

#### PKA™ Certifications

- FDA approved for use in animal feed and water; classified GRAS (Generally Recognized as Safe).
- PKA is manufactured under GMPs (Good Manufacturing Practices)
- ISO 9001-2000 assuring consistent superior quality.
- Meets Food Chemicals Codex 4th Edition Standards assuring purity.
- NSF—National Sanitation Foundation approved for pH adjustment, corrosion and scale control.
- Kosher approved

#### PKA™ Benefits

- Lowers pH with no bitter taste
- Optimum water consumption
- Low cost
- Low addition rate
- Improves chlorine effectiveness
- Easily dissolves in water
- Complements antibiotic free program
- Safe to store and handle

#### Current PKA™ Poultry Industry Applications include:

- Broilers
- Pullets and Broiler Breeders
- Turkeys
- Turkey Breeders
- Commercial Layers
- Commercial Pullets
- Gamebird Growers

Please see PKA™ Product Data Sheet for species specific applications.

Animal Science Products, Inc. is dedicated to bringing innovative solutions to the poultry industry based on solid scientific data. PKA™ is backed by a qualified staff of Veterinarians, Technical Field Sales Representatives and Customer Service Representatives.



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## The Science of Water Quality

PKA™—pH Water Treatment is a new, unique water acidification product from Animal Science Products, Inc. that's completely different and clearly better.

#### WITH PKA™, LESS MEANS MORE

PKA™ contains the strongest animal feed grade mineral acid available today. A much lower addition rate is required to acidify drinking water to biologically effective low pH levels. This lower addition rate provides pH reduction with no bitter taste. Birds won't back off from PKA™ treated water, so optimum water consumption is maintained. All other water acidifiers on the market today contain weak organic acids that require a much higher addition rate to reach effective low pH levels. This results in a bitter taste, causing birds to drink significantly less water.

#### PKA™ DELIVERS

PKA™ delivers the proven science, cost reduction and performance characteristics to optimize water consumption for your poultry operation. PKA™ can meet all of your water management needs providing benefits in acidification, water consumption, water flow, feed conversion and cost savings.

# The Clear Science Of Water Quality Management

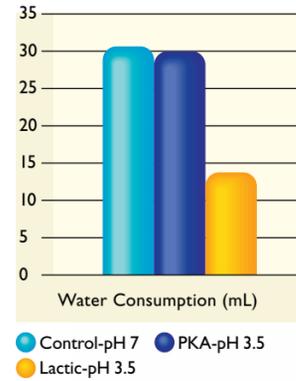
Water acidification is an essential component of scientifically based water quality management programs. Benefits of acidification with PKA™ include improved water flow, chlorine effectiveness and economic payback to both growers and integrators.

## The Clear Choice For Water Acidification

“Why acidify drinking water?” The first line of defense that a bird has is its crop. The bird naturally keeps the crop acidic so that it can function properly. Acidified water mimics the natural pH of the bird’s crop. By acidifying the bird’s drinking water you are working with those natural defenses rather than against them. This is one of the reasons why birds raised on farms with high pH water often have difficulty reaching their genetic potential. Adjusting drinking water pH to 3.0 - 3.5 with PKA (1-2 packs per 1940 Liters) improves performance without reducing water consumption.

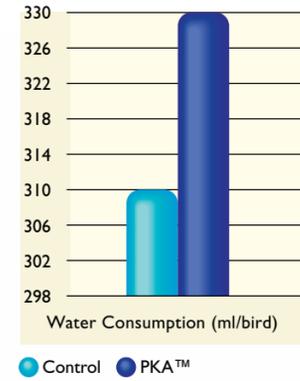
### PKA™ is Better, Not Bitter, So Water Consumption is Maintained

PKA™ has a better taste profile and profound acidification properties that make it superior to any of the organic acids. Dr. J. Allen Byrd, USDA-ARS completed a study looking at water acidification during feed withdrawal periods. Water consumption from the birds in the PKA™ group at pH 3.5 was identical to water consumption in the control group at pH 7.0. Birds administered lactic acid at the same low pH 3.5 drank 44% as much water as the controls. The consumption level of acidified water at the correct pH is the most critical measurement of the success of any water acidification program.



### Continuous Water Acidification is Safe and Desirable from Day One

Birds are known to object to the bitter taste of low pH water containing organic acids (i.e. citric and lactic acids). For this reason, production managers were hesitant to administer water acidification programs at bird placement. A study conducted at Stephen F. Austin State University demonstrated that the delivery of PKA™ at pH 3.5 for the first 7 days after chick placement did not impact water consumption or chick performance. This research paves the way for intense water acidification at the most critical phase in a bird’s life—the time when gut flora is established. PKA™ allows birds to receive the benefits of water acidification from day one.



# The Clear Choice For Improving Water Flow Rates

The build-up of scale, algae and bio-film in water supply lines negatively impacts water line function in poultry production facilities. Recent work by Dr. Berry Lott, et al., Mississippi State University, yielded useful information on the management of water intake and the impact on broiler performance. Well capacity, pipe condition, size of pipes into the houses, water line maintenance, nipple function and water sanitation can all be factors in restricting water intake by the birds and may explain some cases of poor performance. Build-up of mineral deposits and bio-film can result in similar flow restrictions, especially in nipple drinkers.

### Removing Scale and Bio-film Between Flocks Using PKA™

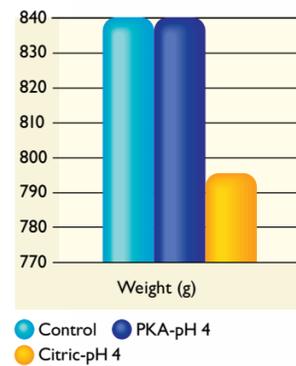
Lime and mineral scale, bio-film build-up and contamination of a watering system will occur with routine usage. Birds consuming this water will be exposed to an increased microbial load through the contaminated system.

Removal of accumulated bio-film layers and mineral deposits from water lines and nipple drinkers will improve water flow and decrease microbial challenges. PKA™

dissolves lime and scale, helping to restore and maintain full function to affected water systems. PKA™ is approved by the U.S. National Sanitation Foundation (NSF) for pH adjustment, corrosion and scale control.

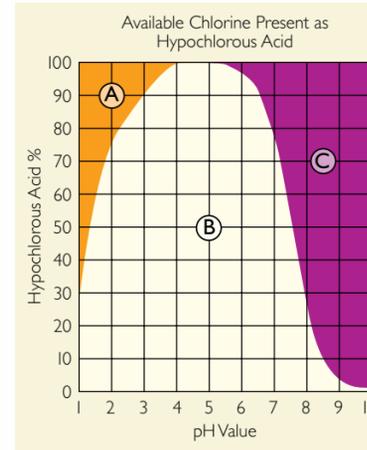
### PKA™ Maintains Feed Conversion and Weight vs. Organic Acids

The University of Arkansas conducted research on the impact of both intermittent and continuous water acidification using PKA™. In the first study, performance was measured in birds given either PKA™ or citric acid at a pH of 4.0. The birds that drank PKA™ at a pH of 4 had the same weights as the birds that drank the control water. The birds given citric acid weighed considerably less. Subsequent research confirmed that birds given PKA™ at a pH of 4 had a feed conversion of 1.633 compared to a feed conversion of 1.667 in the controls.



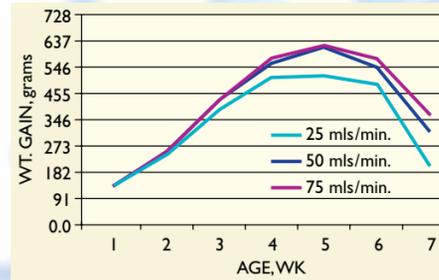
### PKA™ Increases Effectiveness of Chlorine

Chlorine can exist in water solutions in three forms: as a dissolved gas (A), as hypochlorous acid (B) and as a hypochlorite ion (C). Hypochlorous acid is 100 times more effective at disinfecting than a hypochlorite ion. Keeping water between a pH of 3.5 to 6.5 ensures that hypochlorous acid is at a very high concentration. PKA™ economically maintains the correct pH between 3.5 and 6.5, maximizing the effectiveness of your chlorine management program.

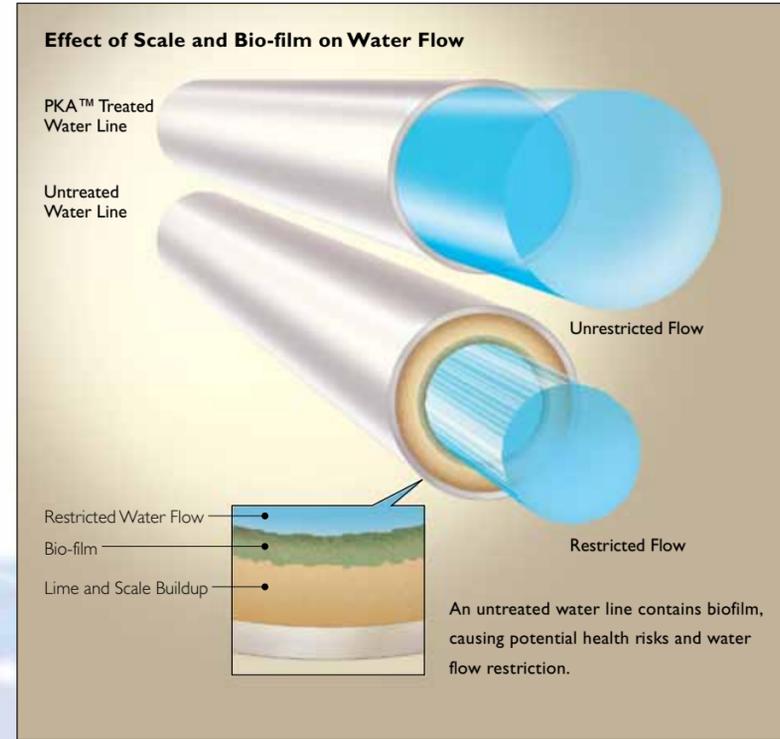


Source: Edstrom Industries

### Effect of Flow Rate on Body Weight Gain



Source: Dr. B. Lott, Mississippi State University



### Maintaining Clean Water Lines During Growout

A PKA™ water acidification program will prevent mineral scale build-up and maintain optimum water flow resulting in enhanced flock performance. Between flocks, add 1 pack of PKA™ to each 970 liters of water. Allow solution to cleanse water lines for a minimum of 8 hours, up to a maximum of 24 hours. Flush thoroughly with fresh water after cleansing is complete.