

Evaluation of fermented dry soybean curd residues  
as an energy source in diets for juvenile  
olive flounder (*Paralichthys olivaceus*)

Mihai Sun<sup>1</sup>, Youngchul Kim<sup>1</sup>, Okorie Okorie Eme<sup>1</sup>, Sukumar Devnath<sup>1</sup>,  
Yong-Kil Jo<sup>2</sup> and Sungchul C. Bai<sup>1</sup> \*

<sup>1</sup>Department of Aquaculture, Pukyong National University, 599-1 Daeyoeon-3-dong  
Pusan 608-737, Rep. of Korea

<sup>2</sup>Dohaindustry, #1183, Songhyon-Ri, Jinrae-Myon, Kimhae-City, Kyongnam 621-882,  
Rep. of Korea

An 8-week feeding experiment was conducted to evaluate the potential use of dry soybean curd residue (DSCR) as an energy source in diets for juvenile olive flounder *Paralichthys olivaceus*. Five isonitrogenous and isoenergetic diets were formulated to contain dry soybean curd residue to replace wheat meal (WM) that currently used as the main energy source at the level of 0%, 25%, 50%, 75% and 100% ( DSCR<sub>0</sub>, DSCR<sub>25</sub>, DSCR<sub>50</sub>, DSCR<sub>75</sub>, DSCR<sub>100</sub>), respectively. White fishmeal, squid liver powder, wheat gluten meal and corn gluten meal were used as the dietary protein sources in this study.

Prior to the start of the feeding trial, fish were fed the commercial diet for 2 weeks to adjust to the experimental conditions. Fish averaging  $6.00 \pm 0.07$  g (mean  $\pm$ SD) were randomly distributed to fifteen aquaria as groups of 15 fish and fed the experimental diets in triplicate at a rate of 4 to 5% of wet body weight twice daily to satiation per day. The feeding trial was conducted by using a recirculating system with fifteen 60-L aquaria receiving filtered seawater as a rate of 0.8L/min. All the experimental aquaria were under the natural light conditions and the seawater temperature was maintained at  $20 \pm 1^\circ\text{C}$  by heaters during the whole experimental period. Supplemental aerations were provided to keep dissolved oxygen near saturation in each aquarium.

At the conclusion of the trial, weight gain(WG) and specific growth rate (SGR) of olive flounder fed diet DSCR<sub>0</sub> was significantly higher compared to fish fed

diet DSCR<sub>75</sub> and DSCR<sub>100</sub> ( $P < 0.05$ ), but not different from fish fed diet DSCR<sub>25</sub> and DSCR<sub>50</sub>. Feed efficiency ratio (FER) and protein efficiency ratio (PER) of fish fed diet DSCR<sub>15</sub> were significantly higher compared to the fish fed diet DSCR<sub>30</sub>, DSCR<sub>45</sub>, and DSCR<sub>60</sub>, but not different from the fish fed diet DSCR<sub>0</sub>. There were no significant differences in hematological characteristics along with condition factor and hepatosomatic index among all treatments. These results indicated that dry soybean curd residue could replace 50% wheat meal with good growth and healthy conditions in feeds for juvenile olive flounder.