CHANGES OF THE CHEMIACL COMPOSITION OF CHICKENS AS SUPPLEMENTAL LEVELS OF TALLOW

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***Abstract*-This work was carried to investigate the effect of tallow on the chemical characteristics of chicken carcass as supplemental high levels of tallow at broiler diets. It was thought that when the tallow was added as common levels and high energy levels to the broiler diet, thickness of skin of chicken increased and strength of that increased so that a wound ratio decreased. SF decreased as increasing the tallow levels. Lightness and Redness increased as increasing the tallow levels but Yellowness decreased. Unsaturated fatty acid was high at the high energy treatment. So the occurrence ratio would be high, skin was weaken and thinned and unsaturated fatty acid ratio was high due to the excess levels of dietary tallow.**

***Index Terms* - thawing chicken, freshness, tissue**

□. INTRODUCTION

The tallow diet was used to the broiler diet to improve the performance of broilers. Specially, tallow is added to the finisher diet rather than to the starter diet, because the added tallow let to increase the energy concentration of diet so that accomplishes the rapid performance of broilers. Because tallow was relatively cheap and was high the occurrence of energy, tallow was largely used as the feed ingredient. However, the broiler farm family suggested that a wound was occurred easily with a little stimulation for a cockfight as weakening of skin in case of the excess use of tallow. There were few researches that were investigated what kind of the effect of tallow on the quality of carcass of chickens. This work was carried to investigate the effect of tallow on the chemical characteristics of chicken carcass as supplemental high levels of tallow at broiler diets.

□. MATERIALS AND METHODS

Hubbard broilers were used in this work and were fed at the windowless flatted house with no sexual division for 32 days. Divided two treatments were the basal diet treatment and the high energy treatment. At starter period, the basal diet was 3.12% tallow and ME 3,150 kcal/kg and the high energy diet was 4.11% tallow and ME 3,180 kcal/kg. The basal diet was 3.65% tallow and ME 3,200 kcal/kg and the high energy diet was 4.80% tallow and ME 3,250 kcal/kg at finisher period (Table 1). Broilers were fed for 32 days and were slaughtered with commercial methods of the common butcher house after about 8 hour's starvation. Slaughtered chickens ere investigated on the quality grade of carcass, a wound, dermatitis, a bruise, an external wound, dislocation, scab and so on.

□. RESULTS AND DISCUSSION

Strength and thickness of the carcass skin of chickens as supplemental levels of tallow was shown to Table 2. The strength of skin was 8.33 kg at the basal diet treatment and 6.61 kg at the high energy treatment, and it was low as about 20.1% at the basal diet treatment compared to the high energy treatment. The thickness of skin was 1.72 mm at the basal diet treatment and 1.37 mm at the high energy treatment, and it was low as about 20.3% at the high energy treatment compared to the basal diet treatment. Cooking loss of chicken carcass was 21.32% at the basal diet treatment and 20.42% at the high energy treatment, and two treatments have similar results (Table 3). Share force (SF) was 1.81 kg/0.5inch^2 at the basal diet treatment and 1.61 kg/0.5inch^2 at the high energy treatment. It was low as 11.0% at the high energy treatment compared to the basal diet treatment. Water holding

capacity (WHC) was 60.47% at the basal diet treatment and 59.65% at the high energy treatment, two treatments was similar results, and WHC has a similar tendency with SF. Thus, it was evaluated that the meat quality of chicken was softer as increasing dietary tallow. Nutrients of chickens were shown to Table 4. Moisture content was 75.86% at the basal diet and 75.93% at the high energy treatment, and two treatments had the similar results. Fat content was 0.69% at the basal diet treatment and 0.37% at the high energy treatment, and that decreased a little at the high energy treatment but there was no significant difference between the basal diet treatment and the high energy treatment. Ash content was 1.03% at the basal diet treatment and 1.04% at the high energy treatment, and two treatments have the similar results. pH of chicken was 6.02 at the basal diet treatment and 6.00 at the high energy treatment, and two treatments have the similar results. Meat color of chicken was shown to Table 5. Lightness (L*) increased a little at the high energy treatment as L* was 54.45 at the basal diet treatment and 55.97 at the high energy treatment. Redness (a*) was 2.89 at the basal diet treatment and 3.47 at the high energy treatment, and the high energy treatment was high as about 16.7%. Yellowness (b*) was 5.79 at the basal diet treatment and 4.67 at the high energy treatment, and the basal diet treatment was high as about 19.3%. Changes of fatty acid of chicken were 35.72% at the basal diet treatment and 35.72% at the high energy treatment, and the high energy treatment was low as about 1.44%. Oleic acid (C18:1,n9) was 43.15% at the basal diet treatment and 43.46% at the high energy treatment, and two treatments have the similar results. Linoleic acid (C18:2,n6) was 13.59% at the basal diet treatment and 13.18% at the high energy treatment, and two treatments have the similar results. So it was shown that fatty acid has no changes as increasing dietary tallow.

□. CONCLUSION

It was thought that when the tallow was added as common levels and high energy levels to the broiler diet, thickness of skin of chicken increased and strength of that increased so that a wound ratio decreased. SF decreased as increasing the tallow levels. Lightness and Redness increased as increasing the tallow levels but Yellowness decreased. Unsaturated fatty acid was high at the high energy treatment. So the occurrence ratio would be high, skin was weaken and thinned and unsaturated fatty acid ratio was high due to the excess levels of dietary tallow.

Table 1. Tallow and Metabolic energy levels of experimental diets (Unit: %)

Items	Starter		Finisher	
	Basal diet	High energy diet	Basal diet	High energy diet
Tallow (%)	3.12	4.11	3.65	4.80
CP (%)	21.0	21.0	19.0	19.0
ME (kcal/kg)	3,150	3,180	3,200	3,250

Table 2. Strength and thickness of skin as energy levels

Division	Skin Strength (kg)	Skin Thickness (mm)
The basal diet treatment	8.33±0.97	1.72±1.19
The high energy treatment	6.61±1.19	1.37±0.62

Table 3. Chemical composition of chickens as energy levels

Division	Cooking loss (%)	SPF[1] (kg/0.5inch^2)	WHC[2] (%)
The basal diet treatment	21.32±0.91	1.81±0.25	60.47±1.03
The high energy treatment	20.42±1.27	1.61±0.19	59.65±1.31

[1] SF = Share Force

[2] WHC = Water Holding Capacity

Table 4. Nutrients of chickens as supplemental tallow levels

Division	Moisture	Fat	Ash	pH
The basal diet treatment	75.86±0.36	0.69±0.17	1.03±0.02	6.02±0.05
The high energy treatment	75.93±0.31	0.37±0.18	1.04±0.06	6.00±0.08

Table 5. Changes of meat color of chicken as supplemental tallow levels

Division	L*	a*	b*
The basal diet treatment	54.45±2.00	2.89±0.86	5.79±0.74
The high energy treatment	55.97±3.75	3.47±0.41	4.67±1.29

Table 6. Changes of fatty acid of chicken as supplemental tallow levels

Division	The basal diet treatment	The high energy treatment
Myristic acid (C14:0)	1.01±0.06	1.32±0.14
Palmitic acid (C16:0)	26.24±0.74	25.14±1.10
Palmitoleic acid (C16:1n7)	5.66±0.50	7.03±1.48
Stearic acid (C18:0)	8.47±0.25	7.82±0.52
Oleic acid (C18:1n9)	43.15±1.81	43.46±2.66
Vaccenic acid (C18:1n7)	0.11±0.01	0.13±0.03
Linoleic acid (C18:2n6)	13.59±0.76	13.18±1.78
γ-Linoleic acid (C18:3n6)	0.15±0.02	0.18±0.02
Linolenic acid (C18:3n3)	0.64±0.05	0.69±0.10
Eicosenoic acid (C20:1n9)	0.66±0.07	0.65±0.08
Arachidonic acid (C20:4n6)	0.32±0.06	0.42±0.17
Saturated fatty acid	35.72±0.68	34.28±1.43
Unsaturated fatty acid	64.28±0.68	65.17±1.43
- Mono unsaturated fatty acid	49.58±1.38	51.26±2.65
- Poly unsaturated fatty acid	14.70±0.82	14.45±2.01

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