

# Analysis of Animal Feed Products Sold in Connecticut During 2020

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## Analysis of Animal Feed Products Sold in Connecticut During 2020

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### INTRODUCTION

The Animal Feed Regulatory Program Standards (AFRPS) were designed to institute a uniform framework for the establishment of animal feed monitoring programs at the state level. In Connecticut, The Agricultural Commodities Division of The Department of Agriculture is responsible for regulation and inspection of animal feeding products and pet foods. The goal of state regulators is to ensure manufacture label accuracy and screen for the presence of aflatoxins. Products collected by Department of Agriculture inspectors are delivered to the Department of Analytical Chemistry at The Connecticut Agricultural Experiment Station for analysis to ensure compliance with state and federal regulations. The laboratories in the Department of Analytical chemistry are ISO 17025:2017 accredited to perform percent crude fat, percent crude protein, and aflatoxin analysis in animal feeds. This accreditation ensures accurate results with appropriate quality control samples and record keeping.

Aflatoxins are carcinogenic toxins that are produced by the fungus *Aspergillus flavus*. *A. flavus* mold can grow on cereal grains and legumes such as corn or peanuts while in storage. As recently as December 2020 there were 28 fatalities linked to dog food contaminated with aflatoxins (5). This event triggered an FDA recall of the associated animal feed batches. A similar event occurred in September of 2020, with a recall extending to animal feeds that used the same corn grain. There are four main Aflatoxins B1, B2, G1 and G2. Aflatoxin B1 is predominate and considered the most toxic. If ingested, B1 and B2 can be transformed into aflatoxin metabolites M1 and M2 respectively, which can be transferred into milk. The toxins can also enter the human food chain both by direct consumption of the product, or through livestock that have eaten the contaminated product. Currently, the FDA has a set action level for combined Aflatoxins (B1+B2+G1+G2) ranging from 100-300 µg/kg for beef cattle, swine, or

poultry fed animal feed containing corn, peanut, or cottonseed ingredients. A lower action level of 20 µg/kg is in place for animal feeds intended for dairy animals, immature animals, and pets (4).

### METHODS

In calendar year 2020, The Department of Analytical Chemistry at The Connecticut Agricultural Experiment Station analyzed 44 animal feed products for label guarantees and 61 products for the presence of aflatoxins that were for sale in Connecticut. Animal feeds were collected by Department of Agriculture Commodity Inspectors at manufacturing facilities, wholesale dealers, and retail locations. Samples were drawn from bulk storage/delivery containers, as well as from retail bags, boxes, and cans.

After delivery to The Connecticut Agricultural Experiment Station, the animal feed products were sub sampled and prepared for analysis. The samples were analyzed for protein, fat, and fiber based on modified methods described in Official Methods of Analysis (2).

Aflatoxins were extracted using 80% acetonitrile in water, followed by solid phase extraction with cartridges specific for Aflatoxin B1, B2, G1, and G2. Analytes are then eluted using methanol. Aflatoxin analysis was performed using liquid chromatography with high resolution mass spectroscopy (LC-HRMS). The LC-HRMS detection limit for individual aflatoxin compounds was 1 µg/kg.

All results are submitted to the Department of Agriculture for possible regulatory response.

### RESULTS AND DISCUSSION

#### Animal Feed Regulatory Program Standards (AFRPS) For Label Guarantees

Animal feed products are reported to be unsatisfactory based on guidelines established by the Association of American Feed Control Officials (AAFCO) (3).

Table 1 shows the results for the analysis of crude protein, crude fat, and crude fiber. The label guaranteed nutrient value is denoted as (G) and the laboratory determined nutrient value is denoted as (R). Deficiencies and excesses of a guaranteed nutrient are expressed in red.

The number of samples deemed unsatisfactory in one or more macronutrients was 3 out of 44 samples processed (6.8%). The first deficiency occurred for claimed % crude protein of 18% when analysis determined a value of 14.5%. The second deficiency occurred for claimed % crude fat of 3% when analysis determined a value of 1.9%. The third deficiency occurred for claimed % crude fat of 2.5% when analysis determined a value of 1.2% (Table 1).

All protein samples are analyzed in duplicate. However, there are no duplicates for Fat and Fiber. The results for protein reflect the average of duplicates. In Table 1, ND indicates that an analysis was not performed.

#### **Animal Feed Regulatory Program Standards (AFRPS) for Aflatoxins**

The products analyzed for aflatoxins during 2020 are shown in Table 2. For all animal feeds tested the sum of Aflatoxins B1, B2, G1, and G2 was below FDA action levels.

**Table 1. A comparison between label guarantees (G) and analytical results (R) for animal feeds received from the Connecticut Department of Agriculture for the calendar year 2020. Values in red indicate results that did not pass.**

| Sample ID | Brand                 | Description                                  | Protein % |      | Crude Fat % |      | Crude Fiber % |      |
|-----------|-----------------------|--|-----------|------|-------------|------|---------------|------|
|           |                       |  | G         | R    | G           | R    | G             | R    |
| KAN20-21  | Green Mountain Feeds  | Organic Layer Pellets                        | 17.0      | 16.7 | 4.0         | 5.9  | 5.5           | 4.4  |
| KAN20-22  | Blue Seal             | Home Fresh 18 Sheep Starter                  | 18.0      | 14.5 | 3.0         | 5.1  | 8.0           | 4.3  |
| KAN20-23  | Blue Seal             | Home Fresh Pig Grow & Finish Pellet          | 16.0      | 17.4 | 3.0         | 4.1  | 3.7           | 3.3  |
| KAN20-24  | Nutrena               | Empower Boost                                | 12.0      | 13.2 | 22.0        | 21.6 | 8.0           | 6.1  |
| KAN20-25  | Nutrena               | Country Feeds Select Stock Pellet            | 16.0      | 17.2 | 3.0         | 4.4  | 15.0          | 7.3  |
| KAN20-26  | White Millet          |  | 10.0      | 10.2 | 3.0         | 3.7  | 8.5           | 5.9  |
| KAN20-27  | Blue Seal             | All Stock 12 Pels                            | 12.0      | 13.2 | 2.5         | 4.6  | 15.0          | 9.8  |
| KAN20-28  | Blue Seal             | Extra Egg Layer Pellet                       | 16.0      | 16.5 | 3.0         | 3.6  | 4.0           | 3.7  |
| KAN20-30  | Blue Seal             | Bunny 16 Rabbit Pellets                      | 16.0      | 17.2 | 2.5         | 4.5  | 19.0          | 16.1 |
| KAN21-01  | Nutrena               | Naturewise Hearty Hen (Soy Free)             | 18        | 18   | 2.5         | 4.6  | 6.0           | 4.8  |
| KAN21-02  | Nutrena               | Country Feeds All Flock 18% Pellets          | 18.0      | 18   | 2.5         | 3.4  | 8.0           | 5.3  |
| KAN21-03  | Nutrena               | Country Feeds Llama & Alpaca 14% TX          | 14.0      | 16   | 4.0         | 4.4  | 15.0          | 7.9  |
| KAN21-04  | Poulin Grain          | Layer Crumbles                               | 16.5      | 17   | 3.0         | 1.9  | 4.0           | 3.1  |
| KAN21-05  | Nutrena               | Country Feeds Grower Finisher 16% Pellets    | 16.0      | 17   | 3           | 4.3  | 7.0           | 5.9  |
| KAN21-06  | Wrangler              | 12 All Stock Pellet                          | 12.0      | 14   | 3           | 2.7  | 25.0          | 7.5  |
| KAN21-07  | Blue Seal Carb Guard  | Pelleted horse feed                          | 12.0      | 14   | 8.0         | 7.5  | 25.0          | 21.7 |
| KAN21-08  | Poulin Grain          | Decade Challenger 14:8                       | 14.0      | 15   | 8.0         | 7.5  | 10.0          | 8.8  |
| KAN21-09  | Nutrena Country Feeds | Cracked Corn                                 | 6.5       | 7.5  | 2.5         | 1.2  | 3.0           | 1.4  |
| KAN21-10  | Nutrena Country Feeds | Layer Feed Crumbles 16%                      | 16.0      | 17   | 2.5         | 3.6  | 8.0           | 5.0  |
| KAN21-11  | Purina                | Layena + Omega Pellets                       | 16.0      | 17.9 | 3.5         | 4.4  | 7.0           | 3.8  |
| KAN21-12  | Purina                | Layena Pellet                                | 16.0      | 17.6 | 2.5         | 2.9  | 6.5           | 6.2  |
| KAN21-13  | Purina                | Nature's Match GF - Pig                      | 16.0      | 18.4 | 2.5         | 4.4  | 5.0           | 5.1  |
| KAN21-14  | Purina                | Equine Senior                                | 14.0      | 15.7 | 5.5         | 7.2  | 18.0          | 15.4 |
| KAN21-15  | True Choice           | Layer 16 Pellet                              | 16.0      | 17.3 | 1.5         | 3.5  | 10.0          | 7.3  |
| KAN21-16  | Poulin Grain          | Lamb & Kids Starter Pellets Type C Medicated | 18.0      | 20.1 | 3.0         | 2.9  | 8.0           | 6.7  |
| KAN21-17  | Poulin Grain          | Decade Endurance Sport-Premium Horse Pellet  | 12.0      | 13.8 | 8.0         | 7.5  | 10.0          | 7.7  |

**Table 1. A comparison between label guarantees (G) and analytical results (R) for animal feeds received from the Connecticut Department of Agriculture for the calendar year 2020. Values in red indicate results that did not pass.**

| Sample ID  | Brand                      | Description   | Protein % |      | Crude Fat % |     | Crude Fiber % |      |
|------------|----------------------------|---|-----------|------|-------------|-----|---------------|------|
|            |                            |   | G         | R    | G           | R   | G             | R    |
| KAN21-18   | Poulin Grain               | Pig Grower Pellets  | 16.0      | 17.9 | 3.0         | 2.9 | 7.0           | 5.2  |
| KAN21-19   | Poulin Grain               | Scratch Feed  | 8.0       | 8.6  | 2.5         | 2.4 | 5.0           | 5.5  |
| KAN21-20   | Green Mountain Feeds       | Organic Layer Pellets   | 17.0      | 18.3 | 4.0         | 4.7 | 5.5           | 5.1  |
| KAN21-24N  | Purina Friskies            | Shreds with Chicken in Gravy                                  | 9.0       | 13.7 | 2.5         | 3.0 | 1.0           | 0.25 |
| KAN21-28N  | Purina Pro Plan            | Salmon Entree   | 11.0      | 11.6 | 2.0         | 2.5 | 1.5           | 0.21 |
| KAN21-32N  | Hills Science Diet         | Liver 9 Chicken Entree  | 8.0       | 9.7  | 3.5         | 4.9 | 2.5           | 0.94 |
| KAN21-36N  | Blue Healthy Gourmet       | Turkey & Chicken Entrée Pate                                  | 10.0      | 10.9 | 6.0         | 8.6 | 1.5           | 0.62 |
| KAN21-40N  | Wellness                   | Minced Chicken Dinner Cat Food                                | 8.0       | 9.1  | 5.0         | 4.8 | 1.0           | 0.48 |
| KAN21-64N  | Nutrena                    | Country Feeds Hay Extender                                    | 11.0      | 16.5 | 2.0         | 3.5 | 20.0          | 15.9 |
| KAN21-68N  | Nutrena                    | Active 12 Pellet - Horse                                      | 12.0      | 15.4 | 8.0         | 9.0 | 12.0          | 9.2  |
| KAN21-72N  | Tribute                    | Essential K   | 28.0      | 31.5 | 6.0         | 6.4 | 6.5           | 5.2  |
| KAN21-76N  | Kalmbach Feeds             | 17 % Milk Maker Goat Feed                                     | 17.0      | 18.2 | 3.0         | 3.3 | 9.0           | 6.2  |
| KAN21-80N  | Nutrena                    | Gamebird/Turkey Finisher/Maintenance 16%                      | 16.0      | 16.6 | 5.0         | 5.0 | 5.0           | 4.1  |
| KAN21-103N | Hills Pet Nutrition, Inc.  | Chicken and Barley Entre                                      | 4.7       | 5.8  | ND          | ND  | 1.5           | 0.42 |
| KAN21-107N | Hills Perfect Weight Adult | Hearty vegetable and Chicken Stew                             | 4.0       | 4.7  | ND          | ND  | 4.0           | 0.53 |
| KAN21-111N | Whole Earth Farms          | Hearty Duck Stew  | 8.0       | 10.3 | ND          | ND  | 1.4           | 0.46 |
| KAN21-115N | Whole Hearted              | Grain Free for cats salmon Recipe                             | 32.0      | 32.9 | ND          | ND  | 4.0           | 3.41 |
| KAN21-119N | Blue                       | True Solutions Perfect Coat Skin & Coat Care Formula Dog Food | 7.0       | 9.5  | ND          | ND  | 1.5           | 0.69 |

**Table 2. List of animal feeds tested for aflatoxins B1, B2, G1, and G2 in the year 2020.**

| Sample     | Description  | Brand/Regist               |
|------------|--|----------------------------|
| KAN20-29   | Whole Corn   | Blue Seal                  |
| KAN21-01   | Naturewise Hearty Hen (Soy Free)                     | Nutrena                    |
| KAN21-02   | Country Feeds All Flock 18% Pellets                  | Nutrena                    |
| KAN21-03   | Country Feeds Llama & Alpaca 14% TX                  | Nutrena                    |
| KAN21-04   | Layer Crumbles                                       | Poulin Grain               |
| KAN21-05   | Country Feeds Grower Finisher 16% Pellets            | Nutrena                    |
| KAN21-06   | 12 All Stock Pellet                                  | Wrangler                   |
| KAN21-07   | Pelleted Horse Feed                                  | Blue Seal Carb Guard       |
| KAN21-08   | Decade Challenger 14:8                               | Poulin Grain               |
| KAN21-09   | Cracked Corn   | Nutrena Country Feeds      |
| KAN21-10   | Layer Feed Crumbles 16%                              | Nutrina Country Feeds      |
| KAN21-102M | Chicken and barley Entre                             | Hills Pet Nutrition, Inc.  |
| KAN21-106M | Hearty vegetable and Chicken Stew                    | Hills Perfect weight Adult |
| KAN21-110M | Hearty Duck Stew                                     | Whole Earth Farms          |
| KAN21-114M | Grain Free for cats salmon Recipe                    | Whole Hearted              |
| KAN21-118M | True Solutions Perfect Coat Skin & Coat Care Formula | Blue                       |
| KAN21-121M | Adult Dog Mixed Grill Chicken + Beef Dinner in Gravy | Eukanuba                   |
| KAN21-122M | Chicken, Rice+Barley Recipe for Dogs                 | Nature's Recipe            |
| KAN21-123M | Original Grand Lamb, rice+Barley recipe for dogs     | Nature's Recipe            |
| KAN21-124M | True Solutions Jolly Joints                          | Blue                       |
| KAN21-125M | Carnivora Grain Free Coastal Blend                   | Blue                       |
| KAN21-126M | Pro Plan True nature Turkey & Chicken Entre          | Purina                     |
| KAN21-127M | Digestive Sensitine Loafing Sauce                    | Royal Canin                |
| KAN21-128M | Grainfree Chicken Recipe Pate                        | Whole Hearted              |
| KAN21-129M | Grass-Fed Lamb, Carrot + Apple                       | Castor + Pollux            |
| KAN21-130M | Grass-Fed Beef, Pea + Carrot Stew                    | Castor + Pollux            |
| KAN21-131M | Adult Labrador Retriever                             | Royal Canin                |
| KAN21-22M  | Shreds with chicken in Gravy                         | Purina Friskies            |
| KAN21-26M  | Salmon Entrée  | Purina Pro Plan            |
| KAN21-30M  | Liver & Chicken Entrée                               | Hill Science Diet          |
| KAN21-34M  | Turkey & Chicken Entrée Pate                         | Blue Healthy Gourmet       |
| KAN21-38M  | Minced Chicken Dinner Cat Food                       | Wellness                   |
| KAN21-42M  | Peck 'n' mix Herb Surprise                           | Hentastic                  |
| KAN21-43M  | Beef Dinner with Garden Vegetables                   | Blue HomeStyle Recipe      |
| KAN21-44M  | Lamb & Oatmeal Formula                               | Wellness Simple            |
| KAN21-45M  | Red Meat Recipe                                      | Whole Earth Farms          |
| KAN21-46M  | Turkey & Duck Recipe Pate                            | Chicken Soup for the Soul  |
| KAN21-47M  | High Prairie Canine Formula with Bison in Gravy      | Taste of the Wild          |
| KAN21-48M  | Stewlicious Meaty Beefy Stew                         | Davej Day Food             |
| KAN21-49M  | Stew Lamb Recipe with Carrots & Green Beans          | Instinct The Raw Brand     |
| KAN21-51M  | Salmon TunaChovy Recipe                              | Fromm Family Foods         |
| KAN21-53M  | mini dog biscuits                                    | Blue Seal Original Flavor  |

**Cont. Table 2. List of animal feeds tested for aflatoxins B1, B2, G1, and G2 in the year 2020.**

| Sample    | Description   | Brand/Regist             |
|-----------|---|--------------------------|
| KAN21-55M | Guinea Pig Food                                       | Kaytee Fiesta            |
| KAN21-57M | Beef Dinner for dogs                                  | Bravo HomeStyle          |
| KAN21-58M | Horse Treats for all Horses                           | Rourders                 |
| KAN21-59M | Dog Food Adult in Gravy                               | Purina Pro Plan Savor    |
| KAN21-60M | Small and Toy Breed                                   | Hill Science Diet        |
| KAN21-63M | Country Feeds Hay Extender                            | Nutrena                  |
| KAN21-67M | Active 12 Pellet - Horse                              | Nutrena                  |
| KAN21-71M | Essential K   | Tribute Equine Nutrition |
| KAN21-75M | 17 % Milk Maker Goat Feed                             | Kalmbach Feeds           |
| KAN21-79M | Country Feed Gamebird/Turkey Finisher/Maintenance 16% | Nutrena                  |
| KAN21-82M | Performance Rabbit                                    | Nutrena Naturewise       |
| KAN21-84M | Pig Feed 14%  | Nutrena - Country Feeds  |
| KAN21-86M | Dairy Focus Lactation Pellet                          | Cargill                  |
| KAN21-88M | Meat Bird 22% Crumble                                 | Nutrena Country Feeds    |
| KAN21-90M | Maintenance Diet                                      | Mazuri Waterfowl         |
| KAN21-93M | Total Bites for Cricket Feeder Insects                | Nature Zone              |
| KAN21-95M | Reptile Munchies Omnivore Mix                         | Zilla                    |
| KAN21-97M | GrainFree Hearty Turkey Stew - All Life Stage         | Whole Earth Farms        |
| KAN21-99M | Comfort Care All sizes                                | Royal Canin              |

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