

# BROILER

ROSS

**Nutrition Specifications**

*All Plant Protein-Based Feeds*

2019



# ROSS BROILER: Nutrition Specifications

## *(All Plant Protein-Based Feeds)*

### Introduction

After considerable evaluation and research, it has been decided that the broiler nutrition specifications first released in 2014 are still valid and continue to offer optimum biological performance, therefore the advice has not been changed. These broiler nutrition specifications are suitable for all Ross® broilers fed an all plant protein-based diet.

Nutritional specifications for broilers in regions of the world where the dietary inclusion of animal proteins and/or sub-therapeutic levels of antibiotics are prohibited, are given in this document. Modifications may need to be made for specific market conditions. Factors to be considered are:

- Final product - live bird or portioned products - and meat product values.
- The supply and price of feed ingredients.
- Age and live weight at processing.
- Yield and carcass quality.
- Market requirements for skin color, shelf-life, etc.
- Use of sex-separate growing.

The most appropriate diet will be designed to either minimize cost for live bird production or maximize margin over feeding cost for portioned products required by the processing plant. For optimal portions margin, increased dietary amino acid density may be cost-effective.

The energy values used in these specifications are based on assays for Metabolizable Energy published by the World's Poultry Science Association (WPSA). The values for amino acid digestibility are based on Standardized Ileal Digestibility (SID) assays.

The local Aviagen® Nutrition Service Manager or Ross representative should be consulted for more specialized situations and for advice on local markets.

### Nutritional Recommendations When Feeding Plant Protein-Based Diets

Aviagen continues to make genetic improvement in the broiler and has recently updated the global Broiler Nutrition Specifications to support optimal biological performance.

In some world areas the dietary inclusion of animal proteins and/or sub-therapeutic levels of antibiotics are prohibited. Additionally, the use of therapeutic antibiotics is strictly controlled. When the dietary inclusion of animal protein ingredients is not allowed, broiler diet formulations typically have higher dietary levels of soybean meal and, consequently, higher levels of non-starch polysaccharides (NSP) which can lead to increased digesta and fecal viscosity, and wetter litter. Diets higher in NSP create a greater challenge to maintaining optimal enteric health and, for example, can lead to increased risk of foot pad dermatitis (FPD) when fecal material becomes more "sticky" and adheres to foot pads. In some broiler production regions, the incidence of FPD is used as a metric for animal welfare. Additionally, chicken feet (paws) have significant market value and minimizing downgrades due to foot pad lesions is economically important. Achieving optimal enteric health and functionality is essential for maintaining good litter quality. Therefore, it is important to minimize health or stress challenges to gut integrity and function.

For those world areas confronted with the aforementioned conditions, Aviagen has developed specific nutritional specifications to promote good enteric health and minimize the risk of wet litter. While nutrition is an important factor in achieving optimal enteric health, it is also critical that appropriate anti-coccidial programs be in place. The primary aim of this nutritional advice is to promote enteric health when dietary inclusion of animal proteins and/or sub-therapeutic levels of antibiotics are not allowed. The recommended nutrient levels for such conditions are lower in several cases (e.g. protein, amino acids (AA), and certain minerals) with less emphasis on maximizing broiler biological performance. This document outlines the background of this particular set of recommendations.

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## *(All Plant Protein-Based Feeds)*

### Feeding Phases

Smaller dietary transitional changes in balanced protein, energy and mineral levels are recommended to promote enteric health by avoiding abrupt dietary changes. This is achieved by feeding a greater number of diets of shorter feeding duration. In this set of recommendations diets are changed at 10 day intervals.

### Digestible Amino Acids

When feeding plant protein-based diets, it becomes even more important to formulate broiler diets to achieve minimum digestible AA constraints in order to maximize AA utilization, reduce protein intake and, therefore, promote good enteric health and litter quality. Digestible lysine is used as a proxy for balanced protein. Changes in digestible lysine should be accompanied by changes to the other AA based on their specific relationships to digestible lysine. Recent findings indicate that a higher ratio of digestible arginine to digestible lysine promotes better biological performance. However, in these specific recommendations the ratio of digestible arginine to digestible lysine is maintained at previous recommendations to avoid an additional increase in dietary crude protein when formulating to achieve higher digestible arginine levels. The achieved crude protein levels are not requirements *per se*, but instead represent levels which will likely occur when formulating to the specified essential AA minimums while using commercially available synthetic AA, and will vary depending on feed ingredients used and their associated nutritional composition.

Compared to the recently released global Broiler Nutrition Specifications, the nutritional advice herein provides recommendations for balanced protein which are slightly lowered, with the focus being to seek a balance between broiler biological performance and enteric health and litter quality when using plant protein-based diets.

### Macro Minerals

Compared to the recently released global Broiler Nutrition Specifications, recommended levels for calcium and available phosphorus are further decreased in this set of nutritional advice. The specifications for these nutrients will promote good litter quality without compromising leg bone health.

### Trace Minerals & Vitamins

There are no additional changes in these nutrient specifications. To promote optimal skin and paw quality, it may be beneficial to use an organic form of zinc and increased biotin levels.

### Other

Recommended choline levels represent the total dietary contribution coming from the various feed ingredients and the supplementary choline source being used.

# ROSS BROILER: Nutrition Specifications (All Plant Protein-Based Feeds)

**Table 1**

Nutrition Specifications for As-Hatched Broilers - Target Live Weight 1.70 - 3.50 kg (3.75 - 7.70 lb).

		Starter		Grower 1		Grower 2		Finisher 1		Finisher 2	
Age Fed	days	0 - 10		11 - 20		21 - 30		31 - 40		41 - market	
Energy	kcal	3000		3100		3150		3200		3200	
	MJ	12.55		12.97		13.18		13.39		13.39	
<b>AMINO ACIDS</b>											
		<b>Total</b>	<b>Digest<sup>1</sup></b>	<b>Total</b>	<b>Digest<sup>1</sup></b>	<b>Total</b>	<b>Digest<sup>1</sup></b>	<b>Total</b>	<b>Digest<sup>1</sup></b>	<b>Total</b>	<b>Digest<sup>1</sup></b>
Lysine	%	1.40	1.25	1.26	1.12	1.17	1.04	1.10	0.98	1.06	0.94
Methionine + Cystine	%	1.05	0.93	0.97	0.85	0.91	0.80	0.87	0.76	0.83	0.73
Methionine	%	0.54	0.50	0.50	0.46	0.47	0.44	0.45	0.41	0.43	0.39
Threonine	%	0.95	0.84	0.85	0.75	0.79	0.70	0.75	0.66	0.72	0.63
Valine	%	1.08	0.94	0.98	0.85	0.92	0.80	0.88	0.76	0.84	0.73
Isoleucine	%	0.95	0.84	0.87	0.76	0.82	0.72	0.77	0.68	0.74	0.65
Arginine	%	1.43	1.29	1.29	1.16	1.21	1.09	1.14	1.03	1.10	0.99
Tryptophan	%	0.22	0.20	0.20	0.18	0.19	0.17	0.18	0.16	0.17	0.15
Leucine	%	1.54	1.38	1.38	1.23	1.29	1.14	1.21	1.08	1.16	1.03
Achieved Crude Protein <sup>2</sup>	%	22.0		20.0		19.0		18.0		17.5	
<b>MINERALS</b>											
Calcium	%	0.96		0.84		0.78		0.72		0.68	
Available Phosphorus	%	0.48		0.42		0.39		0.36		0.34	
Magnesium	%	0.05 - 0.30		0.05 - 0.30		0.05 - 0.30		0.05 - 0.30		0.05 - 0.30	
Sodium	%	0.16 - 0.23		0.16 - 0.23		0.16 - 0.20		0.16 - 0.20		0.16 - 0.20	
Chloride	%	0.16 - 0.23		0.16 - 0.23		0.16 - 0.23		0.16 - 0.23		0.16 - 0.23	
Potassium	%	0.40 - 1.00		0.40 - 0.95		0.40 - 0.90		0.40 - 0.85		0.40 - 0.80	
<b>ADDED TRACE MINERALS PER KG</b>											
Copper	mg	16		16		16		16		16	
Iodine	mg	1.25		1.25		1.25		1.25		1.25	
Iron	mg	20		20		20		20		20	
Manganese	mg	120		120		120		120		120	
Selenium	mg	0.30		0.30		0.30		0.30		0.30	
Zinc	mg	110		110		110		110		110	
<b>ADDED VITAMINS PER KG</b>											
		<b>Wheat based feed</b>	<b>Maize based feed</b>	<b>Wheat based feed</b>	<b>Maize based feed</b>	<b>Wheat based feed</b>	<b>Maize based feed</b>	<b>Wheat based feed</b>	<b>Maize based feed</b>	<b>Wheat based feed</b>	<b>Maize based feed</b>
Vitamin A	IU	13,000	12,000	11,000	10,000	10,000	9,000	10,000	9,000	10,000	9,000
Vitamin D3	IU	5,000	5,000	4,500	4,500	4,000	4,000	4,000	4,000	4,000	4,000
Vitamin E	IU	80	80	65	65	55	55	55	55	55	55
Vitamin K (Menadione)	mg	3.2	3.2	3.0	3.0	2.2	2.2	2.2	2.2	2.2	2.2
Thiamin (B1)	mg	3.2	3.2	2.5	2.5	2.2	2.2	2.2	2.2	2.2	2.2
Riboflavin (B2)	mg	8.6	8.6	6.5	6.5	5.4	5.4	5.4	5.4	5.4	5.4
Niacin	mg	60	65	55	60	40	45	40	45	40	45
Pantothenic Acid	mg	17	20	15	18	13	15	13	15	13	15
Pyridoxine (B6)	mg	5.4	4.3	4.3	3.2	3.2	2.2	3.2	2.2	3.2	2.2
Biotin	mg	0.30	0.22	0.25	0.18	0.20	0.15	0.20	0.15	0.20	0.15
Folic Acid	mg	2.20	2.20	1.90	1.90	1.60	1.60	1.60	1.60	1.60	1.60
Vitamin B12	mg	0.017	0.017	0.017	0.017	0.011	0.011	0.011	0.011	0.011	0.011
<b>MINIMUM SPECIFICATION</b>											
Choline per kg	mg	1,700		1,600		1,500		1,500		1,400	
Linoleic Acid	%	1.25		1.20		1.00		1.00		1.00	

Digest<sup>1</sup> = Digestible

Achieved Crude Protein<sup>2</sup> is not a "dietary crude protein minimum constraint". The formulation priority is to meet all the recommended minimum essential amino acid levels.

These achieved crude protein levels are not requirements *per se*, but instead are levels which will likely occur when formulating to the specified essential amino acid minimums while using commercially available synthetic amino acids. The achieved crude protein levels actually observed will vary depending on the feed ingredients being utilized and their associated nutritional composition.

**NOTES:** These feed specifications should be used as a guide. They require adjustment for local conditions and markets. A withdrawal feed should be fed to meet local requirements for drug withdrawal times. This can be formulated to the same standards as the final feed listed above.





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