

学 位 論 文 要 旨	
氏 名	ソ ミ ャ リ ン
題 目	Nutritional study on the growth performance and body composition of red sea bream and yellowtail using recirculating aquaculture system (循環式飼育システムを用いたマダイ及びブリの成長と体組成に関する栄養学的研究)
<p>In intensive culture conditions, adequate nutrition is essential for avoid deficiency signs, maintain normal growth performances and sustain health condition. The study was conducted to investigate alternative protein, lipid and vitamin E requirement for red sea bream and yellowtail cultured in a recirculating aquaculture system.</p> <p>Study 1 was conducted to examine the effect of replacing fish meal with plant protein mixture on red sea bream (18 g). Five diets (FM40T, FM25T, FM20T, FM15T, FM15) containing 52% crude protein and 20% lipid were used for the study. After 54 days, feed intake, specific growth rate and increase rate of biomass significantly increased in FM40T and FM25T. FM15 significantly increased the liver lipid contents, GOT (Glutamyl oxaloacetic transaminase) and GPT (Glutamic pyruvate transaminase). FM15T supplemented diet had a higher tolerance against an oxidative stress. In conclusion, FM40T and FM25T diet could be recommended for the optimal growth and health of the fish.</p> <p>Study 2 examined the effects of fishmeal and fish oil replacements with plant sources for yellowtail (2236 g). Diets (FM34, FM25 and FM15) contained 48 to 77% plant proteins, 70% fish oil and 30% palm olein in 37% crude protein and 28% lipid. After 96 days, feed consumption was significantly declined in FM15 diet. Muscle monounsaturated and highly unsaturated fatty acids (HUFA) were significantly increased in the diet of FM34 and FM25. In conclusion, substitution of fish meal and fish oil did not affect the growth performances, but increased the muscle HUFA in FM34 and FM25, respectively.</p> <p>Study 3 examined the effects of three lipid levels (LF13, MF16, and HF19) on juvenile yellowtail (100 g). After 60days, HF diet significantly increased muscle lipid. HF and MF diet significantly decreased linoleic acid contents and increased docosahexaenoic acid (DHA) contents in both liver and muscle tissues. HF and MF diet significantly reduced n-6 HUFA in liver and muscle ($P>0.05$). The muscle n-3 HUFA contents significantly increased in HF and MF diets, and compositions of n-3 HUFA were significantly higher than that of the liver. In conclusion, HF diet improved the tissue fatty acid and health conditions.</p> <p>Study 4 was conducted to examine the effects of supplemented vitamin-E (VE) for juvenile red sea bream (112 g). Diets (0, 100, 200, 400 mg VE/kg diet) were fed for 30 days. Tissues VE was significantly higher in 400mg VE/kg diet, followed by 200 and 100 mg VE/kg diet, respectively. Thiobarbituric acid reactive substances (TBARs) were inversely related ($P<0.05$) with VE levels. Dietary VE significantly increased the profile of DHA and n-3 HUFA. Hemoglobin significantly increased but plasma triglyceride, total cholesterol and oxidative stress decreased as VE increased. In conclusion, VE 200mg/kg diet reduced the tissue lipid oxidation and improved the health conditions.</p> <p>In conclusions, Alternative protein and lipid replacement levels in red sea bream and yellowtail using this RAS are similar to those which reported with net cages and flow-through systems previously.</p>	