SUMMARY OF FEED-THROUGH PESTICIDE RESIDUES IN DOMESTIC SURVEILLANCE AND IMPORT SAMPLES OF ANIMAL FOOD AND ANIMAL FOOD INGREDIENTS DURING FISCAL YEAR 2000 THROUGH 2018.

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Background:

Feed-through pesticides are typically incorporated into animal food; however, they have no direct effect on the animal. They move through its digestive tract relatively unchanged and are deposited in the animal's manure. These products contain pesticides that do not harm the animals themselves, but the pesticides instead act on their targets in the manure.

While the role of the Environmental Protection Agency (EPA) is to establish pesticide tolerances, or limits on the amount of a pesticide chemical residue a food can contain, the Food and Drug Administration (FDA) is responsible for enforcing these tolerances.

The Environmental Protection Agency (EPA) regulates pesticides under broad authority granted in two major statutes, the Federal Insecticide, Fungicide, and Rodenticide Act and the Federal Food, Drug, and Cosmetic Act. These laws have been amended by the Food Quality Protection Act and the Pesticide Registration Improvement Act.

- Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) - Requires all pesticides sold or distributed in the United States (including imported pesticides) to be registered by EPA.
- Federal Food, Drug and Cosmetic Act (FD&C Act) - Requires the EPA to set pesticide tolerances for all pesticides used in or on food or in a manner that will result in a residue in or on human or animal food. A tolerance is the maximum permissible level for pesticide residues allowed in or on human or animal food.
- Under the Food Quality Protection Act, of 1996, which amended both FIFRA and FD&C Act, the EPA must find that a pesticide poses a "reasonable certainty of no harm" before it can be registered for use on human or animal food. The EPA must review each pesticide registration at least once every 15 years.

The FDA, Center for Veterinary Medicine (CVM) has an active pesticide residue monitoring program that monitors a broad range of imported and domestic animal food commodities including ingredients and finished foods. The result of that program is the issuance of an annual report with the Center's findings. This report focuses on CVM's review of the pesticide data collected between FY 2000 - FY 2018 to look for the presence of pesticide residues associated with feed-through pesticides.

Currently, there are only four pesticides approved for use as a feed-through pesticide. These include,

- Methoprene is recognized by the FDA as a feed-through pesticide for use in cattle feed to control horn flies (See 40 CFR 180.1033; formerly 40 CFR 185.4150; formerly 21

CFR 561.282 for EPA tolerance). The product labels give a use level of 0.249 ppm or 11.3 mg/ 100 lbs. of body weight/day of the pesticide to maintain safe practices and avoid contamination in human food.

- Cyromazine is recognized by the FDA as a feed-through pesticide intended for the use in poultry feed (See 40 CFR 180.414 for EPA tolerance) with a maximum level of 5 ppm in complete feed. All manufacturers suggest a three-day withdrawal period before slaughter and that the infected manure should not be used as an animal food ingredient. Another commercial product also uses cyromazine with a suggested use rate of 300mg/horse/day and is intended for use only in horse food.
- Diflubenzuron is a feed-through pesticide approved for use in cattle, equine, and swine food (See 40 CFR 180.377 for EPA tolerance).
- Tetrachlorvinphos is a feed-through pesticide intended for use in cattle, equine, mink, and swine food (See 40 CFR 180.252 for EPA tolerance). It has a recommended use rate of 70mg/100lbs of body weight/day or 1.54 ppm for both cattle and equine. Swine and mink are also approved for use but at a lower use level.

Results:

A search on the above-mentioned feed-through pesticides was conducted utilizing the data in eLEXNET. Data for the past eighteen years, FY 2000 - FY 2018, were reviewed for the presence/detection of these four feed-through pesticides. While methoprene, cyromazine, and diflubenzuron only had positive samples after FY 2011, tetrachlorvinphos was tested for but not detected at any point after FY 2008. The data was compiled, and any reported residue level was compared to tolerance levels in Title 40 Code of Federal Regulations (CFR) as well as confirming that the feed-through pesticide was used for the approved species (animal food) given on the label. Results were as follows:

- Methoprene residues were detected in 45 samples between 2011 to 2018. While fourteen of the samples were classified as mixed feed rations including products used for poultry, swine, cattle, elk, and sheep, this feed through pesticide is only approved for use in cattle food. Even so, all recorded samples were classified by Office of Regulatory Science (ORS) as non-violative, lab class 1 (LC 1) with the highest level detected in a 2015 Poultry Mixed Feed Ration at 2.62 ppm which is compliant with the exemption from requiring tolerance found in 40 CFR 180.1033. The remainder of the samples were specialized products including ground and whole grain products as well as those not elsewhere classified (N.E.C).

- Although cyromazine was only found in animal food three times over the past eighteen years, all the samples were within tolerance with the highest level reported in poultry feed at 2.43 ppm. The regulation (40 CFR 180.414(a)(2)) shows that cyromazine has a tolerance of 5.0 ppm in or on poultry feed when used as a feed through pesticide. Interestingly, this same feed also showed a level of diflubenzuron at 0.025 ppm, which is not approved for use in poultry food. A dairy cattle feed sample was also tested and contained 0.03 ppm of cyromazine. A corn gluten feed sample contained 0.019 ppm.

Currently, cyromazine is only approved for use as a feed-through pesticide in poultry and equine foods, but it is not approved for use in cattle food.

- Diflubenzuron was detected in thirty-nine samples collected since 2012 with only three samples reported as a lab class 3 (LC3) and one as a lab class 2 (LC2). Nineteen of the 39 samples were described as mixed feed rations intended for use in poultry, equine, and cattle. Currently, diflubenzuron is not approved for use as a feed-through pesticide in poultry. However, 40 CFR 180.377 includes several limits dependent on the commodity used in production including a limit of 0.06 ppm in grains and even a zero tolerance in corn. Besides the violative samples, the maximum quantity was found at 0.582 ppm in hay tested from 2016. This resulted in an average of 10% of the samples being violative.

- Finally, tetrachlorvinphos was reported in twelve samples in the FACTS database between FY 2000 – FY 2008. There were three products that were reported as LC2 including swine and equine food; resulting in 25% of the samples being violative. Data that were found consistent with tolerances cited in 40 CFR 180.252 included mixed feed rations intended for use in swine and cattle.

Conclusion:

A review of the data available under CVM's pesticide residue monitoring program for the last 18 years, showed that feed-through pesticides were occasionally detected, but at levels that fell within EPA's established tolerances. During this time period, there were ninety-nine positive samples that were reported with only seven reported as being violative. This yielded a 14% ratio of violative samples to positive samples including four that were LC2 and three that were LC3. Although overall there was a low violation rate, several pesticides were found in non-approved animal food commodities, including methoprene in poultry, swine, elk, and sheep feed although only approved for use in cattle feed; cattle products containing cyromazine which is only approved for use in poultry feed; and poultry products containing diflubenzuron which is only allowed in cattle or equine products.

Overall, results in this report demonstrate that levels of feed-through pesticide residues measured by FDA in animal food and ingredients are generally in compliance with the U.S. Environmental Protection Agency's (EPA's) permitted pesticide tolerances and were used appropriately as per the species donated on a label. However, we recommend continued monitoring of feed-through pesticide residues in animal food and animal food ingredients to help protect both human and animal health.

References:

2018 Official publication: Association of American Feed Control Officials Incorporated. (2018). Champaign, IL: Association of American Feed Control Officials.

Electronic Code of Federal Regulations. (2018, June 14). Retrieved June 18, 2018, from https://www.ecfr.gov/

Elexnet, Electronic Laboratory Exchange Network, Food ... (n.d.). Retrieved June 18, 2018, from www.elexnet.com

Lundeen, T. (2017, October). Feed Additive Compendium. Retrieved from http://feedadditivecompendium.com/