlight some of the major research milestones and advances made in aquaculture nutrition. Milestone 1 explores the advances in fish oil replacement studies. Marine fish oils are the major lipid sources used in the formulation of commercial aquafeeds. Aquafeeds currently consume most of the global supply of fish oil. The high demand, short supply and escalating prices makes dietary fish oil a bottle-neck in the farming of aquatic animals. There is currently great urgency within the global aquafeed industry in finding suitable alternatives to marine fish oils. We have created a niche research area in exploring the use of various palm oil fractions as a fish oil alternative in aquafeeds. The beneficial effects and potential constraints of palm oil use in aquafeeds will be presented. The use of palm oil in salmon feeds as well as its impact on the content of health-beneficial omega-3 fatty acids and palm tocotrienols in fish tissues will be highlighted. Milestone 2 will focus on the advances made in tilapia nutrition research. We are well known for our work on the nutrition and feeding of farmed tilapia from broodstock to harvest. For this presentation, focus will be given to the recent research on optimizing feeds for Genetically Improved Farmed Tilapia (GIFT) so that farmers can exploit the full genetic potential of these fast-growing tilapia strains. Milestone 3 will highlight the advances made in functional feed additives for shrimp feeds. Increasing intensification of shrimp culture systems has led to rapid spread of diseases where farmers incur high financial losses. In view of recent restrictions and ban on the use of antibiotics, there is a critical need to evaluate alternatives. Functional feeds are the new generation of aquafeeds with additional function, usually with health-promoting properties beyond their nutritional value. Our recent research into the use of organic acids as a functional feed additive in shrimp feeds will be presented. The development and pre-commercialization of an innovative prototype organic acids blend will be highlighted.

Recent Publications:

1. Ng W.K., Koh C.B. (2017). The utilization and mode of action of organic acids in the feeds of cultured aquatic animals. Reviews in Aquaculture (in press) doi: 10.1111/raq.12141.
2. Ng W.K. & Romano N. (2013). A review of the nutrition and feeding management of farmed tilapia throughout the culture cycle. Reviews in Aquaculture 5: 220-254. (Invited review).
3. Turchini G.M., Torstensen B.E. & Ng W.K. (2009). Fish oil replacement in finfish nutrition. Reviews in Aquaculture 1: 10-57. (Invited review).