Food Safety Starts at the Farm: How Dispensers Can Help

A guide to selecting the system that's right for your farm

Table of Contents

Consumers demand less antibiotics in food

The use of certain antibiotics within the farming industry can have an adverse effect on consumer health. In fact, using antimicrobial medicines to treat farm animals is suspected to be one of the leading causes of the rise of superbugs.[1]

Consumer demand around what goes into the food we consume is also changing. A survey by Consumer Reports found 72 percent of people were extremely or very concerned about widespread use of antibiotics in animal feed.[2] Reducing antibiotic use on farms is a growing trend and requirement in the U.S. and other countries. A systematic review from *The Lancet Planetary Health* found that interventions that restricted antibiotic use in food-producing animals reduced antibiotic-resistant bacteria in those animals by 39 percent.[3]

As the industry reduces its reliance on antibiotics, farmers are looking for other ways to maintain animal health. To limit antibiotic use, it's important to have the right tools and equipment that prioritize farm sanitation and animal health, such as the correct chemical dosing equipment and pumps.

To ensure success in the growing non-antibiotic era, farmers must understand the benefits of water-driven pumps (WDPs), dispensers and other helpful equipment, as well as best practices for using these solutions.

New regulations: How will farming change?

The U.S. Food and Drug Administration (FDA) recently introduced a new regulation that requires a prescription from a veterinary feed directive to administer antibiotics in feed and water.[4] Now, antibiotic use must be authorized by a vet and should only be administered for prevention, control or treatment. It is also now illegal for farms to use antibiotics for production purposes, such as growth promotion and feed efficiency, without a specific diagnosis.[5] The only time healthy animals should receive antibiotics is to prevent disease if it has been diagnosed in the same population.[6]

These recent changes coincide with a shift in consumers demanding more alternative options. According to a recent study by Consumers Union, 86 percent of consumers think meat raised

[1] https://www.theguardian.com/environment/2017/nov/07/farmers-must-stop-antibiotics-use-in-animals-due-to-human-health-risk-warns-who
[2] https://www.wsj.com/articles/meat-companies-go-antibiotics-free-as-more-consumers-demand-it-1415071802
[3] http://www.who.int/news-room/detail/07-11-2017-stop-using-antibiotics-in-healthy-animals-to-prevent-the-spread-of-antibiotic-resistance
[4] https://www.agriculture.com/livestock/cattle/the-new-rules-of-feed-antibiotics
[5] https://www.fda.gov/AnimalVeterinary/DevelopmentApprovalProcess/ucm449019.htm
[6] http://www.who.int/news-room/detail/07-11-2017-stop-using-antibiotics-in-healthy-animals-to-prevent-the-spread-of-antibiotic-resistance

without antibiotics should be provided at their local supermarket, and 61 percent of consumers are willing to pay an extra cost for antibiotic-free meat.[7]

To keep up with demand, farmers have begun to seek out alternatives to antibiotics to prevent diseases in animals and improve farm hygiene.[8] One of the most common ways to replace antibiotics is to use direct-fed probiotics. Other changes involve utilizing enzymes, prebiotics, oligosaccharides, organic acids and phytogenics.

Highly-aggressive chemicals (HACs), specifically organic acids, deliver efficacy and safety, address specific feeding requirements and can even protect against reactivated Salmonella. A study from the *International Journal of Poultry Science* found that organic acid treatments for drinking water significantly reduced Salmonella contamination in chickens.[9]

Organic acids and other HACs have been used in poultry diets for decades, eliciting a positive response in growth performance while decreasing pathogenic bacteria.[10] Adding organic acids to drinking water reduces the level of pathogens in water, regulates gut microflora and increases digestion of feed to improve growth performance without contributing to antimicrobial resistance.[11]

Ensuring Animal Health between Cleaning Cycles

Healthier animals result in fewer treatments, which reduces the need to cull or quarantine any animals that can impact a farm's profitability. Even when animals are healthy, there is a high probability this could change as animals grow and move around the farm. According to the World Health Organization (WHO), crowded and unsanitary farm conditions, in addition to other factors like the overuse of antibiotics and toxins in feed diets, lead to global health risks for animals and humans like E.coli**,** *Campylobacter* and Salmonella. [3]

Livestock and poultry need to have a safe place to drink, eat and rest without encountering harmful bacteria or viruses. When livestock is removed from one area of the farm and placed in another to make room for new animals, it's critical these areas are properly cleaned and sanitized. If cleaning is forgotten or done incorrectly, this can greatly increase the risk of organic material contaminating other animals.

[7] https://www.forbes.com/sites/daniellegould/2012/06/26/survey-reveals-growing-consumer-demand-for-antibiotic-free-meat/#223a62a87ce1
[8] http://www.who.int/news-room/detail/07-11-2017-stop-using-antibiotics-in-healthy-animals-to-prevent-the-spread-of-antibiotic-resistance
[9] https://scialert.net/abstract/?doi=ijps.2012.482.487
[10] https://www.tandfonline.com/doi/full/10.1080/09712119.2015.1079527
[11] https://www.tandfonline.com/doi/full/10.1080/09712119.2015.1079527

The process of cleaning areas between growth cycles is critical to maintaining health on the farm. Once all dry organic material is removed from the house, areas should be thoroughly cleaned, including:

- **Equipment**. Take any equipment that cannot be cleaned with water, such as light bulbs, and clean it as recommended before returning it to the house. For equipment that can be hosed down, make sure to use a foam detergent, leaving it on surfaces for the specified time and then rinsing thoroughly.

- **Air inlets.** To avoid contaminants like mold, mildew and dust from being introduced through ventilation systems, clean any residue from the inside of air inlets.

- **Floors.** From muddy hooves to spilled food, barn floors quickly become dirty. Make sure to sweep floors thoroughly to remove excess materials. After removing litter, spray floors with water and disinfectant to remove microbes.

  Unfortunately, many barns and stalls are lined with porous wood or have dirt or sand floors which are impossible to disinfect completely. To better protect livestock, consider installing concrete flooring when possible.

- **Walls**. Rinse walls with high-pressure water from top to bottom and then apply a disinfectant with low-pressure water. After walls have been cleaned, ventilate the house to remove any strong chemical fumes and dry all surfaces.

- **Feeding bins.** Remove any leftover feed from feeding bins and clean out bins with the proper disinfectant.

- **Storage facilities.** Storage rooms that house any dead animals must be cleaned between each use to remove any harmful pathogens. Similar to floors, walls and equipment, make sure the whole room is properly cleaned and sanitized with a foam sprayer and rinsed thoroughly.

- **Water lines.** Over time, groups of potentially harmful microorganisms called biofilms can build up in drinking and medicating water lines, attracting diseases like *E. Coli* and Bordetella. It's important to not only ensure your equipment can handle chemicals currently being used for medications and vaccinations, but to also sanitize and de-scale water lines between every growth cycle.

No matter the growth cycle stage, clean water is essential to ensuring animal health. As the movement away from using human health-oriented antibiotics takes off, farmers focus more on the importance of having a clean water supply. On farms, water often comes from ponds and

wells, in addition to a public water supply in certain parts of the world, making it extremely difficult to have a clear understanding of the state of the water quality. Agriculture accounts for 70 percent of water abstractions worldwide, and plays a large role in water pollution due to discharging organic matter, drug residues, sediments and saline drainage into nearby water bodies.[12] Due to this, it's essential that farms treat drinking water for the sake of animal and consumer health.

Local water sources are prime candidates for harmful bacteria to grow, and without the presence of antibiotics to kill off bad bacteria in the gut, farmers need to kill dangerous germs before it is ingested by animals. Consider the fact that the water humans drink goes to a water municipality processing plant to be treated before it reaches consumers. During this process, water undergoes several improvements, including the addition of helpful chemicals that remove harmful bacteria. On farms, it's important to use the same process, but on a much smaller scale.

Inside of barns, farmers should install the proper equipment to sanitize water that is pumped out of the ground. Electric diaphragm pumps like the new Hydro Xtreme product inject chemicals like chlorine dioxide, sodium hypochlorite and hydrogen peroxide into the water, which kills bad bacteria before it reaches any animals.

Utilizing the Right Biosecurity Tools

As the transition away from antibiotic use for growth purposes takes root, farms are focusing on other key tasks like water treatment and elevated biosecurity. However, not all farm cleaning equipment was made to dispense and dilute harsh chemistries like HACs. Now that antibiotics and other chemicals are being phased out in favor of HACs, equipment should be updated accordingly.

To ensure animal and consumer health is top priority, look for the following equipment:

- **A reliable dispenser**. Dispensers can help de-scale water lines and kill algae by diluting chemicals to the lean proportions necessary to care for the water lines and reduce the amount of cleaning needed. This equipment can also deliver medication, vitamins, electrolytes, probiotics, organic acids and vaccines to animals through drinking water systems. Dispensers can also enhance productivity and generate labor savings through accurate dosing with each use.

[12] http://www.fao.org/3/a-i7754e.pdf

There are many different types of dispensers used on the farm, including teat dip cup and bucket cleaning, that make it easy and cost effective to dilute chemicals at the push of a button.

- **A compatible dispenser or pump.** Animals require clean, hygienic drinking water. However, not all farms have access to ideal water conditions and often must rely on ponds or wells. The use of a proper dispenser or pump help ensure animal health, support cleanliness and protect water lines and equipment through proper dilution. By diluting concentrated cleaning products with water and using compressed air to create foam that can be used to clean inside barns as well as trucks, the risk of transferring contaminants is reduced. WDPs are also great for vaccinating and medicating animals, treating water, cleaning water lines and administering the proper nutrients and supplements.

  It's important to find an electric diaphragm pump that is compatible with water line cleaning chemicals, such as calcium chloride, chlorine, iodine, phosphoric acid and any other commonly used chemistries on the farm.

- **Easy to use portable sprayer and foamer**. To clean hard-to-reach areas, spraying and foaming devices are a farmer's greatest cleaning tools. When properly mixed, chemical concentrates can be applied quickly and effectively to areas that require cleaning with sprayers and foamers. Find a foamer with easy automatic dilution and convenient control of where and how solution is applied. It's best to have a foamer with simple on and off functions, allowing complete control with the spray nozzle.

When searching for the right equipment to meet various biosecurity needs, consider Hydro Systems' AquaBlend Xtreme. The AquaBlend Xtreme is a WDP compatible with organic acids and other HACs used to treat or medicate water lines. The unit features enhanced longevity, reliability, tool-free maintenance and a large injection range.

In addition to utilizing a highly dependable WDP, farms should also have the right pumps in place to manage fluctuations in water pressure, temperature and unpredictable environmental factors. Hydro Xtreme, an electric diaphragm pump, offers several advantages compared to peristaltic pumps, including longer life, more precise chemical dilution and no need for costly squeeze tubes or additional controllers for water meters and pump circuits.

Successful Solutions, Successful Farming

It's important for farms to use chemical dispensing systems and equipment that dose the correct amount of chemical and water with each use, limit leaks or spills and enhance productivity around the farm.

When looking for a new dispenser, it's important to seek out the following features:

- **Accurate dosing**. New and technologically advanced dispensers can help eliminate overspill with proper dosing and delivery.
- **Enhanced reliability**. A dispenser should be constructed from durable materials and work consistently over time, delivering the right results for each task.
- **Water pressure and flow rate.** Depending on the water flow and pressure at the farm, it can easily fluctuate and fail to provide the right amount of water or chemical needed. Find a dispenser that uses pressure-regulation technology to eliminate dilution variance and keep the system from "leaning out" or over-diluting.
- **Desired injection ratio and percentage.** Different chemicals, medications and vitamins must be diluted at various ratios. Look for dispensers that can manage these changes to eliminate instances of over-medicating or using too little chemical.
- **Installation and maintenance.** The simpler the installation process, the quicker a dispenser will be ready to use. Dispensers should also require minimal maintenance to reduce downtime and improve productivity and profitability.

Health and Safety beyond the Farm

Farms play a crucial role in world health. The Food and Drug Association (FDA) revealed that about 80 percent of all antibiotics sold in the U.S. are given to animals raised for food, equaling more than 32 million pounds of antibiotics in a single year.[13] The same research found that at least 2 million Americans fall victim to antibiotic-resistant infections each year, killing nearly 23,000.[14]

The rise of organic acid use on farms may bring positive change, but farm equipment may not be up for the challenge. It's important for farmers to re-evaluate the current state of equipment, such as chemical dispensers, WDP's, electric diaphragm pumps and medicators for a smooth transition.

Thanks to advanced technology, farms have the opportunity to embrace the new veterinary feed directive and become champions of human health. New regulations should not alarm farmers worried about financial losses. The new rules increase health for animals and consumers which has a positive impact on farm profits. The less time and resources needed to

[13] https://www.consumerreports.org/cro/health/making-the-world-safe-from-superbugs/index.htm?utm_source=hootsuite

[14] https://www.forbes.com/sites/daniellegould/2012/06/26/survey-reveals-growing-consumer-demand-for-antibiotic-free-meat/#25aa92531069

treat a sick flock, the more time and resources farms have to care for animals and enhance their business.