

Poultry News

LOHMANN TIERZUCHT

Modern nutrition strategies



Recommended Nutrient Levels:

LSL	4-5
Brown	6-7



Modern nutrition strategies

The crude protein contained in poultry feed is digested and metabolized into its components, the amino acids. These smallest components of protein are essential for growth and egg formation. The nutrition recommendations in management programs for Lohmann layers therefore contain standards for amino acid levels to be included. These standards have been updated in recent years to include digestibility of amino acids.

Based on recent research results, these recommendations are now changed to the concept of "ideal protein" or "ideal amino acid profile". This concept is already in use for broilers with world-wide success.

Lohmann Tierzucht GmbH and Evonik Industries (previously Degussa) conducted a series of scientific experiments designed to determine the amino acid demand of modern Lohmann layer strains. Based on the results of these experiments the nutrition recommendations for layer rations have been updated.

The concept of "ideal amino acid profile" is based on a fixed ratio all essential amino acids to digestible lysine. The demand for digestible lysine is used as the basis for a given strain of layers and level of production, and the levels for all other digestible amino acids are derived from the digestible lysine level.

In feed formulation at first all basic data have to be available in the matrix, and after the amount of digestible lysine is determined all other most important amino acids will follow in correct amounts.

In the new recommendations the level of digestible lysine is unchanged. There are only minor changes for other amino acids. The density of rations remains the same. According to the concept of "ideal amino acid" nutrition, Lohmann layers do not need more nutrients – they will only be fed more scientifically.

The ratio of digestible amino acids to lysine is:

Lysine (100) – Methionin (50) – Meth. + Cystein (91) – Threonine (70) – Tryptophane (21) – Arginine (104) – Isoleucine (80) – Valine (88)

Advantages of applying the concept of ideal amino acid profile are:

- better nutrition of the hens on the basis of effective demand for amino acids with reduced safety margins for crude protein
- lower crude protein level without sacrificing productivity
- reduced excretion of nitrogen and corresponding impact on the environment
- less protein helps to reduce heat stress
- less crude protein contributes to healthy microflora composition in the gut
- less ammonia formation, drier litter in floor management and cleaner eggs
- in many cases reduced feed cost



Recommended Nutrient Levels per kg of Feed for different daily Feed

Diet type*		Starter**	Grower	Developer	Pre-Layer
		1. – 3. weeks	1. – 8. weeks	9. – 16. weeks	week 17 – 5 % prod.
Metabol. Energy	kcal	2900	2750 – 2800	2750 – 2800	2750 – 2800
minimum	MJ	12,00	11,40	11,40	11,40
Crude Protein	%	20,00	18,50	14,50	17,50
Methionine	%	0,48	0,40	0,34	0,36
Dig. Methionine	%	0,39	0,33	0,28	0,29
Meth./Cystine	%	0,83	0,70	0,60	0,68
Dig. M/C	%	0,68	0,57	0,50	0,56
Lysine	%	1,20	1,00	0,65	0,85
Dig. Lysine	%	0,98	0,82	0,53	0,70
Valine	%	0,89	0,75	0,53	0,64
Dig. Valine	%	0,76	0,64	0,46	0,55
Tryptophane	%	0,23	0,21	0,16	0,20
Dig. Tryptothane	%	0,19	0,17	0,13	0,16
Threonine	%	0,80	0,70	0,50	0,60
Dig. Threonine	%	0,65	0,57	0,40	0,49
Isoleucine	%	0,83	0,75	0,60	0,74
Dig. Isoleucine	%	0,68	0,62	0,50	0,61
Calcium	%	1,05	1,00	0,90	2,00
Phosphorus tot.	%	0,75	0,70	0,58	0,65
Phosphorus avail.	%	0,48	0,45	0,37	0,45
Sodium	%	0,18	0,17	0,16	0,16
Chloride	%	0,20	0,19	0,16	0,16
Linoleic Acid	%	2,00	1,40	1,00	1,00

* The basis for switching between two diet types is the hens' bodyweight development. The correct time for changing the diet is determined not by age but by bodyweight. Chicks and pullets should therefore be weighed at regular intervals.

** Chick Starter should be fed if the standard bodyweight is not reached by feeding chick grower or if the daily feed intake is expected to be low.

Recommended Nutrient Levels per kg of Feed for different daily Feed Consumption
in Phase 1 (20 to approx. 45 week ≈ above 59,6 g Egg Mass/Hen/Day)

Nutrient	Requirement g/Hen/Day	Daily Feed Consumption in g			
		105 g	110 g	115 g	120 g
Protein (%)	18,50	17,62	16,82	16,09	15,42
Calcium (%)	4,10	3,90	3,73	3,57	3,42
Phosphorus tot. (%) *	0,60	0,57	0,55	0,52	0,50
Phosphorus avail. (%)	0,42	0,40	0,38	0,37	0,35
Sodium (%)	0,18	0,17	0,16	0,16	0,15
Chlorine (%)	0,18	0,17	0,16	0,16	0,15
Lysine (%)	0,87	0,82	0,79	0,75	0,72
Dig. Lysine (%)	0,71	0,68	0,65	0,62	0,59
Methionine (%)	0,44	0,42	0,40	0,38	0,37
Dig. Methionine (%)	0,36	0,34	0,33	0,31	0,30
Met. + Cystine (%)	0,80	0,76	0,73	0,69	0,67
Dig. Met. + Cys. (%)	0,66	0,62	0,60	0,57	0,55
Arginine (%)	0,91	0,87	0,83	0,80	0,76
Dig. Arginine (%)	0,75	0,71	0,68	0,65	0,63
Valine (%)	0,74	0,71	0,67	0,64	0,62
Dig. Valine (%)	0,63	0,60	0,57	0,55	0,53
Tryptophane (%)	0,18	0,17	0,17	0,16	0,15
Dig. Tryptophane (%)	0,15	0,14	0,14	0,13	0,13
Threonine (%)	0,61	0,58	0,55	0,53	0,51
Dig. Threonine (%)	0,50	0,48	0,45	0,43	0,42
Isoleucine (%)	0,70	0,66	0,63	0,60	0,58
Dig. Isoleucine (%)	0,57	0,54	0,52	0,50	0,48
Linoleic Acid (%)	2,20	2,10	2,00	1,91	1,83



* without Phytase

Nutrient	Requirement g/Hen/Day	Daily Feed Consumption in g			
		105 g	110 g	115 g	120 g
Protein (%)	17,76	16,91	16,15	15,44	14,80
Calcium (%)	4,40	4,19	4,00	3,83	3,67
Phosphorus tot. (%) *	0,58	0,55	0,52	0,50	0,48
Phosphorus avail. (%)	0,40	0,38	0,37	0,35	0,34
Sodium (%)	0,17	0,16	0,16	0,15	0,14
Chlorine (%)	0,17	0,16	0,16	0,15	0,14
Lysine (%)	0,83	0,79	0,76	0,72	0,69
Dig. Lysine (%)	0,68	0,65	0,62	0,59	0,57
Methionine (%)	0,42	0,40	0,38	0,37	0,35
Dig. Methionine (%)	0,35	0,33	0,31	0,30	0,29
Met. + Cystine (%)	0,77	0,73	0,70	0,67	0,64
Dig. Met. + Cys. (%)	0,63	0,60	0,57	0,55	0,52
Arginine (%)	0,88	0,84	0,80	0,76	0,73
Dig. Arginine (%)	0,72	0,69	0,65	0,63	0,60
Valine (%)	0,71	0,68	0,65	0,62	0,59
Dig. Valine (%)	0,60	0,58	0,55	0,53	0,50
Tryptophane (%)	0,18	0,17	0,16	0,15	0,15
Dig. Tryptophane (%)	0,14	0,14	0,13	0,13	0,12
Threonine (%)	0,59	0,56	0,53	0,51	0,49
Dig. Threonine (%)	0,48	0,46	0,44	0,42	0,40
Isoleucine (%)	0,67	0,64	0,61	0,58	0,56
Dig. Isoleucine (%)	0,55	0,52	0,50	0,48	0,46
Linoleic Acid (%)	1,60	1,52	1,45	1,39	1,33

**in Phase 2 (approx. week 46 to 65 ≈
above 56 g Egg Mass/Hen/Day**

* without Phytase

Nutrient	Requirement g/Hen/Day	Daily Feed Consumption in g			
		105 g	110 g	115 g	120 g
Protein (%)	16,84	16,03	15,30	14,64	14,03
Calcium (%)	4,50	4,29	4,09	3,91	3,75
Phosphorus tot. (%) *	0,55	0,52	0,50	0,47	0,46
Phosphorus avail. (%)	0,38	0,36	0,35	0,33	0,32
Sodium (%)	0,16	0,16	0,15	0,14	0,14
Chlorine (%)	0,16	0,16	0,15	0,14	0,14
Lysine (%)	0,79	0,75	0,72	0,69	0,66
Dig. Lysine (%)	0,65	0,62	0,59	0,56	0,54
Methionine (%)	0,40	0,38	0,36	0,35	0,33
Dig. Methionine (%)	0,33	0,31	0,30	0,28	0,27
Met. + Cystine (%)	0,73	0,69	0,66	0,63	0,61
Dig. Met. + Cys. (%)	0,60	0,57	0,54	0,52	0,50
Arginine (%)	0,83	0,79	0,76	0,72	0,69
Dig. Arginine (%)	0,68	0,65	0,62	0,59	0,57
Valine (%)	0,67	0,64	0,61	0,59	0,56
Dig. Valine (%)	0,57	0,55	0,52	0,50	0,48
Tryptophane (%)	0,17	0,16	0,15	0,14	0,14
Dig. Tryptophane (%)	0,14	0,13	0,12	0,12	0,11
Threonine (%)	0,55	0,53	0,50	0,48	0,46
Dig. Threonine (%)	0,46	0,43	0,41	0,40	0,38
Isoleucine (%)	0,63	0,60	0,58	0,55	0,53
Dig. Isoleucine (%)	0,52	0,49	0,47	0,45	0,43
Linoleic Acid (%)	1,30	1,24	1,18	1,13	1,08

in Phase 3 (after week 65)

* without Phytase



Recommended Nutrient Levels per kg of Feed for different daily Feed

Diet type*		Starter**	Grower	Developer	Pre-Layer
		1. – 3. weeks	1. – 8. weeks	9. – 16. weeks	week 17 – 5 % prod.
Metabol. Energy	kcal	2900	2750 – 2800	2750 – 2800	2750 – 2800
minimum	MJ	12,00	11,40	11,40	11,40
Crude Protein	%	20,00	18,50	14,50	17,50
Methionine	%	0,48	0,40	0,34	0,36
Dig. Methionine	%	0,39	0,33	0,28	0,29
Meth./Cystine	%	0,83	0,70	0,60	0,68
Dig. M/C	%	0,68	0,57	0,50	0,56
Lysine	%	1,20	1,00	0,65	0,85
Dig. Lysine	%	0,98	0,82	0,53	0,70
Valine	%	0,89	0,75	0,53	0,64
Dig. Valine	%	0,76	0,64	0,46	0,55
Tryptophane	%	0,23	0,21	0,16	0,20
Dig. Tryptothane	%	0,19	0,17	0,13	0,16
Threonine	%	0,80	0,70	0,50	0,60
Dig. Threonine	%	0,65	0,57	0,40	0,49
Isoleucine	%	0,83	0,75	0,60	0,74
Dig. Isoleucine	%	0,68	0,62	0,50	0,61
Calcium	%	1,05	1,00	0,90	2,00
Phosphorus tot.	%	0,75	0,70	0,58	0,65
Phosphorus avail.	%	0,48	0,45	0,37	0,45
Sodium	%	0,18	0,17	0,16	0,16
Chloride	%	0,20	0,19	0,16	0,16
Linoleic Acid	%	2,00	1,40	1,00	1,00

* The basis for switching between two diet types is the hens' bodyweight development. The correct time for changing the diet is determined not by age but by bodyweight. Chicks and pullets should therefore be weighed at regular intervals.

** Chick Starter should be fed if the standard bodyweight is not reached by feeding chick grower or if the daily feed intake is expected to be low.

Recommended Nutrient Levels per kg of Feed for different daily Feed Consumption
in Phase 1 (19 to approx. 45 week ≈ above 59,6 g Egg Mass/Hen/Day)

Nutrient	Requirement g/Hen/Day	Daily Feed Consumption in g			
		105 g	110 g	115 g	120 g
Protein (%)	18,70	17,81	17,00	16,26	15,58
Calcium (%)	4,10	3,90	3,73	3,57	3,42
Phosphorus (%) *	0,60	0,57	0,55	0,52	0,50
Av. Phosphorus (%)	0,42	0,40	0,38	0,37	0,35
Sodium (%)	0,18	0,17	0,16	0,16	0,15
Chlorine (%)	0,18	0,17	0,16	0,16	0,15
Lysine (%)	0,88	0,84	0,80	0,76	0,73
Dig. Lysine (%)	0,72	0,69	0,65	0,63	0,60
Methionine (%)	0,44	0,42	0,40	0,38	0,37
Dig. Methionine (%)	0,36	0,34	0,33	0,31	0,30
Met. + Cys. (%)	0,80	0,76	0,73	0,69	0,67
Dig. Met. + Cys. (%)	0,66	0,62	0,60	0,57	0,55
Arginine (%)	0,91	0,87	0,83	0,80	0,76
Dig. Arginine (%)	0,75	0,71	0,68	0,65	0,63
Valine (%)	0,74	0,71	0,67	0,64	0,62
Dig. Valine (%)	0,63	0,60	0,57	0,55	0,53
Tryptophane (%)	0,18	0,17	0,17	0,16	0,15
Dig. Tryptophane (%)	0,15	0,14	0,14	0,13	0,13
Threonine (%)	0,61	0,58	0,55	0,53	0,51
Dig. Threonine (%)	0,50	0,48	0,45	0,43	0,42
Isoleucine (%)	0,70	0,66	0,63	0,60	0,58
Dig. Isoleucine (%)	0,57	0,54	0,52	0,50	0,48
Linoleic acid (%)	2,00	1,90	1,82	1,74	1,67



* without Phytase

Nutrient	Requirement g/Hen/Day	Daily Feed Consumption in g			
		105 g	110 g	115 g	120 g
Protein (%)	17,95	17,10	16,32	15,61	14,96
Calcium (%)	4,40	4,19	4,00	3,83	3,67
Phosphorus (%) *	0,58	0,55	0,52	0,50	0,48
Av. Phosphorus (%)	0,40	0,38	0,37	0,35	0,34
Sodium (%)	0,17	0,16	0,16	0,15	0,14
Chlorine (%)	0,17	0,16	0,16	0,15	0,14
Lysine (%)	0,84	0,80	0,77	0,73	0,70
Dig. Lysine (%)	0,69	0,66	0,63	0,60	0,58
Methionine (%)	0,42	0,40	0,38	0,37	0,35
Dig. Methionine (%)	0,35	0,33	0,31	0,30	0,29
Met. + Cys. (%)	0,77	0,73	0,70	0,67	0,64
Dig. Met. + Cys. (%)	0,63	0,60	0,57	0,55	0,52
Arginine (%)	0,88	0,84	0,80	0,76	0,73
Dig. Arginine (%)	0,72	0,69	0,65	0,63	0,60
Valine (%)	0,71	0,68	0,65	0,62	0,59
Dig. Valine (%)	0,60	0,58	0,55	0,53	0,50
Tryptophane (%)	0,18	0,17	0,16	0,15	0,15
Dig. Tryptophane (%)	0,14	0,14	0,13	0,13	0,12
Threonine (%)	0,59	0,56	0,53	0,51	0,49
Dig. Threonine (%)	0,48	0,46	0,44	0,42	0,40
Isoleucine (%)	0,67	0,64	0,61	0,58	0,56
Dig. Isoleucine (%)	0,55	0,52	0,50	0,48	0,46
Linoleic acid (%)	1,60	1,52	1,45	1,39	1,33

**in Phase 2 (approx. week 46 to 65 ≈
above 55 g Egg Mass/Hen/Day**

* without Phytase

Nutrient	Requirement g/Hen/Day	Daily Feed Consumption in g			
		105 g	110 g	115 g	120 g
Protein (%)	17,02	16,21	15,47	14,80	14,18
Calcium (%)	4,50	4,29	4,09	3,91	3,75
Phosphorus (%) *	0,55	0,52	0,50	0,47	0,46
Av. Phosphorus (%)	0,38	0,36	0,35	0,33	0,32
Sodium (%)	0,16	0,16	0,15	0,14	0,14
Chlorine (%)	0,16	0,16	0,15	0,14	0,14
Lysine (%)	0,80	0,76	0,73	0,69	0,67
Dig. Lysine (%)	0,66	0,62	0,60	0,57	0,55
Methionine (%)	0,40	0,38	0,36	0,35	0,33
Dig. Methionine (%)	0,33	0,31	0,30	0,28	0,27
Met. + Cys. (%)	0,73	0,69	0,66	0,63	0,61
Dig. Met. + Cys. (%)	0,60	0,57	0,54	0,52	0,50
Arginine (%)	0,83	0,79	0,76	0,72	0,69
Dig. Arginine (%)	0,68	0,65	0,62	0,59	0,57
Valine (%)	0,67	0,64	0,61	0,59	0,56
Dig. Valine (%)	0,57	0,55	0,52	0,50	0,48
Tryptophane (%)	0,17	0,16	0,15	0,14	0,14
Dig. Tryptophane (%)	0,14	0,13	0,12	0,12	0,11
Threonine (%)	0,55	0,53	0,50	0,48	0,46
Dig. Threonine (%)	0,46	0,43	0,41	0,40	0,38
Isoleucine (%)	0,63	0,60	0,58	0,55	0,53
Dig. Isoleucine (%)	0,52	0,49	0,47	0,45	0,43
Linoleic acid (%)	1,30	1,24	1,18	1,13	1,08

in Phase 3 (after week 65)

* without Phytase





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T I E R Z U C H T

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