Nutritional Equivalency Report: Comparison of a fortified whole-seed diet (Nutri-Berries) with a pelleted diet for companion birds

Authors: Kirk C. Klasing, Ph.D., Christina Stevens, Michele Hawkins, VMD, Dipl. ABVP-Avian
Editor: Susan E Orosz Ph.D., DVM, Dipl. ABVP-Avian, Dipl. ECAMS

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Key Points

- There are no clinically significant differences between cockatiels fed a pelleted diet and those fed the whole-seed balanced diet, Lafeber® Nutri-Berries.
- Cockatiels fed Nutri-Berries group spend considerably more time consuming this diet than birds consuming pellets. This finding suggests enhanced foraging enrichment over a pelleted diet.

Introduction

Seed-only diets are nutritionally inadequate for companion bird health because they are deficient in the fat-soluble vitamins (vitamin A, D_3, E, and K), several B vitamins, certain amino acids, and some minerals including calcium, zinc, copper, and iron. To overcome these deficiencies, pellets and extruded diets have been developed to provide balanced nutrition. Seeds, minerals, and vitamins are ground to a mostly homogenous mixture, and then processed into a pellet. This keeps birds from choosing individual components. However, pellets and extruded diets, because of their uniform texture, do not offer much foraging enrichment and environmental stimulation. An alternative is to use whole seeds, add minerals and vitamins to provide a balanced product like a pellet, mix them together, and shape them into a ball. The fortified whole-seed diet provides much needed environmental enrichment along with complete nutrition.

Many companion bird owners and some veterinarians believe that pellets are the only approach to complete nutrition. This misconception likely is due to a lack of appropriately designed trials that demonstrate the nutritional value of a whole-seed balanced diet.

Objective

A clinical trial was conducted with cockatiels (*Nymphicus hollandicus*) to compare a whole-seed balanced diet (Nutri-Berries) with that of a pelleted diet. Blood values, body weight, and other parameters were measured to assess the alternative diet's clinical effects on birds.

Experimental Design

Three treatment groups were created: two using pelleted diets and one using a fortified whole-seed diet (Nutri-Berries).

Treatment 1: Pelleted diet (n=10). This treatment group received pellets that were nutritionally balanced and composed of a mixture of seeds, vitamins and minerals that was nearly identical to that found in Nutri-Berries. The seeds were ground and the mix of seeds, vitamins and minerals were pelleted.

Treatment 2: Pelleted diet (n=10). This group received a pelleted diet that had been used to maintain cockatiels for more than a year with great success. Birds in this treatment group were used as a control for weight gain during the experiment and were not evaluated clinically at the end of the experiment. These birds were weighed only at the start and the end of the experiment.

Treatment 3: Whole-seed balanced diet (n=13). This diet was commercially available Nutri-Berries for cockatiels. The dietary balance was nearly identical to the pellets provided in treatment group 1.

Cockatiels were housed in wire cages (30 cm × 30 cm × 60 cm) in a room maintained at 23°C (73ºF). Day length was 12 hours. Husbandry conditions were as previously described by Koutsos et al 2001. Each dietary treatment was fed to cockatiels for 6 months. Food and water were provided for ad libitum consumption.

Prior to the experiment, all birds were fed the diet used in treatment 2. Birds in treatment 1 and 3 were gradually changed to their experimental diets over a period of 3 to 5 days.

In the fifth month of the experiment, immune response was assessed by challenging the birds with an antigen (keyhole limpet hemocyanin or KLH). Birds were bled 7 days later to determine their specific antibody response by ELISA. Ten days after the challenge, birds were injected with KLH into the wing web and the amount of swelling after 24 hours was determined with pressure sensitive calipers to indicate delayed-type hypersensitivity.

During the last week of the study, time budgets (time spent feeding versus time spent in other activities) and water intake were recorded.

On the last day of the experiment, birds were given a physical examination and body condition score. Birds were then bled for a complete blood count and a chemistry profile [uric acid, lipids, protein, cholesterol, alanine aminotransferase (ALT), creatine phosphokinase (CPK), lactate dehydrogenase (LDH), calcium, and glucose].

Results

Body weight gain: All birds gained weight during the experiment. There was no significant difference in the final body weights due to diet. However, the change in body weight from the beginning to the end of the experiment tended ($p=0.06$) to be less in the birds in treatment 2 than those in treatment 1. Birds consuming Nutri-Berries did not significantly differ in body weight gain from those consuming either of the pelleted diets.

Hematology: Diet did not affect any hematological parameter.

Clinical Chemistry: Diet did not affect any chemistry parameter.

Immunity: There were no differences due to diet in antibody response or cell mediated response to KLH.

Physical exam: Diet did not affect respiratory rates, heart rates, choanal score or body condition score. Health problems in the flock included: lesions on hocks, fluid in oral cavity, mild distention of the abdomen (egg formation likely), heart arrhythmia, poor feather quality, unthrifty plumage, and obesity. None of these conditions were associated with a specific diet.

Water intake: Birds consuming the pelleted diet (Treatment 1) consumed significantly more water than those consuming Nutri-Berries.

Feeding behavior: Birds consuming Nutri-Berries spent twice as much time in feeding related activities. The amount of food wasted was not recorded, but appeared to be higher for birds consuming Nutri-Berries.

Conclusions

1. There are no clinically significant differences in cockatiels fed a pelleted diet compared with those fed the whole-seed balanced diet, Nutri-Berries.
2. Cockatiels in the Nutri-Berries group spent considerably more time consuming this diet than birds consuming pellets. This finding suggests enhanced foraging enrichment over a pelleted diet. Those birds eating pellets consumed more water and likely spent more time drinking than birds consuming Nutri-Berries.

Appendices may be uploaded as separate PDF files

1. *Effect of diet on serum clinical chemistries*
2. *Effect of diet on body weight*
3. *Measuring the immune response using keyhole limpet hemocyanin (KLH)*

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