Chemical Composition of Broiler Chicken Breast Fed Ration with Supplementation of Protected Fatty Acid

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ABSTRACT

The experiment of protected fatty acid (PFA) supplementation in ration on chemical composition of breast broiler chicken was conducted in the field laboratory of Animal Science Faculty, Halu Oleo University. There were 48 broiler chickens, divided into 12 compartments stable. This experiment consist of 3 treatments were Control (100% commercial ration), DCM (+ 3% dry carboxylate salt mixture), COH (+3% coconut oil hydrosilate), and 4 replication. The water content of control treatment was (70.5 ±1.0%), DCM (70.0 ± 0.0 %) and COH (71.5 ±1.0 %). Crude protein of control treatment was (18.26 % ± 0.38%), DCM (19.21±0.14%), and COH (18.37 ± 0.14 %). Ether extract content was 3.15 ±0.19 (control), 1.65 ± 0.13 (DCM) and 2.5 ±0.10 (COH). The data was analyzed by using contrast orthogonal test. The result showed that supplementation of 3 % of protected fatty acids in ration has significant effect ($p<0.01$) on ether extract and ash broiler chicken breast meat but has no significant effect ($p>0.05$) on water and the crude protein contents of broiler chicken breast meat at the age of 4 weeks old.

Key Words: Chemical Composition, Protected Fatty Acid (PFA), Dry Carboxylate Salt Mixture (DCM), Coconut Oil Hydroxilase (COH)

INTRODUCTION

Meat contains a complete, balanced, and easy to digest of essential amino acids. One type of meat that is expected to meet human nutritional needs is broiler meat. Astawan (2006) states that broiler chicken meat contains high nutrition, good in flavor, aroma and tenderness, and has low price.

Protected fatty acid is oil processing result with acid and or alkaline hydrolysis eg a dry carboxylate salt mixture (DCM) (Tasse, 2010) and coconut oil hydrosilate (COH) (Samboligi, 2014). Protection of fatty acids intended to protect the free fatty acid produced from the hydrolyzed especially unsaturated fatty acids. Protected fatty acid which is not oxidized by light and heat will be produce free fatty acids such as saturated fatty acids and proventriculus and ventriculus unsaturated which can be used as energy boast for poultry such as broiler chicken besides that unsaturated fat can be found in chicken meat.

The research of DCM and COH in native chicken has been done. Apri (2014) showed that supplementation of 3% CDM and 3% COH can increase ash mineral materials. But supplementation of 3% DCM and 3% COH in the ration is not improve water content, crude protein and ether extract in the native chicken meat.

Therefore, the research of protected fatty acid DCM and COH in broilers meat needs to be conducted to observe the effect of its using on the nutrient levels include water, ash, crude protein, and ether extract content of broiler chicken breast meat.

MATHERIAL AND METHODS

Forty eight broiler chickens divided into 12 compartments stable. This experiment consist of 3 treatments were Control (100% commercial ration), DCM (+ 3% dry carboxylate salt mixture), COH (+3% coconut oil hydrosilate), and 4 replications. The water content of control treatment was (70.5

±1.0%), DCM (70.0 ± 0.0 %) and COH (71.5 ±1.0 %), crude protein content of control treatment was (18.26 % ± 0.38%) , DCM (19.21±0.14%), and COH (18.37 ± 0.14 %), and ether extract content was 3.15 ±0.19 (control), 1.65 ± 0.13 (DCM) and 2.5 ±0.10 (COH). The data obtained was analyzed by using contrast orthogonal test.

RESULT AND DISCUSSION

Water content

Water content is the percentage of material water that can be expressed based on wet or dry weight. Water content based on wet weight is the ratio between waters weight in material with total weight of materials, ,while the water content by dry weight is the ratio between the weight of water in a material with a dry weight of the material (Suryanagara, 2006). Water content of broiler chicken breast that added 3% protected fatty acid can show in Table 1.

Table 1. Chemical composition of breast broiler chicken on ration supplemented protected fatty acids.

Variable	Control	DCM	COH
Water (%)	70.5 ±1.0	70.0 ±0.0	71.5 ± 1.0
Ash (%)	3.15 ± 0.19 c	1.65 ± 0.13 a	2.5 ± 0.22 b
Crude Protein (%)	18.26 ± 0.38	19.21 ± 0.14	18.37 ± 0.14
Ether extract (%)	3.7 ± 0.18 b	3.4 ± 0.17 b	2.8 ± 0.10 a

*Different superscript at the same row showed significant difference

Supplementation of 3% protected fatty acid in ration has not significant effect (p> 0.05) on water content of chicken breast. So that, the supplementation of protected fatty acids in the diet has not been able to reduce water content of chicken breast meat. It was caused by before the research is conducted, the samples was freezing for 1 week causing increasing the level of water content in COH treatment. Water content of meat is influenced by retention time, this is due to the occurrence of hydrolysis process and meat will be more binding water or absorbs the oxygen from the temperature of freezer so that the free water in meat will be increased. This is appropriate with the higher of WHC is due to protease enzymes activity to the loosing of meat microstructure so that can absorbs more water.(Soeparno, 2009).

Water content of chicken breast with addition 3% protected fatty acid in rations for 2 weeks ranged between 70.0% -72.5%. It is higher than Apri (2014), that water content of breast meat with addition 3% protected fatty acid ranged between 62.77% - 71.27%. Whereas, Supadmo (1997) observe the water content broiler chicken meat that added 4% *lemuru* fish oil is 74.87 %, while the control is 74.92%. Using of several different types of fatty acids do not affect water content of meat (Coetzee & Hoffman, 2002). Water content is affected by the difference of chicken species and age, and environmental conditions such as temperature and humidity.

Ash content

Supplementation of 3% protected fatty acid in ration is very significant (p> 0.01) on ash content of chicken breast meat (Table 1). Ash content of chicken breast meat on supplementation of 3% fatty acid protected, DCM and COH treatments is lower than control. Otherwise, ash content of chicken breast meat with supplementation of 3% DCM is lower than COH. This shows that supplementation of 3% protected fatty acid in ration can decrease ash content of chicken breast meat.

Ash content of chicken breast in ths reseacrh ranged between 1.5% - 3.35%. It is lower than Apri (2014), that ash content of chicken breast with supplementation of 3% protected fatty acid ranged between 3.62% - 4.07%. Komala (2013) observe that ash content of native chicken breast is

1%, while Wardani (2012) states that ash content of meat is 1.05% - 1.06%, and 1% (Rasyaf, 1998). Ash content of native chicken breast with supplementation of 5% Omega-3 is 1.05%, while broiler chicken breast is 1.70%.

Ash content of chicken breast meat is related with water content and crude protein of meat and fat-free tissue. deMan (1997) states that lean beef relatively contain more minerals.

Crude protein

Protein is an important chemical compound in meat because it contains amino acids required in food. Meat protein is a good quality protein because it contains essential amino acids and the amount equivalent with the human body needs and high digestibility and easily absorbed (Mountney et al., 1995).

In this research, supplementation of 3% protected fatty acid in ration has no significant ($p > 0.05$) on crude protein of chicken breast. So that addition of protected fatty acids in the diet has not been able to increase the crude protein of chicken breast meat.

Crude protein of chicken breast with addition of 3% protected fatty acid in rations for 2 weeks ranged between 18.8% -19.25%. This result is lower than Apri (2014) that crude protein of native chicken breast meat with addition of 3% protected fatty acid ranged between 19.85% - 23.20%.

Broiler chickens were observed at 27 days of age, had 14.2% crude protein content, 14% at 42 days, and 13.9% at 56 days and concluded that increasing in broiler chicken age can reduce the percentage of chicken meat protein (Santoso & Tanaka, 2000). Coetzee & Hoffman (2002) also mentioned that using of several different types of fatty acids do not affect the crude protein meat.

Crude protein levels in this study were in the normal range, (18% vs. 18% - 22%). It is accordingly raised by Soeparno (2005) that a normal meat protein is 16-22%.

Ether extract

Supplementation of 3 % protected fatty acid in ration shows very significant effect ($p > 0.01$) on ether extract of chicken breast (Table 1). Crude fat levels in chicken breast meat with addition of 3% protected fatty acids, DCM and COH is lower than control. Otherwise, crude fat level of chicken breast meat with addition of 3% COH is lower than DCM treatment. This shows that addition of 3% protected fatty acid in the form hydrolyzed vegetable oil in rations decrease ether extract content of chicken breast meat. It is because of the fatty acids were used is copra oil which contains trans-fatty acids are from by the oxidation of light and heat process. Trans-fatty acids can decrease the ether extract of animal products.

Ether extrat of chicken breast meat with addition of 3% protected fatty acid in ration for 2 weeks ranged between 2.8%-3.8%. Results of this research are lower in compared with April (2014) that ether extract of native chicken breast meat with addition of 3% protected fatty acid ranged between 2.72%-4.80%. This is in accordance with Coetzee & Hoffman (2002) that using of several different types of fatty acids do not affect the ether extract of meat. Supadmo (1997) reported that broiler chicken fat levels that added 4% of lemuru fish in ration is 3.66%. While Komala (2013) state that ether extract of native chicken is 4.7%. According to Mountney (1996), crude fat level is varies depending on age, gender, and animal species.

CONCLUSION

Supplementation of 3% protected fatty acids in ration has significant effect on ash and ether extract content, but has no significant effect on water and crude protein content of broiler chicken breast meat.

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