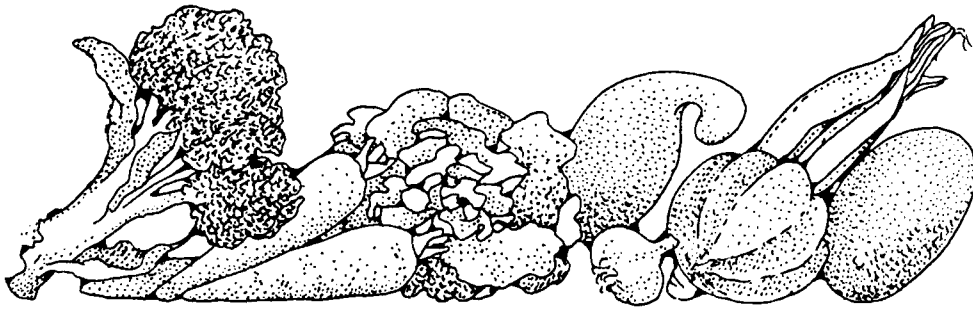


# Vegetables in the Avian Diet

by Joanne Abramson  
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Most aviculturists feed vegetables to their birds. We recently surveyed a dozen specialist breeders to determine what they were feeding. Their answers were as varied as the birds in their collections. The following charts contain 25 different vegetables that are currently being fed. They were culled from 470 vegetable entries that are in the book *Composition of Foods: Vegetables and Vegetable Products*, available from the U.S. Government Printing Office, Washington, DC 20402.

As with fruit, the most cost effective way to purchase vegetables is by the case. Produce managers at your local store will most likely give you a case price which is lower than if you bought the vegetables individually. Many birds adore corn. It is cheapest when purchased during the height of harvest. It can be parboiled by husking the corn and dropping it into boiling water for a couple of minutes. You are not trying to cook it until it is tender, just heat it slightly. Then plunge the corn into cold water to cool it and stop the cooking process. You are then ready to freeze it for use in the winter when corn is unavailable. This method can be done with broccoli, peas, pumpkin and many other vegetables.

Greens such as dandelion, endive, chard, mustard and beet have loads of vitamins and minerals. Many are higher in vitamin A than canteloupe. Turnip greens are also high in calcium. They are best stored by washing the greens, drying them, wrapping them in some paper towels and placing them in a plastic bag. They should be used as quickly as possible and storage is limited to two to four days in the refrigerator. Greens often have a peppery taste

the birds will enjoy.

Most vegetables such as broccoli, carrots, peas and beets are best stored unwashed in the refrigerator for a week or two. Corn should be refrigerated in the husk to prevent drying out. Covering the husks with damp paper towels will help retain moisture. We buy corn by the case, husk it and place it in cold water before feeding. Our own birds love to eat the kernels, then destroy the cob. Corn is a favorite food for weaning birds.

Pumpkin can be cooked and the seeds can be fed fresh or dried. Pumpkin seeds are high in minerals. Squash such as zucchini and crook-neck are great summer vegetables. Large, oversized zucchini can be fed with seeds. Both babies and adults love them.

Beets and beet greens have an intense red dye which will turn a bird's fecal matter red. Don't let this concern you. This can last for a few hours or days depending on the amount eaten.

Spirulina dried seaweed has been popular for the last few years as a dietary supplement for birds. Spirulina has been better known as a color enhancer for ornamental fish such as Koi and goldfish. This is the only dried vegetable included in the chart. Dried foods have a higher concentration of nutrients because the water has been removed. Since seaweed is harvested from the ocean, it has an extremely high sodium content. I am concerned about its use in handfeeding formulas where the babies have a limited amount of water available to them.

Vegetables are excellent as a weaning food. By acquainting the babies with a wide variety of fruits and vege-

tables as young birds, you can avoid the limited diets many adult captive birds eat. Variety in their diet provides for their nutritional as well as emotional well being. The choice of colors, texture and size will stimulate your birds' appetites and keep them happy. Try handing your pet birds the new vegetable instead of putting it in a dish. They will often think it is a treat when their owner gives it to them. Peas are sometimes fed in the pods so the birds can remove the outer skin themselves to get to the pea — a treasure hunt simulating collecting food in the wild.

Thanks to the aviculturists who completed a survey of what their birds were eating, among them Laurella Desborough, Dale Thompson and Isabel Taylor. Special thanks to Jean Hessier and Sylvia Mahon at the AFA graphics department for taking nine tedious pages of numbers and creating two beautiful pages of charts. (see next two pages)

This is part three in a nutritional series. Part one, *Fruit in the Avian Diet*, appeared in *AFA Watchbird* Oct/Nov 1990. Part two, *Nutritional Analysis of Selected Nuts and Seeds*, appeared in *AFA Watchbird* June/July 1991.

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### Nutritional Analysis of Selected Vegetables (per 100 gram weight)

NUTRIENTS: (gr)	Beets		Beet Greens		Broccoli		Carrots		Celery Raw	Swiss Chard		Chicory Gr. Raw	Collards Raw	Corn		Dandelion Greens Raw	Endive Raw
	Raw	Cooked	Raw	Cooked	Raw	Cooked	Raw	Cooked		Raw	Cooked			Raw	Cooked		
Calories	44	31	19	27	28	29	43	45	16	19	20	23	19	86	108	45	17
Protein	1.48	1.06	1.82	2.57	2.98	2.97	1.03	1.09	.66	1.80	1.88	1.70	1.57	3.22	3.32	2.70	1.25
Carbohydrates	10	6.69	3.97	5.46	5.24	5.57	10.14	10.48	3.63	3.74	4.14	4.70	3.76	19.02	25.11	9.20	3.35
Total Fat	0.14	0.05	.06	.20	.35	.28	.19	.18	.12	.20	.08	.30	.22	1.18	1.28	.70	.20
Saturated	0.022	0.008	.009	.031	.054	.043	.03	.034	.032	—	—	.073	—	.182	.197	—	.048
Monounsaturated	.027	.010	.012	.038	.024	.020	.008	.009	.024	—	—	.006	—	.347	.374	—	.004
Polyunsaturated	.050	.018	.021	.070	.167	.134	.077	.088	.060	—	—	.131	—	.559	.603	—	.087
Cholesterol (mg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phytosterols (mg)	25	—	21	—	—	—	12	—	6	—	—	—	—	—	—	—	—
Fiber	.80	.85	1.30	1.05	1.11	1.20	1.04	1.47	.69	.80	.94	.80	.57	.70	.60	1.60	.90
Water	87.32	90.90	92.15	89.13	90.69	90.20	87.79	87.38	94.70	92.66	92.65	92.00	93.90	75.96	69.57	85.60	93.79
Ash	1.06	1.30	2.01	2.64	.92	.99	.87	.87	.89	1.60	1.26	1.30	.55	.62	.72	1.80	1.41
<b>MINERALS: (mg)</b>																	
Calcium	16	11	119	114	48	114	27	31	36	51	58	100	117	2	2	187	52
Iron	.91	.62	3.3	1.9	.88	1.15	.50	.62	.48	1.80	2.26	.90	.62	.52	.61	3.10	.83
Magnesium	21	37	72	68	25	60	15	13	12	81	86	30	17	37	32	36	15
Phosphorus	48	31	40	41	66	48	44	30	26	46	33	47	16	89	103	66	28
Potassium	324	312	547	909	325	163	323	227	284	379	549	420	148	270	249	397	314
Sodium	72	49	201	241	27	11	35	66	88	213	179	45	28	15.2	17	76	22
Zinc	.37	.25	.38	.50	.40	.15	.20	.30	.17	—	—	—	.96	.45	.48	—	.79
Copper	.083	.057	.191	.251	.045	.069	.047	.134	.035	—	—	—	.260	.054	.053	—	.099
Manganese	.352	.240	—	—	.229	.245	.142	.752	.136	—	—	—	.369	.161	.194	—	.420
<b>VITAMINS: (mg)</b>																	
Ascorbic Acid	11.0	5.5	30.0	24.9	93.2	62.8	9.3	2.3	6.3	30	18	24	23.3	6.8	6.2	35.0	6.5
Thiamin	.050	.031	.100	.117	.065	.082	.097	.034	.030	.040	.034	.060	.029	.200	.215	.190	.080
Riboflavin	.020	.014	.220	.289	.119	.207	.059	.056	.030	.090	.086	.100	.064	.060	.072	.260	.075
Niacin	.400	.273	.400	.499	.638	.755	.928	.506	.300	.400	.360	.500	.374	1.700	1.614	—	.400
Pantothenic Acid	.150	.097	.250	.329	.535	.288	.197	.304	.169	.172	.163	—	.064	.760	.878	—	.900
Vitamin B6	.046	.031	.106	.132	.159	.198	.147	.246	.030	—	—	—	.067	.055	.060	—	.020
Folicin (mcg)	92.6	53.2	—	—	71	68.4	14	13.9	8.9	—	—	—	11.5	45.8	46.4	—	142.0
Vitamin A IU	20	13	6100	5100	1542	1409	28,129	24,554	127	3300	3139	4000	3300	281	217	14,000	2050
<b>AMINO ACIDS: (gr)</b>																	
Tryptophan	.017	.012	.029	.040	.029	.031	.011	.012	.009	.017	.018	.031	.020	.023	.023	—	.005
Threonine	.044	.031	.054	.076	.091	.096	.038	.040	.019	.083	.086	.047	.055	.129	.133	—	.050
Isoleucin	.044	.032	.038	.053	.109	.115	.041	.043	.020	.147	.154	.101	.064	.129	.133	—	.072
Leucine	.063	.045	.081	.115	.131	.139	.043	.046	.031	.130	.135	.074	.097	.348	.358	—	.098
Lysine	.053	.038	.053	.075	.141	.150	.040	.043	.026	.099	.103	.067	.075	.137	.141	—	.063
Methionine	.017	.012	.015	.021	.034	.036	.007	.007	.005	.019	.020	.010	.021	.067	.069	—	.014
Cystine	.018	.013	.017	.024	.020	.021	.008	.009	.004	—	—	—	.016	.026	.027	—	.010
Phenylalanine	.042	.030	.048	.068	.084	.090	.032	.034	.019	.110	.114	.041	.056	.150	.155	—	.053
Tyrosine	.035	.025	.043	.061	.063	.067	.020	.021	.009	—	—	—	.042	.123	.126	—	.040
Valine	.052	.037	.054	.076	.128	.136	.044	.046	.026	.110	.114	.077	.077	.185	.191	—	.063
Arginine	.038	.028	.052	.073	.145	.154	.043	.045	.020	.117	.122	.124	.080	.131	.135	—	.062
Histidine	.020	.014	.028	.039	.050	.053	.016	.017	.011	.036	.038	.029	.030	.089	.091	—	.023
Alanine	.055	.040	.067	.095	.118	.125	.059	.062	.022	—	—	—	.067	.295	.304	—	.062
Aspartic Acid	.106	.076	.107	.152	.213	.226	.137	.144	.113	—	—	—	.120	.244	.252	—	.130
Glutamic Acid	.393	.281	.221	.312	.375	.399	.202	.213	.086	—	—	—	.131	.636	.655	—	.166
Glycine	.029	.020	.067	.094	.095	.101	.030	.031	.021	—	—	—	.060	.127	.131	—	.058
Proline	.038	.027	.043	.061	.114	.122	.029	.031	.017	—	—	—	.067	.292	.301	—	.059
Serine	.054	.039	.058	.082	.100	.106	.035	.037	.020	—	—	—	.050	.153	.158	—	.049

(Blank spaces indicate a lack of data)

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## Nutritional Analysis of Selected Vegetables (per 100 gram weight)

NUTRIENTS: (gr)	Kale		Mustard Greens Raw	New Zealand Spinach Raw	Peas		Pumpkin Cooked	Spirulina Seaweed Dried	Spinach Raw	Crookneck Squash Raw	Zucchini Squash Raw	Sweet Potato		Turnips Raw	Turnip Greens Raw	Watercress Raw	Yams	
	Raw	Cooked			Raw	Cooked						Raw	Cooked					
Calories	50	32	26	14	81	84	20	290	22	19	14	105	105	27	27	11	118	116
Protein	3.30	1.90	2.70	1.50	5.41	5.36	.72	57.47	2.86	.94	1.16	1.65	1.65	.90	1.50	2.30	1.53	1.49
Carbohydrates	10.01	5.63	4.90	2.50	14.46	15.64	4.89	23.90	3.50	4.04	2.90	24.28	24.28	6.23	5.73	1.29	27.89	27.60
Total Fat	.70	.40	.20	.20	.40	.22	.07	7.72	.35	.24	.14	.30	.30	.10	.30	.10	.17	.14
Saturated	.091	.052	.010	.032	.071	.039	.037	2.650	.056	.049	.029	.064	.064	.011	.070	.027	.037	.029
Monounsaturated	.052	.030	.092	.005	.035	.019	.009	.675	.010	.018	.011	.011	.011	.006	.020	.008	.006	.005
Polyunsaturated	.338	.193	.038	.084	.187	.102	.004	2.080	.146	.100	.060	.132	.132	.053	.120	.035	.076	.060
Cholesterol (mg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phytosterols (mg)	—	—	—	—	—	—	—	—	9	—	—	12	—	7	12	—	10	—
Fiber	1.50	.80	1.10	.70	2.21	2.31	.83	3.64	.89	.55	.45	.85	.85	.90	.80	.70	—	—
Water	84.46	91.20	90.80	94.00	78.86	77.87	93.69	4.68	91.58	94.20	95.28	72.84	72.84	91.87	91.07	95.11	69.60	70.13
Ash	1.53	.87	1.40	1.80	.87	.92	.62	6.23	1.72	.58	.52	.95	.95	.70	1.40	1.20	.82	.66
<b>MINERALS: (mg)</b>																		
Calcium	135	72	103	58	25	27	15	—	99	21	15	22	21	30	190	120	17	14
Iron	1.70	.90	1.46	.80	1.47	1.54	.57	28.50	2.71	.48	.42	.59	.56	.30	1.10	.20	.54	.52
Magnesium	34	18	32	39	33	39	9	195	79	21	22	10	10	11	31	21	21	18
Phosphorus	56	28	43	28	108	117	30	118	49	32	32	28	27	27	42	60	55	49
Potassium	447	228	354	130	244	271	230	1363	558	212	248	204	184	191	296	330	816	670
Sodium	43	23	25	130	5	3	1	1048	79	2	3	13	13	67	40	41	9	8
Zinc	.44	.24	—	—	1.24	1.19	—	—	.53	.29	.20	.28	.27	—	.19	—	.24	.20
Copper	.290	.156	—	—	.176	.173	—	—	.130	.102	.057	.169	.161	—	.350	—	.178	.152
Manganese	.774	.416	—	—	.410	.525	—	—	.897	.157	.127	.355	.337	—	.466	—	—	—
<b>VITAMINS: (mg)</b>																		
Ascorbic Acid	120	41	70	30.0	40.0	14.2	4.7	10.1	28.1	8.4	9.0	22.7	17.1	21.0	60	43	17.1	12.1
Thiamin	.110	.053	.080	.040	.265	.259	.031	2.380	.078	.052	.070	.066	.053	.040	.070	.090	.112	.095
Riboflavin	.130	.070	.110	.130	.132	.149	.078	3.670	.189	.043	.030	.147	.140	.030	.100	.120	.032	.028
Niacin	1.000	.500	.800	.500	2.090	2.021	.413	12.820	.724	.454	.400	.674	.640	.400	.600	.200	.758	.552
Pantothenic Acid	.091	.049	.210	.312	.104	.153	—	3.480	.065	.102	.083	.591	.532	.200	.380	.310	.314	.311
Vitamin B6	.271	.138	—	—	.169	.216	—	.364	.195	.109	.089	.257	.244	.090	.263	.129	.293	.228
Folicin (mcg)	29.3	13.3	—	—	65.2	63.3	—	—	194.4	22.9	22.1	13.8	11.1	14.5	194.4	—	23.0	16.0
Vitamin A IU	8900	7400	5300	4400	640	597	1082	—	6715	338	340	20,063	17,054	0	7600	4700	0	0
<b>AMINO ACIDS: (gr)</b>																		
Tryptophan	.040	.023	.030	—	.037	.037	.009	.929	.039	.008	.010	.020	.020	.009	.026	.030	.012	.012
Threonine	.147	.085	.072	—	.203	.201	.021	2.970	.122	.023	.028	.082	.082	.025	.082	.133	.054	.052
Isoleucine	.197	.114	.098	—	.195	.193	.023	3.209	.147	.034	.042	.082	.082	.036	.078	.093	.052	.050
Leucine	.231	.133	.083	—	.323	.320	.034	4.947	.223	.055	.068	.121	.121	.033	.137	.166	.096	.094
Lysine	.197	.114	.123	—	.317	.314	.039	3.025	.174	.052	.064	.081	.081	.036	.098	.134	.059	.058
Methionine	.032	.018	.025	—	.082	.081	.008	1.149	.053	.014	.017	.041	.041	.011	.034	.020	.021	.020
Cystine	.044	.025	.040	—	.032	.032	.002	.662	.035	.010	.012	.013	.013	.005	.017	.007	.019	.018
Phenylalanine	.169	.097	.072	—	.200	.198	.023	2.777	.129	.033	.041	.099	.099	.017	.092	.114	.071	.069
Tyrosine	.117	.067	.143	—	.113	.112	.030	2.584	.108	.025	.031	.068	.068	.013	.058	.063	.040	.039
Valine	.181	.104	.105	—	.235	.232	.025	3.512	.161	.042	.052	.108	.108	.030	.102	.137	.062	.060
Arginine	.184	.106	.197	—	.428	.423	.039	4.147	.162	.040	.049	.077	.077	.024	.094	.150	.127	.124
Histidine	.069	.040	.048	—	.107	.105	.011	1.085	.064	.020	.025	.031	.031	.014	.036	.040	.034	.033
Alanine	.166	.096	—	—	.240	.237	.020	4.515	.142	.049	.061	.090	.090	.035	.103	.137	.063	.061
Aspartic Acid	.295	.170	—	—	.495	.490	.074	5.793	.240	.115	.141	.282	.282	.063	.158	.187	.155	.151
Glutamic Acid	.374	.216	—	—	.740	.733	.133	8.386	.343	.101	.124	.161	.161	.130	.204	.190	.181	.176
Glycine	.159	.092	—	—	.184	.182	.019	3.099	.134	.035	.044	.074	.074	.025	.090	.112	.053	.052
Proline	.196	.113	—	—	.173	.171	.019	2.382	.112	.029	.036	.072	.072	.026	.071	.096	.054	.053
Serine	.139	.080	—	—	.181	.179	.032	2.998	.104	.038	.047	.085	.085	.029	.061	.060	.081	.079

(Blank spaces indicate a lack of data)

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