Regulatory Services News

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Director's Digest

Hopefully, the winter of 2017-18 is finally over and spring is here. I had to put out hay for our cows on April 18 and that is the latest I can remember feeding hay in the 29 years we've had our farm. I'll have plenty of grading to do this spring as I have ruts so deep in my roads that the four-wheeler bottoms out when going out to the field. After being confined to indoor work for much of 2018 our inspectors are finally seeing a lot of fertilizer movement the second half of April and our soils lab activity has been later than in most years. The harsh winter makes us appreciate even more the arrival of spring and instills hope for a great growing season.

Instead of one topic this quarter, I have several short topics I would like to cover. As always, please email any of us at regulatory services if you have topics that would be beneficial for us to present. We want this newsletter to be informative for agribusiness in Kentucky.

The Importance of Social Media

A graduate student (Michelle Howard) at the University of Tennessee did her Master's Thesis (2015) on "The Effect of Social Media on Consumer Perceptions of the Beef Industry". There were several points brought out in her thesis that reconfirmed to me the necessity of those in the agriculture industry utilizing social media to promote what we do and tell the true story when others on social media criticize us.

It seems like the internet has been around for a long time but it actually only opened to the public on August 6, 1991. It was only available to those with university, government or military affiliations for the first few years. The first Internet Service Providers (ISP's) began servicing major cities in 1994. For many of us in rural areas, we have had internet service at home for less than 20 years and it is still not available in some places.

Social media is even newer. Mark Zuckerburg launched Facebook in 2004 to Harvard University students only and by 2008 it became the leading social platform nationally. Twitter has become another leading social site but is limited by the number of characters you can use so is somewhat of a mini-blog. While only 10 years old, Facebook has become a major source of news for many people. A Pew Internet and American Life Project found that 78% of adults in the United States read about the news on Facebook.

Many of us are baby boomers (born between 1946-1962) and for a long time have been the largest generation. However, Millenials (born between 1981-2002) now number 75 million (27% of the population) and outnumber the living baby boomers. This generation is also known as Generation Y or the

Continued on page 3

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Digital Natives. They have always had television, cell phones, text messaging and social media. Eighty -nine percent of millenials rely on social media to stay connected with family and friends. Millenials rely more on Facebook and Twitter for their news than traditional sources such as television news programs or newspapers. This generation is also more removed from the farm than previous generations. When it concerns agriculture, they will have more difficulty discerning real news from "fake news".

An example of the effect that social media can have on our industry is the "pink slime" debacle from 2012. Lean finely textured beef (LFTB) is a product made from the trimmings of muscle cuts such as sirloin or ribeye and is between 94-97% lean beef. It has been successfully and safely used in ground beef since 1991. It does not contain any filler materials and is treated with ammonium hydroxide to inhibit bacterial growth. Ammonium hydroxide has been used in food processing for baked goods, cheese, chocolate and pudding since 1974 with approval of the Food and Drug Administration. LFTB is mixed with other beef trimmings to adjust the lean to fat ratio in ground beef. It adds to the flavor of the ground beef, while making it more available and less expensive. When an ABC News report was shared on social media coining the term "pink slime" for LFTB and calling it dog food; the public outcry led to several repercussions. Three of four plants that manufactured LFTB were closed with over 600 jobs lost, the USDA ended the use of LFTB in school lunches, and producers removed it from commercial sale.

As part of her thesis work, the author surveyed 300 students on the UT campus. The survey participants ranged in age from 18-28 and appeared to me to have more of an agriculture background than the majority of people that age. They utilize social media at a rate typical of millenials. They have come to believe the information on social media to be relatively reliable and use it to form opinions. In the case of "pink slime", the majority of survey participants indicated their perception of the industry was negatively affected by the information they received on social media. This effect was seen in the participant's short- and long term buying and eating habits. The beef industry did not respond effectively to the accusations of an unsafe product and suffered severe consequences.

The thesis author provided two recommendations for agribusiness that I strongly agree with:

1. Industry communicators should consider current industry representation on social media and identify ways to proactively supply information to consumers.
2. Industry communicators should identify social media platforms and other media outlets that can be used to reach consumers and provide information proactively and reactively.

Contributions of the Animal Feed and Pet Food Industries to the Economy

If you haven't seen it, AFIA released a report in October on the economic contributions of these industries. The contributions are significant and this is the kind of information we need to share with consumers and public officials at the local, state, and federal level. This sixty-one page report goes so far as to provide the results on a congressional district basis. The table below shows results for Kentucky versus national numbers. **Value added** is a component of total sales that subtracts from total sales the costs of inputs (i.e. grains). It includes labor income, taxes on production and imports, and other property-type income.

	United States	Kentucky
Total Sales	$297.1 billion	$5.9 billion
Value Added Sales	$102.0 billion	$1.7 billion
Labor Income	$55.9 billion	$964.0 million
Jobs	944,227	18,792
Local, State and National Taxes	$22.5 billion	$402.98 million
Feed Consumption by Species		
Broilers	56,283,241 tons	1,771,855 tons
Beef Cattle	74,673,636 tons	792,092 tons
Hogs	46,347,318 tons	278,642 tons
Layers	16,353,189 tons	226,912 tons
Horses	8,016,528 tons	206,198 tons

Continued on page 4

Directors Digest, continued

Nationally, beef cattle consume the highest amount of feed but in Kentucky it is broilers. As you might expect, horses consume a higher proportion of total feed produced in Kentucky versus the nation.

There is valuable information in this report when discussing the contributions of animal and pet food manufacturing in your area. We should all be thankful to AFIA for pulling this information together and providing it to everyone.

Thank You for Your Support

As most of you know, a contentious 2018 legislative session recently came to an end. What some may not know is the initial proposed budget did not provide funding for Regulatory Services or the Veterinary Diagnostic Labs at UK and Murray. Several of us from the College of Agriculture, Food and Environment made multiple trips to Frankfort to discuss the importance of our work to the farmers and consumers of Kentucky. The final budget did provide full funding for us and the diagnostic labs.

I am very thankful for the strong support we received from the College of Agriculture, Food & Environment and many members of the legislature who realize the importance of agriculture in this state and the work that Regulatory Services does. I am also very grateful for the words of encouragement and strong support that we received from several members of the agribusiness community. Having worked in the feed industry for 23 years, I realize that dealing with regulations isn't a fun part of the job. I was happy to hear that many of you realize that the industry would not perform well unregulated and appreciate that the UK Division of Regulatory Services has always treated agribusinesses fairly. I also appreciate the support for our service functions of soil and seed testing.

A heartfelt Thank You to all and I look forward to a strong relationship over the coming years.

Dr. Darrell Johnson
Executive Director

Seed Laboratory Update

Although you cannot tell it at this time, spring and summer are coming! And along with them, will be the harvest of small grains in Kentucky. Starting around the end of June, the seed lab starts to see the first trickle of small grain samples coming in for testing. While most growers and producers request the standard germination test, seed count per pound, or the standard complete test (purity, noxious, and germ); some opt to add TZ testing to their samples. While germination evaluates seedling growth and development, TZ detects signs of life or metabolic activity in the seed. This test is offered by the lab to measure respiration activity and determine seed viability. However the customer should realize that TZ tests cannot be used in the place of germination percentage results, due to the limits of the test, as TZ does not measure the capacity of growth speed, normal cell division or dormancy.

The test uses the chemical 2,3,5- triphenyl tetrazolium chloride (TZ) to stain essential seed structures. The seed must be hydrated to start the process of respiration. Then the TZ reacts with enzymes release during respiration, staining the essential seed structures a red color. TZ testing can be done on virtually any seed, AS LONG AS THE ANAYLYST HAS EXPERIENCE AND USES SANCTIONED GUIDELINES FOR THE SPECIFIC SEED KIND FOR EVALUATION.

Customers often request the TZ test, to get a general idea of their seed lot viability. The TZ test is quicker (most of the time) than waiting the allotted amounted of time for a germination test on a sample. The test must be performed on pure seed, which can be obtained from the sample and different seed kinds require different methods of preconditioning and preparation. Small grains are a fairly large seed and can be prepared by placing in damp germination towels overnight. The next day, they are bisected longitudinally, through the embryo, and placed in a .01% solution of TZ and

allowed to soak for a period of time (usually for 2-3 hours) for staining to take place. The seed's staining pattern of essential structures are examined and evaluated by an experienced analyst, using the AOSA /SCST Tetrazolium Testing Handbook for evaluation guidelines. The seeds are then designated as "viable" or "non-viable". A percentage of viable seed is determined for the sample and that percentage is what is reported under "Other Determinations" on the laboratory report. TZ testing can also be used in conjunction with germination testing to determine dormant seed. This usually applies to seed such as native grasses and forbes. At the end of the prescribed germination test, those seeds left, that are not viable, abnormal or dead, can be tested using TZ. This does not normally apply to small grains in Kentucky, except for the occasional barley sample. Some barley lots can have a deeper dormancy that prechill, predry, and/or TZ cannot detect, when seed is newly harvested.

Smaller seeds, those with a less permeable seed coat, or seed that are deeply dormant, will take considerably more time and effort by the analysts to precondition, prepare, stain and evaluate. While the TZ test provides viability information, there can be issues with the test. Such issues include, but are not limited to; embryo size, tissue texture, staining pattern and color, and artifacts caused by damaging tissue when cutting the seed. Other issues include the analyst's proficiency of the seed kind being tested and the quality of the seed lot. If the seed analyst is not familiar with the seed kind being tested, and /or quality of the seed lot is low, the evaluation becomes much more difficult and time consuming.

This is just one of the many tests that the seed laboratory offers to our customers; that aid in providing as much information as possible on seed lots.

So, when sending in your seed samples to the lab for testing, please indicate the requested tests, along with your name, address, email address, seed variety, seed kind, and lot number.

Tina Tillery
Seed Laboratory Supervisor

Feed Facility Inspections under Food Safety Modernization Act Regulations

The Food Safety Modernization Act (FSMA) was signed into law in 2011 but it has taken a few years for regulations to be finalized and for the impact of this legislation to be felt throughout the feed industry. The two major regulations that affect animal feed are under Preventative Controls for Animal Food (21 CFR Part 507). Good Manufacturing Practices (GMP's) are covered under Subpart B and Hazard Analysis and Risk-Based Preventative Controls (PC's) are under Subpart C. Given that the feed industry would be required to implement both GMP's and PC's and that these are new concepts for the industry, the Food and Drug Administration (FDA) staggered compliance dates for both based on the size of the business. The final compliance date for Good Manufacturing Practices is September 17, 2018. Effectively, what this means is that all facilities, regardless of size, that manufacture, process, pack, or hold animal food will need to comply with these GMP regulations by this fall. This article and a subsequent article in our next newsletter will focus on what is covered in these new GMP's and how this will impact a feed facility inspection. Preventative controls will be discussed in more detail in future articles.

FSMA is federal law and 21 CFR Part 507 is federal regulation but our inspectors will play an important role in the inspection process to verify compliance with these new requirements. Under contracts with FDA, our inspectors have conducted inspections to verify compliance with BSE regulations and manufacture of medicated animal feed. It is important to note that the new regulations under 21 CFR Part 507 are the first federal guidelines on the manufacture and holding of **non-medicated** animal feed. This spring, our inspectors completed 8 Part 507 GMP inspections as part of our contract with FDA. By fall, we will have a total of 9 inspectors

Continued on page 6

trained to conduct these inspections and expect to complete another 15-20 inspections this fall and winter. We do work with our FDA district office to make sure we are not subjecting firms to inspections by both FDA and our state inspectors. Our philosophy is that the more inspections we conduct on a state level, the fewer inspections FDA will need to perform in Kentucky.

Good manufacturing practices are those considered by FDA as being "necessary to prevent animal food from containing filthy, putrid, or decomposed substances, being otherwise unfit for food, or being prepared, packed, or held under insanitary conditions whereby it may have become contaminated with filth, or whereby it may have been rendered injurious to health." These practices establish the baseline standards for the production of safe animal feed and the creation of a Food Safety Plan. Good manufacturing practices are not a new concept and have been required for the manufacture of medicated feeds for 40 years. 21 CFR Part 225 is the set of federal regulations that are followed in the production of medicated animal feed and still remain in place. There are components of medicated GMP's that are similar to the Part 507 GMP's particularly with respect to buildings, grounds, and equipment.

Animal feed manufacturing facilities may already have programs in place to utilize best practices or prerequisite programs. These could include employee training, preventative maintenance, cleaning schedules, Standard Operating Procedures, and quality assurance programs. While these programs may be designed to maximize product quality, personnel safety, or efficiency, they may also set standards that meet the requirements of the Part 507 GMP. Some facilities may have proactive programs in place related to food safety including HACCP, ISO 22000, PAS 222, and Safe Feed/Safe Food. Ultimately, the goal is that facilities will meet all the requirements of 21 CFR Part 507 and FDA structured the regulations to have flexibility in how these requirements are met.

The 8 sections in 21 CFR Part 507, Subpart B will be discussed in a future newsletter and include:

1. Personnel
2. Plant and grounds
3. Sanitation
4. Water supply and plumbing
5. Equipment and utensils
6. Plant operations
7. Holding and distribution
8. Holding and distribution of human food by-products for use as animal food

All businesses involved in the production of animal feed strive to make products that are safe for animals and produced and stored under conditions that minimizes contamination. The practices already in place that ensure consistency, quality, and safe products, will, with the majority of facilities, meet these new regulations. Keep in mind that the initial inspection for compliance with GMP's under Part 507 will focus on education. It is not expected that facilities, particularly smaller scale mills, will meet all these requirements in their first year of being under the regulations. The flexibility built into these GMP regulations allows application to a variety of animal feed production facility types. Compared to Part 225 GMP's for medicated animal feed, the Part 507 GMP's are much less rigid and include phrases such as "when necessary" or "as appropriate".

In our next newsletter, we will review the individual sections of the Part 507 Good Manufacturing Practices and how these will be covered during inspections.

Dr. Alan Harrison,
Director of Feed and Milk Programs

Relative Value in regard to Ammonium Sulfate

When conducting an analysis of fertilizer, our Division reviews two items. The first is a comparison of the nutrient concentration with respect to the Investigational Allowance. This is an allowance, or range, around the guarantee that the nutrient has to fall within to pass. The second is an evaluation of the Relative Value (RV). RV is monetary value of NPK fertilizer from laboratory analysis compared to monetary value based on the guarantee. An example calculation follows:

An Ammonium Sulfate fertilizer is guaranteed to contain 21% N and we find it contains 20.85%. A "Guaranteed Value" and a "Found Value" are computed for the fertilizer by using the following calculations:

Commercial value for Nitrogen is $8.55 per unit (one percentage point or 20 lbs) of N. The "Guaranteed Value" is calculated as follows:

21.0 % N x $ 8.55 = $179.55

Total "Guaranteed Value" is $179.55 per ton of fertilizer.

The same procedure is followed for the "Found Value,"

20.85 % N x $8.55 = $178.27

Total "Found Value" is $178.27 per ton of fertilizer.

The relative value (RV) is then computed by dividing the "Found Value" by the "Guaranteed Value" and multiplying by 100.

RV = (178.27/179.55) X 100 = 99.29%

A fertilizer sample is deemed as passing as long as the nutrient concentration falls within the Investigational Allowance for that nutrient and the RV is 97% or above. This spring we have noticed that several Ammonium Sulfate (AS) samples are passing for the Nitrogen content but falling below 97% for RV. Fertilizer material samples do not fail very often unless they are contaminated with another material. Further investigation showed that the samples were not contaminated but had varying characteristics. We found that AS samples varied in color as well as in prill size. Pictures on page 8 show the varying colors and sizes. So far this year we have analyzed 35 samples of AS. Figure 1 shows the 35 samples and their corresponding RV and the different colored lines indicate their color and size. From this figure we can see that the small white prills have the greatest tendency to fall under the 97% RV threshold. The off white prills and dark tan prills have a tendency to be closer to a value of 100% RV.

Although the color of the AS cannot determine whether a deficiency of RV will occur or not it appears to be a good indicator for this year's spring sampling.

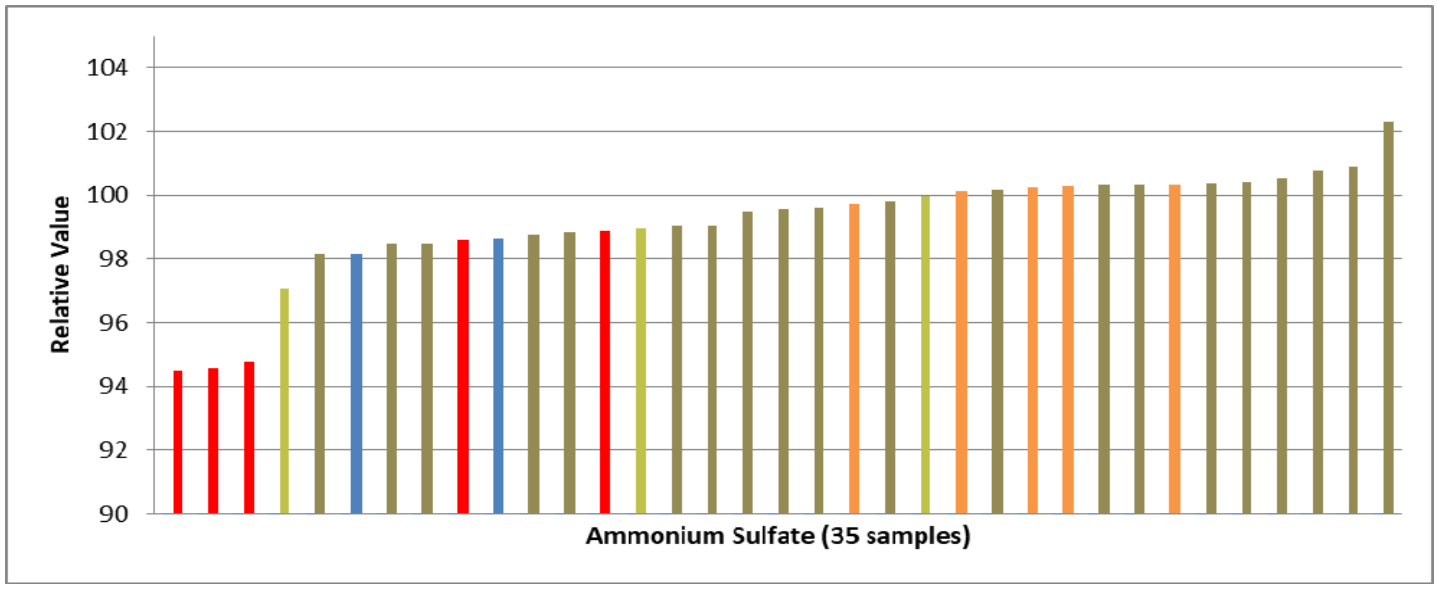

Figure 1. Small White Prills Off White Prills Dark Tan Prills Gray Rock Large Yellow Prills

Continued on Page 8

Small White Prills

Dark Tan Prills

Large Yellow Prills

Gray Rock

Steve McMurry
Director of Fertilizer and Seed Programs

Fertilizer recommendations from Soil Testing

Sending a soil sample to a laboratory for analysis will provide a report with concentrations of various nutrients that are related to what is available to plants. This information is used by laboratories to provide practical values on how much fertilizer nutrient to apply. There are differences in how laboratory data is interpreted to provide fertilizer nutrient recommendations. These differences are often referred to as soil test philosophies.

There are three major philosphies used in making recommendations and they are given names of sufficiency, build-up, and maintenance. In the sufficiency approach, data from field studies are used to determine how much fertilizer nutrient, at a particular soil test result, is needed to increase yield to a level just slightly below maximum yield achievable. Any yield increase above this level would not return an economic value in excess of the cost of fertilizer applied. This application rate is referred to as the economic optimum level. The build-up approach recommends fertilizer nutrient to increase soil test values to a certain level. For Kentucky soils, approximately 10 lbs P_2O_5 per acre and 4 lbs K_2O per acre are required to increase soil test P and K by 1 lbs/acre, respectively. The maintenance approach has fertilizer nutrients applied to maintain soil test values at some level. The amount of nutrient removed in the harvested portion of the crop is recommended to be applied. The sufficiency approach focuses on the plant. The latter two approaches focus on the soil with the build-up approach having fertilizer applied to increase soil test levels and the maintenance approach having fertilizer applied to maintain soil test levels.

The sufficiency approach normally results in lower nutrient recommendations and thus a lower fertilizer cost while the other two approaches normally result in higher nutrient recommendations and higher fertilizer cost. The UK Soil Testing Laboratory utilizes an approach that considers both sufficiency and build-up philosophies. A little extra is recommended beyond the sufficiency approach to increase soil test levels. University soil test laboratories normally have lower recommendations compared to private labs because the recommendation philosophy is strongly dependent on the sufficiency approach where economically optimum recommendations are made to maximize plant growth. If no yield is expected due to a high soil test result, fertilizer nutrient is not recommended. The UK soil test nutrient recommendations can result in considerable savings to a producer's fertilizer cost when compared to a private lab's recommendations.

Dr. Frank Sikora
Director of Laboratories and Soils Program

Upcoming Meetings

Milk Advisory Board for UK Division of Regulatory Services
May 24, 2018
UK Good Barn

American Association of Seed Control Officials
July 15-19, 2018
Des Moines, IA
http://seedcontrol.org/meetings.html

American Association of Feed Control Officials Annual Meeting
July 29-August 1, 2018
Ft. Lauderdale, FL
www.aafco.org/Meetings/Annual/2018

American Association of Plant Food Control Officials Annual Meeting
August 1-4, 2018
Ft. Lauderdale, Fl
http://www.aapfco.org/meetings.html

Kentucky Agriculture Experiment Station Annual Report

Each year we prepare a report on our activities for the previous year for the Kentucky Agriculture Experiment Station Annual Report. Hopefully, you will find this information of interest. In this issue we feature the Milk Program, Soils Program and Seed Regulatory Program.

Milk Regulatory Program

The mission of the milk regulatory program is to ensure raw farm milk produced and marketed in Kentucky is bought and sold using accurate weights and tests. The program's primary function is to monitor milk handling systems from the time a producer's milk is sampled and weighed, through delivery and laboratory testing, until producer payments are calculated. The program provides support to the producers and processors of Kentucky's dairy industry. Industry participants are trained, licensed and subsequently monitored to maintain compliance with the law.

In addition to regulatory functions, the milk program cooperates with other agencies in educational projects to provide a variety of services to Kentucky dairy producers, processors and allied industries. Our laboratory provides milk testing services to support research projects within the College. The milk program also operates a laboratory that is available for Kentucky producer, processor and handler service testing and cooperates with both USDA and FDA to provide analytical services when the need arises.

2017 Highlights:

- Reviewed applications and issued licenses to 1 transfer stations, 27 milk handlers, 16 laboratories, 71 technicians, and 290 sampler-weighers (milk-haulers, receivers and samplers).
- Collaborated with Kentucky Cabinet for Health Services Milk Safety Branch to train sampler-weighers and processor receiving personnel. Trained and examined 38 sampler-weighers and 8 technicians.
- Conducted 8 pay-record and 15 raw milk receiving audits.
- Conducted 36 milk laboratory inspections.
- Conducted 307 sampler-weigher inspections and analyzed milk samples from 1,832 dairy herds to evaluate sampler-weigher performance and ensure accurate producer payments.
- Administered a monthly milk lab quality control check sample program through the distribution of samples to the 16 licensed laboratories and 2 other labs to ensure accurate component-analysis procedures.
- Provided analyses for Kentucky small processor cheese makers (43 samples).
- Our division provides a unique service to dairy producers by reproducing bulk tank calibration charts. In 2017, we created charts for 39 dairy producers including 15 KY producers (at no charge).

Soil Testing Laboratory

Soil testing provides agricultural producers, homeowners, greenhouse operators, and others with valuable information on the fertility status of their soils or greenhouse media. The laboratory works in close partnership with the University of Kentucky Cooperative Extension Service to provide laboratory results along with lime and fertilizer recommendations. The philosophy behind our recommendations is to optimize economic benefit to the producer by maximizing crop yield, minimizing input costs, and maintaining fertile soil. We also offer analyses of animal wastes and nutrient solutions used to supply nutrients to agronomic and horticultural crops.

The laboratory supported research programs throughout the UK College of Agriculture with 6,483 samples tested at a cost of $112,000. Our analyses help support research that improves on information to benefit crop production and environmental stewardship.

The soil test web site is at soils.rs.uky.edu. The number of samples analyzed in 2017 with the percent change from 2016 is shown in the table on the next page.

Type	Number	% change
Agriculture	28,963	-12
Home lawn and garden	9,893	7
Commercial horticulture	1,067	23
Greenhouse media	115	117
Atrazine residue in soil	17	-11
Animal waste	289	-26
Nutrient solution	74	-13
Soil nitrate	30	-87
Research samples	6,483	-3
TOTAL	46,931	-6

Seed Regulatory Program

The seed regulatory program ensures Kentucky farmers and urban consumers of quality seed while promoting fair and equitable competition among seed dealers and labelers through inspection and analysis of products found in the marketplace. The Division, which administers and implements the Kentucky Seed Law, promotes compliance through facility inspections, sampling and analysis of seed offered for sale. The law requires proper labeling of seed which includes kind, variety and lot designation, purity percentages, noxious weeds, origin, test date and a germination guarantee. The Division is also responsible for maintaining registration of seed labelers, seed conditioners, and seed dealers in the state.

2017 Highlights:

- Conducted 940 visits to perform inspections and to sample agricultural, lawn, turf, and garden seeds at Kentucky seed processing, wholesale and retail locations.
- Collected and tested 1,773 official seed samples.
- Issued stop-sale orders on 285 official seed samples and 52 violative seed lots at seed dealer and seed processor locations.
- Cooperated with the USDA-Seed Branch regarding shipments of seed into the state that was in violation of the Federal Seed Act.
- Reviewed and issued 218 permits to label agricultural seed and 57 permits to label vegetable and flower seed.
- Registered 640 seed dealers and 31 non-certified custom seed conditioners.
- Provided training to firms on labeling requirements, retail sales procedures, stop sale release procedures, and record keeping requirements.

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