

13. Faecal characteristics and waste production of yellowtail kingfish (*Seriola lalandi*) fed with pelleted and natural feed

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Yellowtail kingfish (*Seriola lalandi*) is a quite recent cultured fish species in recirculating aquaculture systems and is gaining attention due to its high growth rates. One of the challenges of farming yellowtail kingfish in closed systems is their poor faecal quality, also referred to as 'diarrhoea-like' faeces due to their instable consistency and fine faecal particles. This poor quality makes it difficult to remove the solid faecal matter from the water, resulting in high concentrations of total suspended solids in the RAS and effluent water. Whether diarrhoea-like faeces occur naturally, or this is diet-related, remains unclear. Therefore, this study investigated the effect of feed type (pelleted vs. natural feed) on the faecal characteristics and waste production of yellowtail kingfish. The research question was investigated by three dietary treatments over a 35-day experimental period: a pelleted diet based on marine ingredients (known composition) which served as positive control (Marine), a commercial pelleted kingfish feed (Commercial; unknown composition) and a mixed diet composed by 50% frozen fish and 50% commercial pelleted feed (Natural). These treatments were selected to determine faecal characteristics and digestibility under both commercial farming conditions and in nature. In particular, the Natural treatment was intended to clarify whether diarrhoea-like faeces occur naturally in yellowtail kingfish. Each dietary treatment was tested in four tanks, which were stocked with 27 yellowtail kingfish (39 g). Fish were fed ad libitum. This study showed that the inclusion of natural ingredients increased the nutrient digestibility ($p < 0.001$). Furthermore, it was revealed that the natural faeces characteristics of yellowtail kingfish are not of poor (diarrhoea-like) quality, as the formation of faecal pellets was visually observed. The faecal characteristics of the Marine and Commercial dietary treatment were described as diarrhoea-like. As a result, the Natural treatment had the highest faeces recovery among treatments ($p < 0.001$). Ultimately, both the increased digestibility and faeces recovery resulted in the lowest amount of non-recovered faeces per feed intake ($p < 0.001$) for the Natural treatment (65.9 g/kg FI) compared to the Marine (103.4 g/kg FI) and Commercial treatment (115.0 g/kg FI). In conclusion, the current study showed that diarrhoea-like faeces are not naturally occurring in yellowtail kingfish, ultimately, demonstrating the potential of dietary intervention to reduce the build-up of total suspended solids in the system water.