Red Dragon™ Poultry House Flame Sanitizer

Effective, inexpensive poultry house pathogen control

Poultry house sanitation is essential to prevent and control diseases that decrease bird weight gains and livability. To destroy disease-causing pathogens, producers sanitize poultry house litter, the bedding material that covers poultry house floors.

Producers often sanitize litter using acids or chemical disinfectants that destroy spores, worm eggs, fungi, and viruses such as avian influenza. Both acid and chemical treatments have drawbacks. Acids can be effective, but they are expensive and may cause unwanted side effects (see sidebar). Chemicals can be ineffective in organic litter, leaving residues that make pathogens resistant to treatment. Chemicals can also be expensive, difficult to apply, and harmful to soil and groundwater.

Propane-fueled flame sanitization is a new technique that offers effective, affordable, environmentally friendly poultry house treatment that may be incorporated into a comprehensive sanitation program. Using extreme heat rather than chemicals, it kills pathogens and burns off toxic ammonia, resulting in a healthier environment for the incoming flock.

Propane-fueled poultry house sanitization offers an important avenue for increasing agricultural demand for propane. If 10 percent of broiler producers were to use propane flame sanitization, propane consumption would increase by 2,500,000 gallons per year.

Project Description

The Propane Education & Research Council supported two key research projects to boost commercialization of propane flame sanitization technology. First, the *LP GAS for Weed and Nematode Control* (**Docket 10557**) study confirmed that propane flame is an effective pathogen killer. Based on the study's success, Flame Engineering, Inc., commercialized the Red Dragon™ Poultry House Flame Sanitizer. The *Poultry House Sanitizer/Landscape Flamer* (**Docket 11391**) project was a follow-up study led by Flame Engineering, Inc. A current research study, *Poultry House Sanitation to Reduce Pathogens* (**Docket 12026**), led by the University of Missouri, will explore the Red Dragon sanitizer's efficacy in destroying pathogens in various kinds of litter and on bare floors in both turkey and broiler houses.

Flame Sanitation Safer than Acid Treatments

While acids may achieve favorable poultry house sanitization results, acid treatments can have several undesirable side effects.

Acid treatments such as sulfuric acid and aluminum sulfate minimize pathogens by reducing floor pH to a level that is hostile to pathogens. This low-pH environment corrodes steel, which damages the poultry house structure, and renders the litter unsafe for reuse on fields.

In addition, acid treatments are expensive, in some cases costing up to $500 per house, while comparable propane flame treatments cost as little as 10 to 20 percent of that amount.

Propane Flame Sanitizer

The Red Dragon sanitizer uses six liquid propane torches to project 2,000°F (1,093°C) flames under a steel hood. The flames' extreme heat burns off ammonia and kills pathogens by rupturing their cell walls.

The sanitizer connects to a tractor's three-point hitch and 12-volt electrical system. Fueled by a 120-gallon propane tank, the sanitizer operates at one-half mile per hour and uses approximately 30 gallons of propane to treat a 20,000-square-foot house. An equivalent chemical treatment would require about 2,000 pounds of chemicals and be two to five times more expensive than propane treatment.

Project Objectives

Specific project objectives include

- Measuring the Red Dragon sanitizer's effectiveness in reducing yeast, mold, E. coli., coliform, salmonella, aerobic bacteria, and other pathogens in rice hulls, sawdust, synthetic litter, and bare floors
- Measuring ammonia reduction after flame treatment
- Testing the sanitizer's effectiveness in controlling weed growth in various turf applications (including golf courses and schoolyards)

A research team at the University of Missouri is currently testing the effects of a single, double, and modified double treatment where the litter is tilled between testing.

Preliminary Project Results

Preliminary data from the University of Missouri clearly reveals that the flame procedure reduces the number of tested microorganisms substantially. All treatments reduced aerobic plate counts, coliform counts, and mold counts. In general, microbial reductions were greater on the surface of the litter when compared to reductions of total litter samples.

Other research has found that treatment with the sanitizer also boosts bird health. It can reduce ammonia concentrations to 10 to 12 ppm (an acceptable ammonia level is approximately 25 ppm). It also improves livability, allowing producers to bring more birds to market.

In addition, the Red Dragon sanitizer was used in Texas after an outbreak of avian influenza in 2004. Houses cleaned with the sanitizer experienced no reoccurrence of the avian flu in 2005.

Project Status: In Progress

This project is ongoing and further analyses of microbial counts and performance data will be forthcoming.

Features and Benefits

Propane flame sanitization provides significant benefits over conventional chemical and acid treatments:

- Increases effectiveness of treatment (pathogens cannot become resistant to intense heat)
- Reduces cost of treatment
- No run-off, residues, or soil contamination
- Eliminates the risk of chemical spills or mixing errors
- Boosts bird health by reducing ammonia levels
- Allows safe reuse of litter as bedding or fertilizer
- May be used on organic farms

January 2008

For More Information:

Propane Education & Research Council
Mark Leitman
Director of Agriculture Programs
1140 Connecticut Avenue, Suite 1075
Washington, DC 20036
202-452-8975

www.propanecouncil.org/rd
www.usepropane.com
www.agpropane.com

Project Partner:

Flame Engineering, Inc.
Steve Koch
Director, Agriculture Division
West Hwy. 4
LaCrosse, KS 67548
800-255-2469
steve@FlameEngineering.com