ABSTRACT

SITTI WAJIZAH. Resistance of Amide in Ruminal System and Its Effectiveness in Modifying Fatty Acid Composition in Rat as Post Ruminal Model. Under supervision of KOMANG G. WIRYAWAN, WASMEN MANALU, and DWI SETYANINGSIH.

Dietary n-3 polyunsaturated fatty acids (PUFA n-3), such as fish oil in ruminant potentially decrease cholesterol concentration in meat. Due to extensive lipolysis and hydrogenation of n-3 PUFA by rumen microorganism, n-3 PUFA was reacted with butylamine to produce fish oil amides that resist microbial breakdown in the rumen. Three in vitro trials were conducted to determine whether fish oil amides were degraded and hydrogenated by ruminal organism. The treatments consisted of ground corn hay supplemented with either no lipid, fish oil, combination of fish oil and amide, and amide alone. After 24 hours incubation, the degradation of amide was lower for 10% supplementation than for 5% supplementation (13% and 30% respectively). Fish oil amides had no effect on VFA, acetate:propionate, NH₃, microbial protein, and gas production. Relative to control, fish oil amide significantly reduced the degradabilities of dry and organic matters, and protozoa population in cultures. In in vivo experiment, fish oil amide was added to rat diets as post ruminal model. This experiment was conducted to study the effectiveness of fish oil amide in decreasing plasma cholesterol and triglyceride concentrations, increasing PUFA in rat muscle and its effect on blood hematological status. Thirty five male Sprague Dawley rats of 7 weeks old were randomly divided into 5 (five) treatment groups. Control group (A) was fed with semi-purified diet containing of 8% corn oil. Treatment groups were supplemented with 4.5% fish oil (B), 3% fish oil+1.5% fish oil amide (C), 1.5% fish oil+3% fish oil amide (D), and 4.5% fish oil amide (E), respectively. The result showed that fish oil amide supplementation could maintain the number of erythrocytes and hemoglobin, while hematocrit value began to decrease with 3% amide supplementation compared to fish oil supplementation (B) and 1.5% amide supplementation (C). The number of leucocytes in group with 4.5% amide supplementation significantly increased (P<0.05) compared to the group supplementing fish oil (B). Fish oil amide supplementation had no effect on plasma cholesterol and HDL concentrations, but began markedly increased (P<0.05) plasma triglyceride, LDL concentrations, and muscle cholesterol at 3% amide supplementation. There was no enriched levels of n-3 PUFA in rat muscle with amide supplementation. It was concluded that 3% amide supplementation gave negative impact on hematological status, plasma lipid profile, muscle and adipose tissue.

Keywords: amide, fish oil, rumen, biohydrogenation, lipid profile