Proceeding
The First International Conference
Technology on Biosciences and Social

"Industry based on Knowledges"

17th-19th November 2016, Convention Hall, Andalas University

Organized by :
Animal Science Faculty of Andalas University
Co-organized by :
Alumni Center of Universiti Putra Malaysia

Penerbit Lembaga Literasi Dayak (LLD)
berkerja sama dengan Universitas Andalas, Padang

Proceeding of The First International Conference
Technology on Biosciences and Social Sciences
"Industry based on Knowledges"
17th-19th November 2016, Convention Hall, Andalas University

Proceeding of The First International Conference Technology on Biosciences and Social Sciences

ISBN 978-602-6381-22-4

"Industry based on Knowledges"

17th-19th November 2016, Convention Hall, Andalas University

The Proceeding Of

The 1st International Conference Technology on Biosciences and Social Science 2016

"Industry Based On Knowledges"

17th – 19th November 2016, Convention Hall, Andalas University, Padang, West Sumatera, Indonesia

Organized by:

Animal Science Faculty of Andalas University
and
Alumbi Center of Universiti Putra Malaysia

Organizing Committee

SteeringCommittee:
Rector of Andalas University
Deputy Rector II Andalas University
Dean of Animal Science Faculty
Deputy Dean I of Animal Science Faculty
Deputy Dean II of Animal Science Faculty
Prof. Dr. Ir. Salam N. Aritonang, MS
Prof. Dr. Ir. H.M. Hafil Abbas,MS
Prof. Dr. Ir.Zaituni Udin, M.Sc

Chairman :
Prof. drh. Hj. Endang Purwanti, MS., Ph.D

Co-Chairman:
Prof. Dr. Ir. Hj.Husmaini, MP

Secretary:
Dr. drh. Hj.Yulia Yellita, MP
Afriani Sandra, S.Pt., M.Sc

Secretariat:
Hendri Purwanto, S.Pt.,M.Si
Yunizardi, S.Pt.
Arif Trisman, S.Pt.
Rahmat Mulyadi,SE

Treasurer :
Dr. Ir. Elly Roza, MS,

Financial
Dr. Ir.Tinda Afriani, MP.
Dr. Ir. Sabrina, MP

Editors:
drh. H. Yuherman, MS., Ph.D; Dr. Ir. Rusmana Wijaya Setia Ningrat, M. Rur.Sc,;Dr.Ir. Masrizal, MS.; Dr.Ir. Firda Arlina,MP.; Indri Juliyarsi, SP., MP.; Deni Novia, S.TP., MP.; Sri Melia, S.TP., MP.; Aronal Arief Putra, S.Pt., M.Sc; Ferawati,S.Pt, MP.; Yulianti Fitri Kurnia, S.Pt,M.Si

Meet and Greet of UPM Alumny
Prof. Dr. Marlina, Apt.,MS.; Dr. Ir. Adrinal, MS.; Dr. P.K.Dewi Hayati,MS.

Contents

Preface

List Paper of Oral Presentation

List of Poster

Growth and Carcass Characteristic in Kampong x Broiler Crossbred Divergently Selected for Unsaturated Fatty Acid

Asep Gunawan[a*], Ahmad Furqon[b], Kasita Listyarini[b], Jakaria[a], and Cece Sumantri[a]

[a]Departement of Animal Production and Technology, Bogor Agricultural University, Bogor, 16680, Indonesia
[b]Graduate School, Departement of Animal Production and Technology,
Bogor Agricultural University, Bogor, 16680, Indonesia
*Corresponding author: aagun4780@gmail.com

Abstract

Unsaturated fatty acid is one of the group fatty acid composition which is important for human health. The objective of this study was to identify the growth and carcass characteristic in Kampong x Broiler crossbred chicken in divergent unsaturated fatty acid. The highest unsaturated fatty acid were devide into to two group (high and low), where high dan low sample had value were 58.87% and 50.43% respectively. The data were analyse using t-test to observe carcass characteristic between high and low unsaturated fatty acid. The result showed there were not significantly (P>0.05) differences in growth (body weight) and carcass characteristic (carcass weight, breast muscle weight, and leg muscle weight) between to selected group. Divergent selection base on unsaturated in Kampong x Broiler crossbred chicken could provide a usefull model for genetics studies of fatty acid content related trait.

Keywords : Broiler, carcass characteristic, kampong chicken, unsaturated fatty acid

1. Introduction

Kampong chicken is a native chicken from Indonesia. Kampong chicken is slow growth and lean meat type chicken but it has adaptability and resistancy to disease. Broiler is fast growth and fatty meat type chicken. Crossbreeding program hopefully can increase meat quality, growth, adaptability and resistancy. Fatty acid composition is closely related to the nutritive value and the teste of meat. Fatty acids play an important role in the component of meat quality such as tenderness, shelf life, and flavour [1]. Fatty acid were devide into saturated and unsaturated fatty acid. Saturated fatty acid such as C14:0 and C16:0 are risk factors for cardiovascular diseases [2]. In contrast, unsaturated fatty acids are beneficial to human health which have function to decrease the circulating consentration of low density lipoprotein (LDL)-cholesterol by increasing hepatic LDL receptor activity [3].

Unsaturated fatty acid are hydrocarbon chain containing at least one carbon-carbon double bond. In the UK, the major dietary sources of unsaturated fatty acids include meat and meat products. A well-established risk factor for cardiovascular disease is an elevated plasma low density lipoprotein (LDL) cholesterol consentration. Replacing saturated fatty acids with either monounsaturated fatty acids or n-6 PUFAs reduces LDL (the _bad‘) cholesterol, and so reduces the risk of developing the disease. Unsaturated fatty acids, such as linoleic acid or monounsaturated fatty acids, also slightly raise high density lipoprotein (HDL) (the _good‘) cholesterol, which assist in the removal of triacylglycerols from the bloodstream [4]. Previous studies have shown that diets rich in unsaturated fatty acids (UFA) led to lower fat content [5].

There is some evidence fat deposition such as intramuscular fat were are subject to

different regulatory mechanism such as growth, carcass characteristic and meat quality in chicken [6]. The aim of this study was to examine the consequences of divergent selection for unsaturated fatty acid content on growth and carcass characteristic in Kampong x Broiler crossbred chicken.

2. Material and Methods

2.1. Samples

Tissue samples and phenotypes were collected from theKampong x Broiler crossbred chicken. Ten chicken were selected from a pool 62 chicken as according to unsaturated fatty acid value. Among the ten chickens use in unsaturated fatty acid study, five chickens were classified as extremely high and low unsaturated fatty acid level and consider for this study.

2.2. Fatty Acids Analysis

Fatty acid analyis was determined by Soxhlet extraction method. Fatty acid analysis was done using Soxhlet method at Integrated Laboratorium at Bogor Agricultural University.

2.3. Statistical Analysis

Differences between value from unsaturated fatty acid related to growth and carcass characteristic were analyse by the paired t-test (SAS 9.1). Value of $p<0.05$ were considered to indicate statisticaly significant differences. Pearson correlation coefficients were determined to know relationship between unsaturated fatty acidgrowth and carcass characteristic.

3. Result and Discussion

3.1 Unsaturated Fatty Acid Profile

We focused on unsaturatedfatty acids that account for ~53 % ofthe total fatty acids (Table 1). The most abundant unsaturatedfatty acid was C18:1n9c, followed by C18:2n6c and C16:1, across the populations analyzed. C18:1n9c is an unsaturated fatty acid that is constitutes one third of chicken meat fat [7]. C18:1n9c was the major monounsaturated fatty acid comprising 26.71% in the yolk, whereas C18:2n6c was the major polyunsaturated fatty acid in the fatty acid content of quail egg yolk [8]. C16:1 and C18:1 are product that converted from C16:0 and C18:0 through the SCD enzyme catalyzes a Δ9-cis desaturation of a number of fatty acyl-CoA substrates with converted C16:0 to C16:1 and C18:0 to C18:1 [9].

3.2 Growth and Carcass Characteristic

The level of unsaturated fatty acid were not found significantly ($P>0.05$) difference to growth trait (body weight) and carcass characteristic (carcass weight, breast muscle weight, and leg muscle weight) between to selected group (Table 2). Previous studies have shown that diets rich in unsaturated fatty acids (UFA) led to lower fat content (Sanz 2000) [5]. However, no difference between the content of IMF in leg [6] or breast muscle [10] was found between two lines divergently selected for abdominal fat percentage. Other researchers reported when using two types of essential unsaturated fatty acid (α-linoleic and α-linolenic) they observes differences which were highly significant ($P<0.01$) for carcass weight and the weight of the chest and thigh [11]. This means that even the type of fatty acid affect the quality of mass parts.

Table 1. Profile divergent unsaturated fatty acid

Unsaturated Fatty Acid	Group	
	High	Low
C14:1	0.08 ± 0.02	0.08 ± 0.03
C16:1	2.63 ± 0.87	2.28 ± 0.52
C18:1n9t	0.18 ± 0.02	0.12 ± 0.03
C18:1n9c	33.71 ± 0.94	30.04 ± 1.69
C18:2n6c	21.93 ± 2.26	19.39 ± 0.39
C18:3n6	0.09 ± 0.01	0.08 ± 0.01
C20:2	0.16 ± 0.03	0.18± 0.03
C20:4n6	0.68 ± 0.21	1.12 ± 0.37
C22:6n3	0.06 ± 0.02	0.11 ± 0.04

Table 2. Descriptive statistic of growth and carcass characteristics with divergent unsaturated fatty acid

Carcass Characteristic	Group Unsaturated Fatty Acid	
	High	Low
Body Weight (g)	1086.00 ± 180.88	1127.60 ± 162.30
Chest Weight (g)	202.40 ± 35.41	205.00 ± 36.28
Carcass Weight (g)	679.60 ± 101.95	707.20 ± 118.53
Wing Weight (g)	98.60 ± 9.29	95.20 ± 17.27
Thigh Over Weight (g)	122.20 ± 22.63	118.00 ± 22.44
Thigh Down Weight (g)	110.80 ± 17.31	121.20 ± 23.97
Muscles Chest Weight (g)	145.60 ± 25.72	141.40 ± 35.14
Muscles Thigh Over Weight (g)	92.20 ± 22.11	87.40 ± 17.39
Muscles Thigh Down Weight (g)	71.20 ± 12.56	77.00 ± 14.82
Muscles Thigh Mayor Weight (g)	104.40 ± 20.73	101.00 ± 27.10
Muscles Thigh Minor Weight (g)	41.80 ± 5.76	39.80 ± 8.93

Table 3. Correlation of growth and carcass characteristics with divergent unsaturated fatty acid

Carcass Characteristic	Unsaturated Fatty Acids
Body Weight (g)	-0.03
Chest Weight (g)	-0.07
Carcass Weight (g)	-0.09
Wing Weight (g)	0.21
Thigh Over Weight (g)	0.15
Thigh Down Weight (g)	-0.20
Muscles Chest Weight (g)	0.10
Muscles Thigh Over Weight (g)	0.13
Muscles Thigh Down Weight (g)	-0.18
Muscles Thigh Mayor Weight (g)	0.12
Muscles Thigh Minor Weight (g)	0.11

3.3 Correlation between Growth and Carcass Characteristics With Divergent Unsaturated Fatty Acid

The correlation between unsaturated fatty acid with growth and carcass characteristic were variable with indication unfavourable correlation. Correlation analysis between growth and carcass characteristics with divergent unsaturated fatty acid are summarised in Table 3. The range of correlation were -0.20 to 0.21. The high correlation coefficients evident between unsaturated fatty acid with wing weight (0.21). The low correlation were between

unsaturated fatty acid with tight down weight (-0.20).Aldai *et al.* (2007) [12]reported positive correlations (P<0.001) were found between carcass conformation scores and unsaturated fatty acid (r=0.69) group.

Conclusion

Unsaturatedfatty acid profile was C18:1n9c, followed by C18:2n6c, and C16:1, across the populations analyzed. The divergent of unsaturated fatty acid was not significantly (p>0.05)to growth and carcass characteristic between high and low sample. The correlation between unsaturated fatty acid with growth and carcass characteristic were variable with indication unfavourable correlation among the traits.

Acknowledgements

This work was funded by Directorate of Research and Community Service Directorate General of Strengthening Research and Development Ministry of Research, Technology, and Higher Education which is gratefully acknowledged. We also thanks to Integrated Laboratory at IPB for fatty acid analysis.

References

[21] Hoenselaar R., –Saturated fat and cardiovascular disease: The discrepancy between the scientific literature and dietary advice,‖ J. Nutr, vol.28, pp. 118-123, 2011.

[22] FAO, –Fats and fatty acids in human nutrition,‖ FAO Food Nutr. Pap, vol. 91, pp. 1-116, 2010.

[23] Taniguchi M, Utsugi T, Oyama K, Mannen H, Kobayasi M, Tanabe Y, Ogino A, Tsuji S, –Genotype of stearoyl-coA desaturase is associated with fatty acid composition in javanese black cattle,‖ Mamm Genome, vol. 15, pp. 142-148, 2004.

[24] J. Lunn, and H.E. Theobald, –The health effects of dietary unsaturated fatty acids,‖ *British Nutrition Foundation Bulletin.*, vol. 31, pp. 178–224, 2006.

[25] Sanz M, Lopez-Bote C.J, Flores A, Carmona J.M, –Effect of the inclusion time of dietary saturated and unsaturated fats before slaughter on the accumulation and composition of abdominal fat in female broiler chickens,‖ Poult. Sci, vol. 79, pp. 1320-1325, 2000.

[26] Ricard F., Legleroq B., Tourable C, –Selecting broilers for low or high abdominal fat: distribution of carcass fat and quality of meat,‖ British Poultry Science, vol. 24, pp. 511-516, 1983.

[27] Desnell, Zainal F, –Oxidation reaction kinetics myristic acid, stearic, and oleic in the medium coconut oil, palm oil, and without medium,‖ Jurnal Penelitian Sains, vol. 12(1C): 12107 (1-6), 2009.

[28] Tokusoglu O, –The quality properties and saturated and unsaturated fatty acid profiles of quail egg: the alterations of fatty acids with process effects,‖ Int. J. Food Sci. Nutr., vol.57, pp. 537-545, 2006.

[29] Enoch HG, Catala A, Strittmatter P, –Mechanism of rat liver microsomal stearyl-CoA desaturase: studies of the substrate specificity, enzyme-substrate interactions, and the function of lipid,‖ J. Biol. Chem, vol. 251, pp. 5095-5510, 1976.

[30] Sibut V., L.E. B.E., Tesseraud S, Godet E, Bordeau T, Cailleau-Audoun E, Chartrin P, Duglos M, Berri C, ―Adenosine monophospate-activated protein kinase involved in variations of muscle glycogen and breast meat quality between lean and fat chickens,‖ Journal of Animal Science, vol. 86, pp. 2888-2896, 2008.

[31] Kralik G, Sktic Z, Kusec G, Kadlec J, –The influence of rape seed/oil on the quality of chicken carcass.‖ J. Anim. Sci, vol.48, no.2, pp. 77-84, 2003.

[32] Aldai N, A.I Najera, A. Martinez, R. Celaya, K. Osoro, –Correlation between carcass conformation and fat cover degree, and muscle fatty acid profile of yearling bulls depending on breed and mh-genotype,‖ Livestock Science, vol.107, pp. 199-212, 2007.