DEFINING ENERGY AND PROTEIN REQUIREMENTS OF GILTHEAD SEABREAM (*SPARUS AURATA*) TO OPTIMIZE FEEDS AND FEEDING REGIMES

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Abstract

Energy and protein requirements of growing fish can be quantified as the sum of the amounts of energy and protein retained as growth plus the amounts simultaneously lost from the body. The requirement for dietary gross energy and protein can be calculated using the respective efficiencies of utilization. Growth of gilthead seabream as a function of body weight and temperature was predicted by the equation: $y = 0.024 \times BW^{0.514} \times \exp^{0.060T}$ (where $y =$ daily weight gain in g/fish, $BW =$ body weight in g and $T =$ temperature in °C). The gain was determined in fish ranging 1-470 g. The energy content of the fish depended on fish weight and rose from 4.7 to 11.0 kJ/g body mass as the fish grew whereas the protein content was constant at 176 mg/g regardless of fish weight. The efficiencies of utilization of digestible energy (DE) and digestible protein (DP) for maintenance and growth were determined by feeding the fish at increasing feeding levels from zero to the maximum voluntary feed intake. The daily requirement of DE for maintenance was dependent on temperature and determined as $(16.6kJ \times \exp^{0.055T})/BW$ in kg$^{0.82}$. The maintenance requirement for DP was independent of temperature and equaled 0.62g/ BW in kg$^{0.70}$. The relationship between DE intake and energy gain was linear, constant at $k_{DEg} = 0.67$ and independent of feed intake and temperature. Efficiency of protein utilization for growth varied between 0.33 and 0.80 depending on the DP/DE ratio in the diet. The optimal protein utilization for protein deposition was estimated at $k_{DPg} = 0.47$. Using these values allows optimization of feeding for seabream culture.

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