

**Protein Sparing Using Sago Starch on The Performance of Tiger Grouper,
Epinephelus Fuscoguttatus ♀ × Giant Grouper, E. Lanceolatus ♂ Hybrid**

ABSTRACT

Starch is an important non-protein energy source in the practical diets for fish and its optimal inclusion can maximise the use of dietary protein for growth. In the present study, a feeding trial was conducted to investigate the effects of protein sparing with carbohydrates on growth and diet digestibility in hybrid grouper (*Epinephelus fuscoguttatus* × *E. lanceolatus*). Diets were formulated with lowered levels of protein (50% to 45% and 40%) and increased levels of starch (20% to 25% and 30%). At the end of the feeding trial, growth performance and body indices (except for viscerosomatic index) were not significantly influenced ($P > 0.05$) by the dietary treatments. In contrast, the whole-body proximate fish and liver compositions depended on the test diets. The dietary starch influences the haematological parameters, even though no clear trend was observed. Meanwhile, the apparent digestibility coefficient of protein and lipid was considered high in all experimental diets. Overall, the diet with protein level lowered to 45% and starch level increased to 30% performed as well as the control diet, indicating some ability of hybrid grouper to utilise sago starch as an energy source to spare protein.