

ABC-4 of Nursery Ingredients

Table 1. Acid-binding capacity-4 (ABC-4) of ingredients common in early nursery diets.¹

Item:	N	Average initial pH	Average ABC-4 (meq)
Cereal grains			
Corn	8	6.48	93 ± 23.5
Soft Red Winter Wheat	2	6.70	43 ± 4.7
Soft White Wheat	2	6.67	60 ± 0.0
Barley	2	5.49	77 ± 8.2
Sorghum	2	7.04	110 ± 14.1
Whole Oats	7	6.14	104 ± 22.5
Vegetable Protein			
Soybean-meal	8	6.91	613 ± 41.6
Expelled SBM	1	7.13	567
AX3 Digest ²	3	4.08	13 ± 30.1
Fermex 200 ³	2	4.62	307 ± 16.3
HP 300 ⁴	3	6.45	767 ± 60.0
MEPro ⁵	2	4.83	87 ± 24.2
Proplex T ⁶	1	5.14	207
Provisoy ⁷	1	6.96	653
PurePro Soy ⁸	5	7.25	680 ± 72.5
Soytide ⁹	1	7.87	853
XSoy 600 ⁹	1	6.86	620
High protein dried distillers grains	2	4.87	100 ± 65.7
Animal Proteins			
Fish meal	3	6.36	1,189 ± 774.8
Poultry meal	1	6.74	1,007
Spray-dried bovine plasma	3	7.61	856 ± 108.5
Milk Products			
Crystalline lactose	2	5.85	32 ± 24.8
Spray-dried whey permeate	2	6.04	507 ± 30.1
Granular whey permeate	1	6.44	433
Spray-dried whey powder	2	6.32	450 ± 11.0
Co-products			
Dried distillers grains	3	4.85	147 ± 38.7
Cereal blend	1	6.08	107
Oat groats	2	6.44	107 ± 37.7
Wheat midds	2	6.77	373 ± 23.1
Soybean hulls	3	6.72	360 ± 22.4
Rice hulls	1	6.45	73
Beet pulp	3	5.57	151 ± 25.3
Yeast	4	4.96	237 ± 242.8

Table 1. Continued

Item:	N	Average initial pH	Average ABC-4 (meq)
Vitamins and Minerals			
Limestone	4	9.61	18,600 ± 774.8
Zinc oxide	3	9.40	21,638 ± 859.8
Monocalcium phosphate	2	4.04	17 ± 66.2
Dicalcium phosphate	4	5.24	2,427 ± 797.9
Sodium chloride	3	6.13	13 ± 5.0
Calcium propionate	1	9.11	9,240
Copper	3	6.40	8,238 ± 9,802.9
Manganese	3	7.60	5,349 ± 5,386.9
Zinc	2	7.14	12,820 ± 12,707.3
Vitamin premix	14	6.42	2,341 ± 3,529.1
Trace mineral premix	16	5.47	3,308 ± 2,497.1
Vitamin-trace mineral premix	11	5.49	2,416 ± 2,972.8
Choline chloride	2	5.61	30 ± 11.0
Sodium metabisulfite	1	4.00	0
Titanium dioxide	1	7.80	40
Amino Acids			
L-Lys	3	5.79	87 ± 10.0
Liquid Lys	1	9.54	3,580
DL-Met	3	5.74	144 ± 13.3
Liquid Met	1	2.37	-4,193
L-Thr	3	5.49	171 ± 17.6
L-Trp	2	5.21	117 ± 8.2
L-Val	2	5.37	200 ± 12.3
L-Ile	2	5.76	207 ± 10.3
Acidifiers			
Acid-AID ¹⁰	1	2.21	-4,680
Activate DA ¹¹	1	2.99	-4,487
Acitra ¹²	1	2.97	-4,067
Amasil NA ¹³	2	3.02	-8,287 ± 50.3
Citric acid	2	2.30	-5,887 ± 41.6
Fumaric acid	3	2.34	-10,873 ± 98.7
KEM-GEST ¹⁴	1	2.06	-3,800
Vevovital ¹⁵	1	3.09	-2,500
Additives and Carriers			
CTC	1	6.54	1,733
Denegard	1	5.00	73
FxP ¹⁶	1	6.64	373
N Hance ¹⁶	1	3.79	-127
Valopro Win ¹⁷	1	5.24	87
Corn cobs	1	5.39	100
Zeolite	1	6.92	5,820

¹ Acid-binding capacity-4 was determined by the amount of 0.1 N HCl required to lower the initial pH of a sample to a stable pH of 4.00 ± 0.04. Each sample was analyzed in triplicate.

² Protekta, Newport Beach, CA

³ Purina Animal Nutrition, Shoreview, MN

⁴ Hamlet Protein, Findlay, OH

⁵ Prairie Aquatech, Brookings, SD

⁶ ADM Animal Nutrition, Quincy, IL

⁷ Cargill, Minnetonka, MN.

⁸ Bunge, Chesterfield, MO.

⁹ CJ America-Bio, Downers Grove, IL

¹⁰ Alltech, Nicholasville, KY

¹¹ Novus, St. Charles, MO

¹² Eastman Chemical, Kingsport, TN

¹³ BASF, Florham Park, NJ

¹⁴ Kemin, Des Moines, IA

¹⁵ DSM, Parsippany, NJ

¹⁶ Ani-Tek Group, Shelbina, MO

¹⁷ MixScience, Bruz, France

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