

SUPPLEMENTATION OF VALINE IN LOW LYSINE BROILER DIETS

KIMBERLY LUCAS ENAJE

An undergraduate thesis manuscript presented to the faculty of the Department of Animal Science, College of Agriculture, Central Luzon State University in partial fulfilment of the requirements for the degree of Bachelor of Science in Agriculture

**BACHELOR OF SCIENCE IN AGRICULTURE
(ANIMAL SCIENCE)**

JUNE 2017

SUPPLEMENTATION OF VALINE IN LOW LYSINE BROILER DIETS

by

KIMBERLY LUCAS ENAJE

An undergraduate thesis manuscript presented to the faculty of the Department of Animal Science, College of Agriculture, Central Luzon State University in partial fulfilment of the requirements for the degree of Bachelor of Science in Agriculture

APPROVED:


JOICE V. SAN ANDRES

Adviser

06-13-17

Date Signed


ERNESTO A. MARTIN

Critic

06-19-17

Date Signed


JOICE V. SAN ANDRES

Department Research Coordinator

06-19-17

Date Signed


IRENE J. DOMINGO

Department Chairwoman

06-19-17

Date Signed

ACCEPTED:

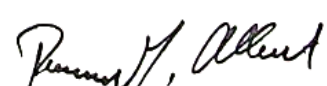

ERNESTO A. MARTIN

Dean

06-19-17

Date Signed

RECORDED:


RONALDO T. ALBERTO
College Research Coordinator

6/20/17

Date Signed

BIOGRAPHICAL SKETCH

On the 19th day of October 1996 the author, KIMBERLY LUCAS ENAJE was born in Guimba, Nueva Ecija. She is the youngest among the children of Mr. Arnel M. Enaje and Mrs. Luisa L. Enaje.

She completed her elementary education in Balingog East Elementary School and took up her secondary education at World Citi Colleges in Guimba. She took Bachelor of Science in Agriculture Major in Animal Science with Poultry Production as her field of specialization at Central Luzon State University (CLSU). She conducted and finished her undergraduate thesis at APO Poultry Module I, CLSU. During her days in CLSU, she became a member of the Society of Animal Science.

ACKNOWLEDGEMENT

Deepest gratitude and appreciation to all the people who contributed and helped the author made by the following persons for the successful fulfillment of this study.

First and foremost, the author would like to thank our Almighty God, for his guide, unconditional love, blessings, and strength to overcome all the trials and hardship in her life and studies.

To Ms. Joice V. San Andres her Adviser and Department Research Coordinator for her invaluable guidance and lessons for the completion and success of the study.

To the dean of the College of Agriculture and her critic, Dr. Ernesto A. Martin for the invaluable support and supervision during the conduct of the study.

To the support of the laborers of Poultry Module I, Kuya Rolly, Kuya Jeff, Kuya John, and Kuya Randy for their help, hospitality, kindness, and concern during the conduct of her study.

To Sir Joseph Mendoza, his co-researcher in this study, for his unfailing support, lecture and guide during the conduct of their study.

Special thanks and appreciation to her kind and loving family Mr. Arnel M. Enaje and Mrs. Luisa L. Enaje as well as her elder sisters Mercy and Nhelyssa and her brother Louie, for their endless love, advice, patience, understanding, financial support and sacrifices they have made for the author that led her to pursue her dream and finished her studies.

To the author's classmates and friends who showed concern and support during the conduct of the study.

To her brothers and sisters in Society of Animal Science for the countless memories they have made with her, be it in joy or in hardship.

Finally, to all the people she failed to mention but helped her in special ways. So much appreciation is extended to you.

KIMBERLY LUCAS ENAJE

TABLE OF CONTENTS

	PAGE
TITLE PAGE	i
APPROVAL SHEET	ii
BIOGRAPHICAL SKETCH	iii
ACKNOWLEDGEMENT	iv
LIST OF TABLES	viii
LIST OF APPENDIX FIGURES	ix
ABSTRACT	1
INTRODUCTION	2
Importance of the Study	3
Statement of the Problem	3
Objectives of the Study	3
Hypothesis of the study	3
Time and Place of the Study	4
Scope and Limitation of the Study	4
REVIEW OF RELATED LITERATURE	5
Importance of valine	5
Valine as a limiting amino acid	5
Importance of amino acids	6
Valine as essential amino acid for broilers	8
Order of Limiting Amino Acids	9

METHODOLOGY	10
Experimental Birds	10
Formulation and preparation of experimental Diets	10
Care and management	14
Data Gathered	14
Data Analysis	16
RESULTS AND DISCUSSION	17
Production Performance	17
Effect on Carcass Yield	18
Effect on Income Over Feed Cost	19
SUMMARY AND CONCLUSION	21
LITERATURE CITED	22
APPENDICES	26

LIST OF TABLES

TABLE		PAGE
1	Dietary amino acid (% of diet) requirements for high-yielding broilers (Dozier et al., 2008)	7
2	NRC (1994) requirement for crude protein and the most rate limiting amino acids for broilers.	8
3	Dietary composition, cost per kg and nutritional content of starter diets	11
4	Dietary composition, cost per kg and nutritional content of grower diets	12
5	Dietary composition, cost per kg and nutritional content of finisher diets	13
6	Mean production performance of broilers supplemented with valine based on val:lys ratio	16
7	Mean dressing percentage and percentage cut-up parts of broilers supplemented with valine based on val:lys ratio	19
8	Mean income over feed cost (IOFC) of broilers supplemented with valine based on val:lys ratio	20

LIST OF APPENDIX FIGURES

FIGURE		PAGE
1	Brooding cage used in the study	27
2	Weighing of ingredients	28
3	Feeding of birds	29

SUPPLEMENTATION OF VALINE IN LOW LYSINE BROILER DIETS¹

by

KIMBERLY LUCAS ENAJE

ABSTRACT

A total of 320 day old Cobb broilers were used to determine the effect of valine supplementation at various level in diet with reduced amount of lysine on growth performance, carcass yield and income over feed cost. The birds were randomly allocated to four dietary treatments namely; 75% val:lys, 84% val:lys, 87% val:lys, and 92% val:lys. Each treatment had 8 replications per treatment and 12 birds per replicate.

Results showed significant differences in gain in weight, feed intake, and feed conversion ratio. However, 75% val:lys had the highest value among the four treatments. Carcass yield and cut-up parts showed no significant differences, except breast meat yield which differed significantly. Income over feed cost also showed significant differences and 75% val:lys had the highest value.

¹Undergraduate thesis manuscript presented as partial fulfilment for the degree of Bachelor of Science in Agriculture, Central Luzon State University, conducted in the Department of Animal Science, College of Agriculture under the supervision of Joice V. San Andres with experimental contribution no. CA. 02-17-0001

LITERATURE CITED

- AJINIMOTOEUROLYSINE S.A.S.** 2009. L-VALINE: Release the potential of your feed. Retrieved from [http:// ajinomoto-eurolysine.com/technical-bulletins-download.html](http://ajinomoto-eurolysine.com/technical-bulletins-download.html) on July 26,2016.
- APPLEGATE, T. J., & ANGEL, R.** 2008. Protein and Amino Acid Requirements for Poultry. University of Maryland, College Park.
- BAKER, D. H., A. B. BATAL, T. M. PARR, N. R. AUGSPURGER and C. M. PARSONS.** 2002. Ideal ratio (relative to lysine) of tryptophan, threonine, isoleucine, and valine for chicks during the second and third weeks posthatch. *Poultry Science*, 81(4), 485-494.
- BAKER, D. H.** 2009. Advances in protein–amino acid nutrition of poultry. *Amino acids*, 37(1), 29-41.
- BERRES, J., S. L. VIEIRA, S. L. KIDD, D. TASCHETTO, D. M. FREITAS, R. BARROS and E. T. NOGUEIRA.** 2010. Supplementing L-valine and L-isoleucine in low-protein corn and soybean meal all-vegetable diets for broilers. *The Journal of Applied Poultry Research*, 19(4), 373-379.
- CAMPOS, A.M.A., H.S. ROSTAGNO,, E.T. NOGUEIRA, C.F.T ALBINO, J.F.T PEREIRA and R.C. MAIA.** 2012. Actualiza ca da proteina ideal para frangos de corteariginina, isoleucinia, valina e tritofano. *Revista. Brasileira de zootecnica.* 4(2): 326-332
- BERRI, C., J. BESNARD, and C. RELANDEAU.** 2008. Increasing dietary lysine increases final pH and decreases drip loss of broiler breast meat. *Poultry Science*, v. 87, n. 3, p. 480-484.
- CORRENT, E. and J. BARTELT.** 2011. Valine and Isoleucine: The next limiting amino acids in broiler diets. Lohmann Animal Health GmbH & Co. KG. vol. 41 (1). P 59
- CORZO, A., M. T. KIDD, W. A. DOZIER III, G. T. PHARR and E. A. KOUTSOS.** 2007. Dietary threonine needs for growth and immunity of broilers raised under different litter conditions. *J. Appl. Poult. Res.* 16:574–582.
- DOZIER, W. A., III, A. CORZO, M. T. KIDD and M. W. SCHILLING.** 2008. Dietary digestible lysine requirements of male and female broilers from forty-nine to sixty-three days of age. *Poult. Sci.* 87:1385–1391

- DOZIER, W.A., III, M.T. KIDD** and **A. CORZO**. 2008. Amino acid responses of broilers. *J. Appl. Poult. Res.* 17:157-167.
- DUARTE, K. F., O. M JUNQUEIRA, C. H. D. F , R. D. S FILARDI, L. L. BORGES** and **M. F. F. M.PRAES**. 2014. Digestible valine requirements for broilers from 22 and 42 days old. *ActaScientiarum. Animal Sciences*, 36(2), 151-156.
- EDMONDS, M. S., C. M. PARSONS** and **D. H. BAKER**. 1985. Limiting amino acids in low-protein corn-soybean meal diets fed to growing chicks. *Poultry Science*, 64(8), 1519-1526.
- EMMERT, J. and D. BAKER**. 1997. Use of the Ideal Protein Concept for Precision Formulation of Amino Acid Levels in Broiler Diets. Aviagen. Ross 308 broiler management guide. Retrieved from: www.aviagen.com.
- FARKHOY, M., M. MODIRSANEI, O. GHAVIDEL, M. SADEGH** and **S. JAFARNEJAD**. 2012. Evaluation of Protein Concentration and Limiting Amino Acids Including Lysine and Met. *Veterinary medicine international*, 2012.
- FERNANDEZ, S. R., S. AOYAGI, Y. HAN, C. M. PARSONS** and **D. H. BAKER**. 1994. Limiting order of amino acids in corn and soybean meal for growth of the chick. *Poultry Sci.* 73: 1887-1896.
- KERR, B. and M. KIDD**. 1999. Amino acid supplementation of low-protein broiler diets: 2. Formulation on an ideal amino acid basis. *The Journal of Applied Poultry Research* 8: 310-320.
- SKLAN, D. and Y. NOY**. 2005. Direct determination of optimal amino acid intake for maintenance and growth in broilers. *Poult. Sci.* 84:412-418
- SLEMAN, B., A. ROBERT** and **P. SWICK**. 2015. Specialized protein products in broiler chicken nutrition. doi:10.1016/j.aninu.
- TAVERNARI, F. C., LELIS, G. R., VIEIRA, R. A., ROSTAGNO, H. S., ALBINO, L. F. T., & NETO, A. O**. 2013. Valine needs in starting and growing Cobb (500) broilers. *Poultry science*, 92(1), 151-157.
- WU, G**. 2009. Amino acids: metabolism, functions, and nutrition. *Amino acids*, 37(1), 1-17
- WU, G**. 2010. Functional amino acids in growth, reproduction, and health. *Advances in Nutrition: An International Review Journal*, 1(1), 31-37.

VU, G. 2013. Functional amino acids in nutrition and health. *Amino Acids*, 45(3), 407-411.