



## THE BIRD CLINIC VETERINARY CORPORATION

### NUTS AND SEEDS: HOW NUTRITIOUS ARE THEY?

This handout will explain the science of nutrition as it relates to seeds and nuts. Comments such as "I have always fed my birds seed and they have done fine" or "My amazon lived for 20 years on a seed diet" or "I never saw a problem in my bird until he just died one day" do not support the idea that seed is a good or even adequate diet for a bird. Analogous comments related to a human being might be "My ancestors always ate an all meat diet and did fine" or "My father lived for 50 years on an all meat diet" or "My father at 50 was in perfect health until he died one day of a heart attack".

The chart on page three will document and further support the idea that seeds alone or in combination with nuts or grains are deficient in key areas necessary for avian species to live a long (at least 80% of their genetic potential) as well as a metabolically healthy life.

The chart lists eleven examples of seeds and nuts that are commonly used in commercially sold seed products in the pet industry. The three main areas to be discussed are **Total Fat levels**, **Calcium** and **Phosphorus** levels, and **Vitamin A** content.

**Total Fat levels:** Current nutritional research suggests that most psittacines need no more than 15% total fat in their diet. In review of the items listed, safflower seed represents the lowest fat level at 38.40%, exceeding maximum levels by 250%. The full discussion of how various fats affect a bird's body systems is beyond the scope of this handout, however neutral lipids (triglycerides), cholesterol esters, free fatty acids, and other fat soluble products all play a role in the fat metabolism of a bird. Unfortunately most of the research has been performed in poultry species. In 2001, the first paper was published using pet birds as a model to establish normal serum fat concentrations. The BIRD Clinic in 2000 started researching the relationship of triglycerides, cholesterol, and total fat levels to determine both normal values as well as to determine their potential detrimental effects in pet birds.

**Calcium (Ca), Phosphorus (P), and Ca:P ratio:** Poultry nutritional research has determined that a diet should contain 0.50% calcium for maintenance and 1% for proper bone development. Psittacine research seems to mirror these poultry findings. Using 100 gms of any given food, this would equate to 0.5 - 1 gm (500 -1000 mg) of calcium to contain adequate levels for maintenance and growth. The highest level on the chart is demonstrated by almonds at 266 mg, barely 50% the levels necessary for maintenance and only 27% of the calcium needed for growth. High-fat diets may further exacerbate the situation by forming insoluble calcium soaps thereby preventing calcium uptake in the small intestines.



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Ca:P ratio analyzed in bone approximates 2:1. Any given diet should deliver this ratio of calcium to phosphorus to maintain equilibrium within the body. The best level to be achieved is represented on the chart by macadamia at 1:1.94, delivering 4 times higher phosphorus levels compared to calcium. The kidneys must excrete this excess phosphorus from the body and when they do, they also excrete calcium. This process further magnifies the overall calcium depletion within the body of the bird.

**Vitamin A:** Vitamin A is crucial to cellular function in many parts of the body including the formation of mucous membranes and epithelial surfaces, for growth, vision, development of the vascular system, production of adrenal hormones, formation of red and orange pigments in feathers and many other functions. A concentration of 5000 IU/pound of food is required to prevent eventual signs of Vitamin A deficiency. For a 100 gm portion of food, there must be 1100 IU of vitamin A to meet these requirements. The highest level on the chart is represented by pumpkin seeds at 380 IU/100 gm wt., barely a third of the level necessary for sustained avian health.

Profiling these three nutritional categories of seeds and nuts should demonstrate to anyone how a diet exclusive of any supplementation will eventually lead a bird to multiple nutritional deficiencies and a shortened life span. The deficiencies are masked for an extended period of time due to each organ's reserve capacity. Example: The kidneys can perform 100% of their function with only 30% of their total mass. This is why people can donate a kidney and still live normally. The liver can perform 100% of its function in some species with only 10% of its total mass. Cases seen at The BIRD Clinic have shown this to be true in psittacine birds. Once this threshold is crossed the clinical symptoms are not only obvious, but usually severe and often life threatening. It has been said many times that "ignorance is bliss", but as it relates to one's health we know this not to be true. **A diet for a pet bird must contain ALL nutritional groups** (protein, fat, carbohydrates, vitamins, and minerals) in the right proportions to support each bird's genetics for maximum life expectancy.

One last thought: the claim that supplementing a seed diet with fruits and vegetables will make the diet "complete" is not an accurate statement. Supplementation solves some of the problems, but tends to create others (please refer to The BIRD C News "Nutritional Problems in Pet Birds"). Today's science does not have all the answers, but much progress has been made in the last 20 years. Blood tests are now available and often required to determine the current nutritional condition of a bird and serve as a guide to demonstrate improvement once nutritional therapy is instituted. Your avian veterinarian should be able to help you plan out the proper nutrition for your specific species of pet bird, but you must sometimes ask. If you do not get an informed answer, you should possibly search out a new avian veterinarian. This is supported by the fact that 94% of the birds first presented to The BIRD Clinic have nutritional imbalances. "The bird is the result of what it eats!"



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### NUTRITIONAL ANALYSIS OF SELECTED NUTS AND SEEDS (WITHOUT SHELL) PER 100 GRAMS WEIGHT (3.5 ounces)

Nutrients/Gram	Almond	Brazil	Filbert	Macadamia	Peanut	Pecan	Pine Nut	Walnut	Pumpkin	Safflower	Sunflower
<b>Calories</b>	589.00	656.00	632.00	702.00	567.00	667.00	515.00	642.00	541.00	517.00	570.00
<b>Protein</b>	19.90	14.30	13.00	8.30	25.60	7.70	24.00	14.20	24.50	16.10	22.70
<b>Carbohydrates</b>	20.40	12.80	15.30	13.70	16.10	18.20	14.20	18.30	17.80	34.20	18.70
<b>Total Fat</b>	52.20	66.20	62.60	73.70	49.10	67.60	50.70	61.80	45.80	38.40	49.50
Saturated	4.90	16.10	4.60	11.00	6.80	5.40	7.70	5.50	8.60	3.60	5.10
Monounsaturated	33.90	23.00	49.00	58.10	24.30	42.10	19.00	14.10	14.20	4.80	9.40
Polyunsaturated	10.90	24.10	6.00	1.20	15.50	16.70	21.30	39.10	20.90	28.20	32.70
Cholesterol (mg)	0	0	0	0	0	0	0	0	0	0	0
Fiber	2.70	2.20	3.80	5.20	4.80	1.60	0.80	4.60	2.20	2.40	4.10
Water	4.40	3.30	5.40	2.80	6.60	4.80	6.60	3.60	6.90	5.60	5.30
Ash	3.00	3.30	3.60	1.30	2.30	1.50	4.40	1.80	4.80	5.40	3.50
<b>Minerals (mg)</b>											
Calcium	266.00	176.00	188.00	70.00	58.00	36.00	26.00	94.00	43.00	78.00	116.00
Magnesium	296.00	225.00	285.00	116.00	180.00	128.00	*	169.00	535.00	*	354.00
Phosphorus	520.00	600.00	312.00	136.00	383.00	291.00	508.00	317.00	1174.00	644.00	705.00
Potassium	732.00	600.00	445.00	368.00	717.00	392.00	599.00	502.00	807.00	*	689.00
Sodium	11.00	2.00	3.00	5.00	16.00	1.00	4.00	10.00	18.00	*	3.00
Zinc	2.92	4.59	2.40	1.71	3.27	5.47	4.25	2.78	7.46	*	5.06
Copper	0.94	1.77	1.50	0.29	1.00	1.18	1.020	1.38	1.38	*	1.75
Manganese	2.27	0.77	2.01	*	1.11	4.50	*	2.89	0	*	2.02
<b>Vitamins (mg)</b>											
Ascorbic Acid (C)	0.600	0.70	1.00	*	0	2.00	*	3.20	0	0	*
Thiamin	0.211	1.00	0.500	0.350	0.664	0.848	0.810	0.382	0.210	1.163	2.290
Riboflavin	0.779	0.122	0.110	0.110	0.131	0.128	0.190	0.148	0.320	0.415	0.250
Niacin	3.361	1.622	1.135	2.140	14.150	0.887	3.570	1.042	1.745	2.284	4.500
Pantothenic Acid	0.471	0.236	1.148	*	2.764	1.707	*	0.631	*	*	*
Vitamin B6	0.113	0.251	0.612	*	0.296	0.188	*	0.558	*	*	*
Folacin (mcg)	58.70	4.00	71.80	*	100.60	39.20	*	66.00	*	*	*
<b>Vitamin A, IU</b>	0	0	67.00	*	*	128.00	*	124.00	380.00	*	50.00

Reference: July 1991 AFA

\*Blank spaces indicate lack of data