# Change of Fatty Acid, Amino Acid and Free Amino Acid of Chicken According to Breeding days

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*Abstract*— **The result of current studies was carried out to development the large chicken. Therefore we investigated the meat quality of the chicken according to breeding days(30, 36 and 42 days). The linoleic acid which has one of the most essential fatty acid of chicken breast muscle was increased as increasing growth stage. DHA which the major ingredient of brain cell, was 0.69% at 30 days, 0.90% at 36 days and 1.29% at 42 days in chicken. The glutamic acid among amino acid composition was 3.63% at 30 days, 3.63% at 36 days and 3.54% at 42 days in chicken breast muscle. The glutamic acid composition in the chicken breast muscle was decreased by increasing growth stage. The total free amino acid composition were higher in chicken breast legs than in chicken breast muscle.**

*Keywords*— **fatty acid, amino acid, free amino acid, chicken .**

## INTRODUCTION

A production method of meat chicken in Korea was fixed into small chicken(approximately 1.5 kg) and the propensity to consume was consumed by a roast chicken than meat cut. But the foreign produced a large size chicken of approximately 2.1-2.7 kg and was in circulation with meat cut. Meat cut of chicken was produced more according to breeding with a large size and it was not only export promotion, but also satisfy the demand of chicken breast was increased with a diet recently. And it also expected to decrease of import for chicken breast. Recently, the size of Japan and the United States retail market of meat cut were each 70% and 90%, so invigorate the circulation market. National Institute of Animal Science has been established the manufacturing technology by production research since 1993, but it's need the new manufacturing technology for production of meat cut, because feed system and breeding days were improved all the while by development of breeding technology.

## MATERIALS AND METHODS

We purchased 1 day starter and breeds in a henhouse. The early feed(CP : 21%, ME : 3,030 Kcal/ ) gave for 10 days, the turn feed(CP : 18.5%, ME : 3,050 Kcal/ ) gave 25 days and the latter feed(CP : 17.5%, ME : 3,100Kcal/ ) gave until before shipment. Random selection and processing of a male performed at 30, 36 and 42 days and analyze general element, mineral, nucleic acid and meat color of chicken breast and leg.

## RESULTS AND DISCUSSION

Fatty acid change of chicken breast according to breeding days showed in Table 1.C18:2n6(linoleic acid) that the highest content of all essential fatty acid was increased 13.9% compared with 30 and 36 days as 17.84% at 30 days, 17.84% at 36 days and 20.33% at 42 days. C20:4n6(Arachidonic acid) which has similar pattern with linoleic acid content, was increased with the passing of breeding days as 4.75% at 30 days, 6.10% at 36 days and 8.67% at 42 days. C20:5n3(EPA) which known components of brain was

appear to increase with the passing of breeding days and increasing weight of chicken, as 0.30% at 30 days, 0.38% at 36 days and 0.45% at 42 days. This pattern was appear to C22:6n3(DHA) content similarly as 0.69% at 30 days, 0.96% at 36 days and 1.29% at 42 days, so a large size chicken(42 days) was content DHA of over 1.4 fold compared with 30 days. All of unsaturated fatty acid(USFA) was appear to 64.15% at 30 days, 64.16% at 36 days and 65.94% at 42 days, so a large size chicken of 42 days was contain USFA more compared with 30 days. Amino acid change of chicken breast showed in Table 2. Methionine classified with essential fatty acid was contain approximately 0.13% more in 42 days compared with 30 days as 0.46% at 30 days, 0.61% at 36 days and 0.59% at 42 days. Leucine which has the highest content among essential fatty acid was decreased with the passing of breeding days as 1.91% at 30 days, 1.82% at 36 days and 1.76% at 42 days. Glutamic acid which known associated with taste was not increased by breeding days as 3.63% at 30 days, 3.63% at 36 days and 3.54% at 42 days. Free amino acid change of chicken breast showed in Table 3. Total free amino acid were appear to decrease little by little with the passing of breeding days as 370.62 mg% at 30 days, 235.90 mg% at 36 days and 246.30 mg% at 42 days. Methionine classified with essential fatty acid was 8.81 □% at 30 days, 4.79 □% at 36 days and 4.90 □% at 42 days, so 30 days chicken which has the lowest among all of selected days was appear to highest Methionine content. Threonine that the highest content of all free amino acid was not appear to be a regular pattern as 39.58 □% at 30 days, 26.19 □% at 36 days and 31.18 □% at 42 days, and approximately 8.40% was detected in the lowest 30 days among selected days. Glutamic acid which known associated with taste among amino acid was decreased with the passing of breeding days as 46.63 □% at 30 days, 29.75 □% at 36 days and 28.24 □% at 42 days. Total free amino acid of leg meat of breeding 42 days chicken was increased approximately 30.7% when compared with breast meat. So, it was supported that the taste of the leg meat was better than the breast meat.

## CONCLUSION

The linoleic acid which has one of the most essential fatty acid of chicken breast muscle was increased as increasing growth stage. The DHA in the chicken was increased as increasing growth stage. The glutamic acid composition in the chicken breast muscle was decreased by increasing growth stage. The total free amino acid composition were higher in chicken legs muscle than in chicken breast muscle.

Table 1. Change of lipid acid components on chicken breast according to breeding days (unit : %)

| Items | 30day | 36day | 42day |
|---|---|---|---|
| C18:0 | 11.12±0.64 | 11.70±0.87 | 10.64±0.58 |
| C18:1n9 (Oleic acid) | 29.88±1.58 | 29.07±2.37 | 25.47±1.66 |
| C18:1n7 | 3.68±0.13 | 4.08±0.67 | 3.99±0.33 |
| C18:2n6 (linoleic acid) | 17.84±0.44 | 17.84±1.05 | 20.33±1.32 |
| C18:3n6 | 0.10±0.20 | 0.00±0.00 | 0.00±0.00 |
| C18:3n3 (linolenic acid) | 0.47±0.02 | 0.34±0.04 | 0.31±0.09 |
| C20:1n9 | 0.70±0.52 | 0.45±0.13 | 0.25±0.05 |
| C20:4n6 (Arachidonic acid) | 4.75±1.58 | 6.10±1.56 | 8.67±1.03 |
| C20:5n3 (EPA) | 0.30±0.07 | 0.38±0.10 | 0.45±0.06 |
| C22:4n6 | 1.30±0.25 | 1.42±0.42 | 2.18±0.29 |
| C22:6n3 (DHA) | 0.69±0.16 | 0.96±0.28 | 1.29±0.25 |

| | | | |
|---|---|---|---|
| SFA | 35.85±0.92 | 35.84±2.02 | 34.06±0.31 |
| USFA | 64.15±0.92 | 64.16±2.02 | 65.94±0.31 |

Table 2. Change of amino acid component on chicken breast according to breeding days (unit : %)

| Items | 30day | 36day | 42day |
|---|---|---|---|
| Methionine | 0.46±0.02 | 0.61±0.03 | 0.59±0.03 |
| Threonine | 1.05±0.03 | 1.06±0.03 | 1.00±0.04 |
| Glutamic acid | 3.63±0.08 | 3.63±0.08 | 3.54±0.12 |
| Glycine | 0.96±0.02 | 0.98±0.01 | 0.93±0.03 |
| Alanine | 1.32±0.03 | 1.36±0.03 | 1.28±0.05 |
| Valine | 0.95±0.02 | 0.97±0.01 | 0.95±0.03 |
| Leucine | 1.91±0.05 | 1.82±0.06 | 1.76±0.04 |
| Phenylalanine | 1.13±0.11 | 1.20±0.02 | 1.09±0.04 |
| Lysine | 2.02±0.09 | 2.28±0.09 | 2.02±0.12 |
| Histidine | 0.82±0.03 | 0.90±0.04 | 0.82±0.03 |
| Arginine | 1.39±0.01 | 1.30±0.09 | 1.27±0.03 |

Table 3. Change of free amino acid component on chicken breast according to breeding days (unit : %)

| Items | 30day | 36day | 42day |
|---|---|---|---|
| Methionine | 8.81±1.50 | 4.79±0.73 | 4.90±0.90 |
| Threonine | 39.58±7.70 | 26.19±3.65 | 31.18±7.54 |
| Serine | 24.01±3.98 | 14.90±3.05 | 14.84±2.65 |
| Glutamic acid | 46.63±7.82 | 29.57±0.37 | 28.24±4.08 |
| Glycine | 15.39±2.47 | 9.77±3.86 | 11.25±2.96 |
| Alanine | 33.03±3.90 | 17.03±1.81 | 21.57±5.41 |
| Valine | 12.46±2.39 | 5.99±1.44 | 6.32±2.02 |
| Leucine | 19.24±3.65 | 9.52±2.34 | 9.71±3.33 |
| Phenylalanine | 19.58±3.31 | 16.27±3.93 | 13.94±3.39 |
| Lysine | 56.99±8.30 | 55.85±7.06 | 54.91±9.67 |
| Proline | 24.03±3.43 | 9.87±4.93 | 12.40±5.85 |
| Total | 370.62 | 235.90 | 246.30 |
| Legs total free amino acid | 470.01 | 326.40 | 321.90 |

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