On-farm feed intake prediction in barramundi (Lates calcarifer)

Richard Le Boucher*[1], Weiqiang Chung , Jessalin Kai Lin Ng , Ben Woon Rong Neo , Lydia Shun En Tan , Kar Chun Lee , and Co Sin Lee

[1]Temasek life sciences laboratory [Singapore] – 1 Research Link Singapore 117604, Singapore

Abstract

Efficient feed management is critical for reducing waste and enhancing fish growth and health. This presentation reviews three trials aimed at developing on-farm feed intake prediction tools for barramundi (*Lates calcarifer*).
In the first trial, 1,872 juveniles (33.5g) were reared in a flow-through system and fed to satiation using 11 commercial feeds. Thirty variables-spanning environmental factors, fish traits, feed composition, and pellet properties-were analyzed using stepwise regression, Bayesian model averaging, and factorial polynomial modeling to predict daily feed intake (DFI). Ten significant variables ($P < 0.05$) accurately explained DFI ($R^2 = 0.85$–0.88). Fish length, origin, and water temperature explained 77% of the variance. Pellet sinking behavior and size increments were key factors influencing feed efficiency.

The second trial involved 3,510 fish (50.2g) in a recirculating aquaculture system (RAS) across 27 tanks, testing three stocking densities (24.9, 29.3, and 33.0kgm^3) and three feeding levels. Higher densities significantly reduced body weight gain and feed intake ($P < 0.05$), while lower feeding levels improved feed conversion ratios ($P < 0.001$). Feeding to subsatiation ensured stable intake, whereas overfeeding led to variability across tanks.

The third approach introduced a non-invasive method for estimating key metabolic parameters in RAS-metabolic rate, routine metabolic rate, specific dynamic action (SDA), and SDA coefficient-providing new insights into physiological responses under varying rearing conditions.
Together, these trials offer practical strategies to optimize feed use, improve growth performance, and reduce environmental impact in barramundi farming.

Keywords: Barramundi, Feed intake prediction, Recirculating aquaculture systems, Metabolic performance, Feeding strategy optimization

*Speaker