pH CONTROL SYSTEMS

PetShure®
TURNING IMAGINATION INTO REALITY

balchem

Food Safety: Stacking the Odds In Your Favor

Building an Effective and Comprehensive Pathogen Mitigation Plan

Highly Pathogenic Avian Influenza (HPAI) is a growing concern in the pet food industry, particularly for manufacturers of minimally processed and raw diets. HPAI has been detected in various animal species, including poultry, dairy cattle, and cats, with cases of transmission linked to the consumption of contaminated raw pet food, eggs, and milk. While no canine deaths have been reported in the U.S. at this time, international cases suggest that dogs are not entirely immune to the virus.

With the FDA now requiring all pet food manufacturers to revalidate their pathogen mitigation protocols, we must reassess food safety plans to account for HPAI as a known hazard. Regulatory scrutiny, including state and federal audits and potential product sampling, will focus heavily on raw and minimally processed pet foods, making it essential for manufacturers to implement comprehensive control measures.

pH Control: A Key Component of a Comprehensive Food Safety Plan

Among the various pathogen control strategies available, pH control stands out as a scientifically validated option for mitigating risks in pet food. Research demonstrates that HPAI viruses may be unstable under acidic conditions. Shahid et al., 2009[1] found that H5N1 could be neutralized at pH 5 after 18 hours, while a pH below 3 led to complete virus inactivation within six hours. However, achieving such low pH levels in pet food can negatively impact product aesthetics and palatability.

Straubue et al. (2010)[2] demonstrated that incorporating 0.15-0.2% lactic acid in solution, while maintaining a pH range of 3.80 and 4.70, led to the inactivation of avian influenza (AI). Additionally, beneficial bacteria used during the ripening of short-fermented raw poultry sausage produced measurable levels of lactic acid, successfully inactivating AI strains (H3N8, H5N6). These findings underscore the potential lactic acid has as a key component in food safety protocols.

Avian Influenza neutralization: Studies show AI viruses become inactive at pH 5 after 18 hours and are fully inactivated at pH 3 within six hours.

Additional Benefits of pH Control in Pet Food Manufacturing

Beyond its role in pathogen control, pH regulation offers multiple benefits for pet food manufacturing, making it a valuable inclusion in minimally processed diets:

- **Extended Shelf Life:**
  Inhibits spoilage bacteria, keeping products fresh longer.
- **Improved Palatability:**
  Controlled pH reduction helps maintain desirable flavor and texture.
- **HPP Compatibility:**
  Works in synergy with High-Pressure Pasteurization (HPP) to improve microbial safety.
- **Regulatory Compliance:**
  Strengthens food safety plans to help meet FDA requirements.

Organic acids, in a microencapsulated form, offer an effective solution for controlling pathogens by lowering pH (Figures 1 & 2) in minimally processed pet foods, without the adverse effects on meat color and texture commonly seen with raw organic acids (Figure 3). By leveraging these pH-lowering properties, preservative benefits, and compatibility with existing processing methods, manufacturers can strengthen their food safety protocols while maintaining product integrity and consumer trust.

Figure 1. pH of meat patties treated with 2.0% PetShure or raw lactic acid.

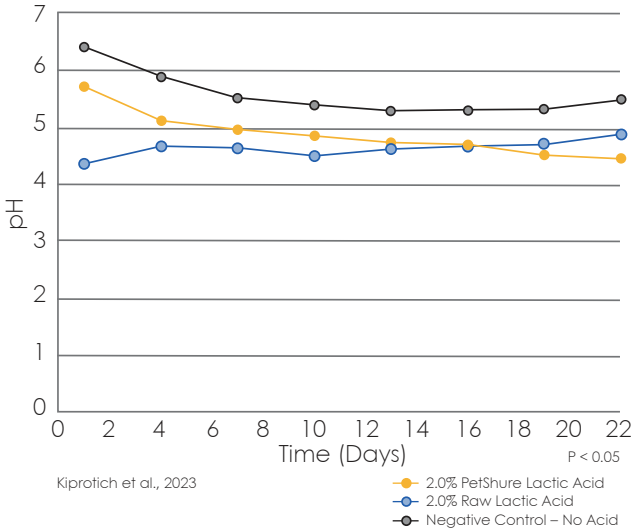


Figure 2. pH of meat patties treated with 2.0% PetShure or raw citric acid.

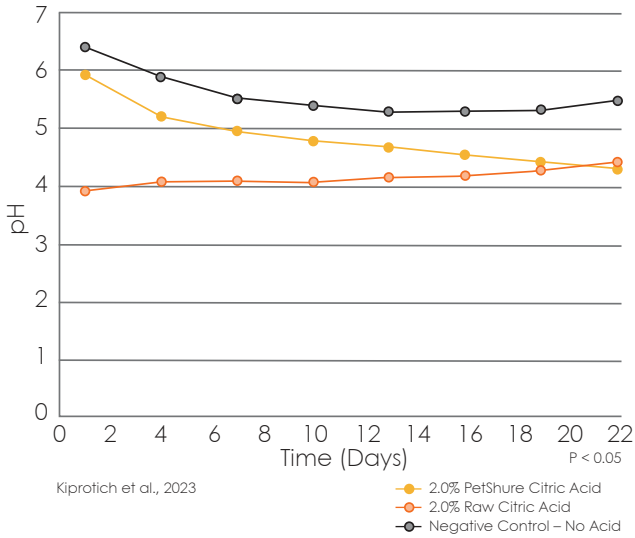
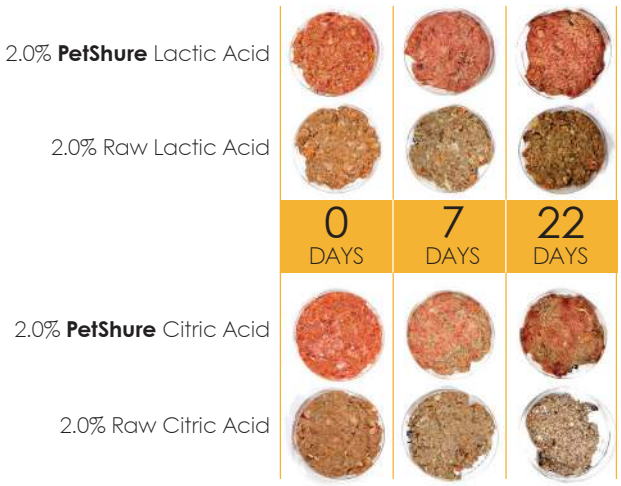


Figure 3. Visual appearance of meat patties treated with 2.0% PetShure or raw acid



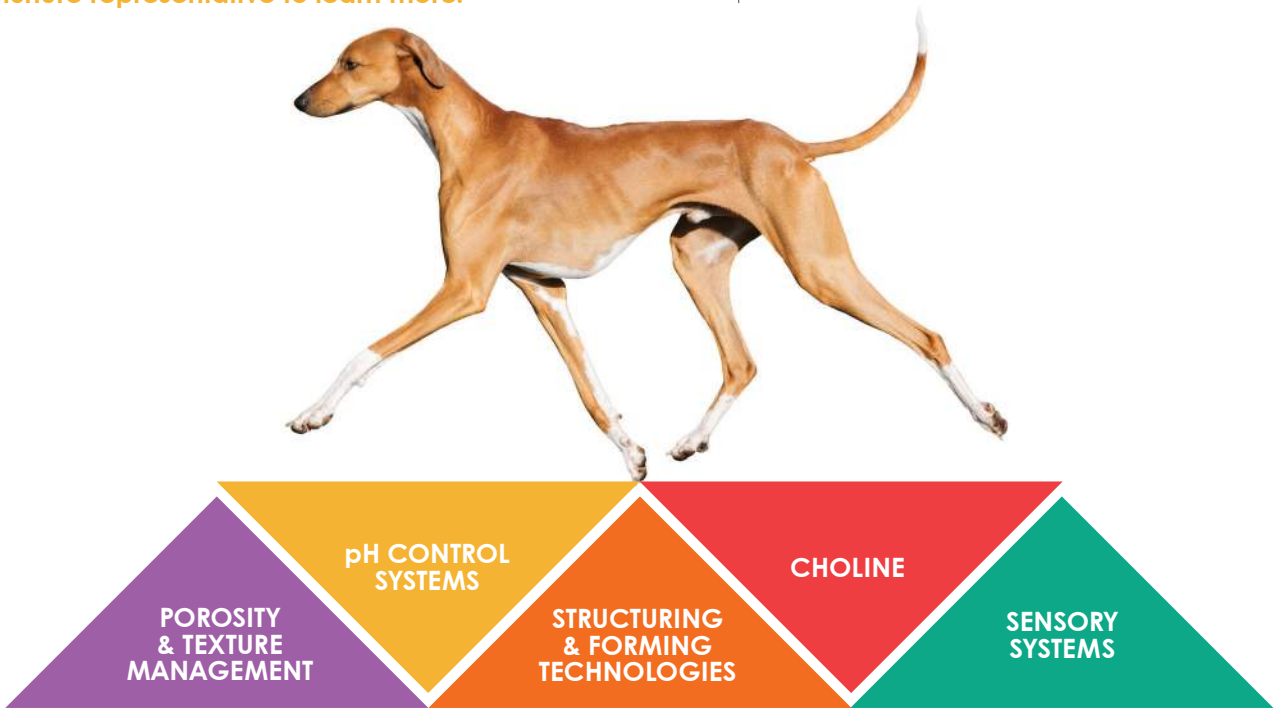
PetShure® pH Control Systems

PetShure pH Control acidulants (lactic acid and citric acid) from Balchem offer an additional benefit by providing a controlled, gradual pH reduction over time. Data from studies conducted at Kansas State University, (Kiprotich et.al., 2023) shows that both microencapsulated lactic and citric acids can lower and maintain the pH of raw meat-based diets below 5 in as few as five days, contributing to pathogen control while preserving the natural color and texture of the finished product.

With regulatory scrutiny increasing, now is the time to evaluate PetShure pH Control Systems as part of a food safety strategy that helps safeguard the health of vulnerable companion animals. **Contact your PetShure representative to learn more.**

Raw meat application:

Beneficial bacteria used in short-fermented raw poultry sausage generated lactic acid that successfully inactivated AI strains.



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[1]Shahid, Muhmmad Akbar et.al. Avian influenza virus (H5N1); effects of physico-chemical factors on its survival. 2009. Virology Journal. Vol 6: article number 38. Avian influenza virus (H5N1); effects of physico-chemical factors on its survival | Virology Journal | Full Text.

[2]Straubue, Julaine, et al. Low pathogenic avian influenza viruses (H3N8, H5N6): In vitro influence of D,L-lactic acid and sodium chloride on infectivity and virus persistence in short fermented raw poultry sausage. Journal of Food Environment Virology. 2010 vol 2: 74-82.

[3]Kiprotich, Samuel et. al. Application of Encapsulated and Dry-plated food acidulants to control salmonella enterica in raw meat-based diets for dogs. Journal of Food Protection. 2023 Vol. 86 article 100077. Application of Encapsulated and Dry-plated Food Acidulants to Control Salmonella enterica in Raw Meat-based Diets for Dogs – ScienceDirect.