What To Feed (2nd Part)

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Beginning in the late 1970s studies were undertaken at the University of California Davis Campus to determine the nutritional requirements of Cockatiels. As a result of these studies manufactured diets began to appear that meet the nutritional needs of most seed eating species.

Manufactured Diets

Along with the appearance of the manufactured diets, came advertising campaigns designed to convince people that the new diets were superior to seed based diets. Avian veterinarians soon joined in on the side of the manufactured diets. Since many if not most of the diseases and premature deaths they were seeing in their avian patients were diet related, the veterinarians became the most vocal and persistent spokesmen for manufactured diets. In their eagerness to convince bird owners of the advantage of manufactured diets, manufacturers and veterinarians alike often resorted to hyperbole and exaggeration. Statements comparing seed based diets to junk food, assertions that feeding seeds was a death sentence for a bird, claims that all seeds were devoid of nutritional value, that all seeds were high in fat and low in nutrients were made and largely went unchallenged.

Seed Based Diets

So, how do seed diets stack up against manufactured diets? Are seeds really as bad as the makers of manufactured diets would have us believe. The answer to that question is quite complex. Any examination of the value of seed based diets needs to recognize that the available diets will vary greatly in content, and quality, both of which strongly influence the nutritional value of the mix. It is also necessary to acknowledge that supplements are necessary (especially for Vitamin D3) for those nutrients that are typically low or missing from most seeds. Still it is possible to construct a diet based on seeds that is comparable to manufactured diets.

Variety of Seeds

Seed varies greatly in nutritional content. It is therefore necessary to design seed-based diets using several different seeds. Some seeds, particularly the oil seeds such as safflower, sunflower, rape, and sesame are high in minerals and vitamins but also high in fat. Others such as millet are quite low in fat, are low in minerals, but many have good amounts of protein. What most seeds lack is vitamin A and calcium.

Vitamin A

The highest vitamin A content is found in the oil seed. Sunflower contains 500 IU (injectable units) per kilogram, while safflower contains the same amount, but they are the exception. Most seed such as millets and other grains contain little or no vitamin A.

Calcium

Calcium is also a problem in seed diets. Again, the oil seed tend to be the best sources. Sunflower contains 1160 mg/Kg while Sesame contains 9750 mg/Kg. Non oil seed such as millet, oats, and buckwheat tend to be much lower. Canary seed while a good source of calcium is quite high in phosphorus which can skew the calcium phosphorus ratio dramatically.

Vitamin D

No seed or other vegetable product contains vitamin D in any form. This can present serious problems for birds kept indoors as in order to manufacture vitamin D3 they must be exposed to ultraviolet light at a high enough intensity to activate chemicals contained in their preen gland and in, their skin. Birds kept inside generally do not receive sufficient exposure to ultraviolet to produce adequate amounts of vitamin D on their own. Birds kept outside and exposed to unfiltered sunlight do not experience this problem. Vitamin D deficiency contributes to many health problems ranging from decreased auto-immune response to liver and kidney failure. Vitamin D deficiency is of special concern to breeders as it is required to bind calcium and a deficiency can cause egg binding, soft-shelled eggs, and cause development problems in chicks. It is important that this lack be corrected in any seed diet fed to birds kept inside.

Vitamin supplements can be added to the food, or foods such as egg, hard cheeses, meats, or fish can be added to the diet to provide sufficient vitamin D. Great care should be taken when supplementing vitamin D through the use of vitamin powders or solutions. While I am not aware of any clear studies demonstrating at what level vitamin D becomes toxic in birds, anecdotal evidence seems to indicate that levels above 2,000 IU/Kg may be toxic for some species.

Seed Diet Deficiencies Corrected

Supplements

While seed diets are not complete food sources, the deficiencies are easily corrected. As mentioned, vitamin D can be added through eggs, meats, fish, or low lactose and lactose free dairy products. Vitamin A can be supplemented by feeding dark green leaf vegetables such as spinach (3360 IU/Kg), dandelion (7000 IU/Kg), parsley (52,000 IU/kg fresh, 233,400 IU/kg dried (it should be noted that parsley has been shown to cause photo sensitivity in water fowl), or Kale (89,000 IU/kg). Yellow fruits and vegetables are also excellent sources of vitamin A. Winter squashes (40,600 IU/Kg average), carrots (14,060 IU/kg), sweet potato (10,030 IU/Kg), it is worth noting that the leaves of the sweet potato plant *Ipomoea batatas,* are also edible and have slightly more vitamin A than the tuber.

Fruits

Among the fruits, mango and papaya both contain moderate amounts of vitamin A, as does Kiwi (Chinese Gooseberry), and Persimmon (Japanese variety). Other fruits such as apples, peaches and grapes tend to be moderate to low in vitamin A though grape leaves are extremely high at 266,000 IU/kg.

Calcium content of most seeds is low, though some are quite good. It is easily supplemented and as a rule most of the same fruits and vegetables that are high in vitamin A are also high in calcium. Cuttlebone and mineral blocks along with powdered mineral supplements also easily add calcium to the diet. The calcium-phosphorus ratio is often discussed. In order for calcium to be utilized, phosphorus must also be present in the diet. Exactly what that ratio should be is open to debate, but the consensus here in the States seems to be that a ratio of 2 calcium to 1 phosphorus is ideal. However it is very difficult to achieve that ratio using fresh or dried foods.

Natural foods tend to have a ratio that is higher in phosphorus than calcium. It therefore seems likely that birds have evolved mechanisms to deal with the higher phosphorus except in extreme amounts.

So, are seeds as bad as the advocates of manufactured diets would have us believe? The answer is clearly no, not at all. Equally, seeds are not the complete diet some would have us believe.

Sprouting

Sprouting should not be ignored as a means of increasing the vitamin content of seed diets. Sprouting can result in dramatic increases in the vitamin content, especially vitamin A. Seed that contains virtually no vitamin A produce significant amounts when sprouted, while those with appreciable vitamin A to begin with may show increases by a factor of 10 or greater. Sprouted or germinated seed generally retains all the other nutrient values of dry seed but will be much lower in fat. Seed sprouted in distilled water may lose some minerals.

Amino and Fatty Acid

One nutritional area in which seeds require no supplementation are the amino and fatty acids. Most seeds contain at least trace amounts of all eight essential amino acids, while the oil seeds tend to contain high levels. Many seeds are actually higher in amino acids than the manufactured diets. (Canary seed is an especially good source, it contains all 8 essential amino acids at high levels along with all the essential fatty acids.)

Conclusion

So, are seeds as bad as the advocates of manufactured diets would have us believe? The answer is clearly no, not at all. Equally, seeds are not the complete diet some would have us believe. While an all seed diet will not meet all the nutritional needs of birds, with care and a little homework, a highly nutritious and balanced diet can be fed offering seed as the basis, supplemented by a selection of other fresh or dried foods.

Bibliography

The following were used but not quoted in preparing this article:

Feeding Your Pet Bird, Barrons Press, 1995
Pionus Parrots, Rosemary Low, Dona , 2002
Genus Amazona, John & Pat Stoodley, Bezels Publications, 1990
Exotic Bird Report, various, University of California at Davis, 1999-2002

Web Sites

The following web sites were used in researching nutritional values:

New Crop Search Engine
http://www.hort.purdue.edu/newcrop/SearchEngine.html

Alternative Crop Manual
http://www.hort.purdue.edu/newcrop/afcm/cangrass.html

USDA Nutrient Database for Standard Reference
http://www.nal.usda.gov/fnic/cgi-bin/nut-search.pI

Nutrition Analysis Tool
http://www.nat.uiuc.edu/mainnat.html

Parrot Nutrition
http://www.ilsham.demon.co.uk/nutrition.htm1

Nutritional Information for Vets
http://www.roudybush.com/vetinfo.html

Note: All nutritional values stated in the article were taken from the USDA Nutritional Database for Standard Reference
http://www.nal.usda.gov/fnic/cgi-bin/nut-search.pI

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