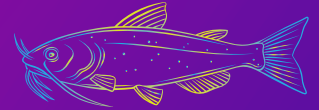


# FARM-RAISED,



ON LAND  in WATER



## Purpose of study

# Development of Digestibility Matrix for Soybean Meal

## Effects of a soy based diet on Pacific White Shrimp

Auburn University, Dr. Allen Davis & Harsha Galkanda-Arachchige

### Purpose / Goals

The research assessed four different objectives in the study of a soybean meal digestibility matrix on Pacific White Shrimp.

- 1 ► Identify soy crushers that utilize soy from multiple countries of origin and obtain samples for chemical analysis and biological testing.
- 2 ► Determine digestibility coefficients for a range of soybean meals offered to the Pacific white shrimp.
- 3 ► Conduct a standardized growth trial to evaluate relative biological value as measured by growth and protein deposition.

### Study Design

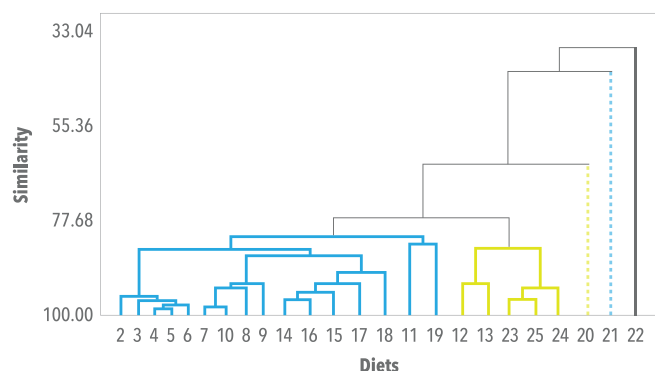
Twenty-five test diets were created to fulfill both digestibility and growth trials using soybean meal from 24 sources from China, Argentina, Brazil, India, and the U.S. The digestibility trial was carried out in a semi-closed recirculation system with six replicate groups per treatment using 8 shrimps/ tank. Eight shrimp per tank were stocked into a recirculating system. Six replicate groups of shrimps were offered each diet and the resulting fecal pellets from every two tanks were pooled into three replicate samples per treatment (Galkanda-Arachchige et al., 2020). In the growth trial, dietary treatments were randomly assigned to tanks and each of the two trials were conducted using a double-blind experimental design stocking 10 shrimp per aquaria. The first growth trial was



conducted with 14 treatments while assigning 4 replicate groups diets 2-14 and 8 replicates were assigned to the reference diet. Twelve treatments were tested during the second growth trial, each with 5 replicates including the reference diet (Galkanda Arachchige et al., 2019).

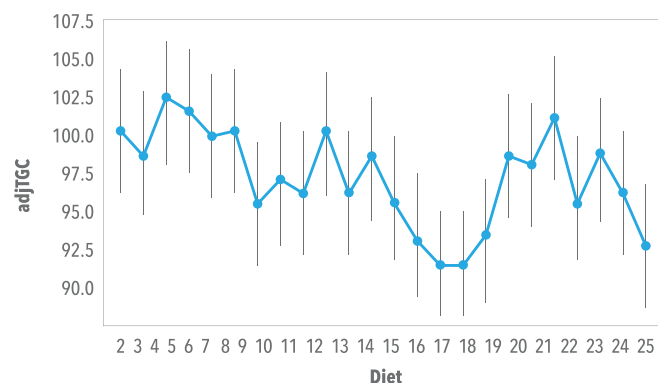
## Figure 1:

Grouping of SBM diets based on their chemical characteristics



## Figure 2:

Standardized growth response of shrimp relative to the reference diet



## Results

- Based on multivariate analysis, ADF, NDF, lignin, raffinose and trypsin inhibitor were screened as the key chemical characteristics in SBM that influenced digestibility.
- It may be essential to explore these factors further in the future to understand their interactions and threshold levels in shrimp diets. Results of standardized comparisons of growth indicated significant difference across several sources.
- Growth was negatively correlated to raffinose levels of the diet, confirming its negative effects on both digestion and growth.
- Variations in growth performances of shrimp were in line with the variations in apparent digestibility coefficients of SBM verifying the importance of digestibility data in shrimp feed formulations.

Galkanda-Arachchige, H.S., Guo, J., Stein, H.H. & Allen Davis, D. (2020) Apparent energy, dry matter and amino acid digestibility of differently sourced soybean meal fed to Pacific white shrimp *Litopenaeus vannamei*. *Aquaculture Research*, 51, 326-340.

Galkanda Arachchige, H.S.C., Qiu, X., Stein, H.H. & Davis, A. (2019) Evaluation of soybean meal from different sources as an ingredient in practical diets for Pacific white shrimp *Litopenaeus vannamei*. *Aquaculture research*, 50, 1230-1247.



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