Proper Scalder Management Using SAS® Process Water Acidifier

The use of hot water immersion scalders is an important step in the slaughter process for poultry. Most establishments use a multi-stage, counter flow scalder but single-stage scalding systems can still be found. A properly managed scalder prepares the carcasses for picking without reducing yield or increasing the pathogen load on the carcass. Achieving that proper balance is not always easy and many processors struggle to get the birds to pick easily without sacrificing yield. Others manage to achieve their yield goals but in so doing turn the scalder into a large Salmonella incubator.

There are three important characteristics to a well-managed scalder: scald temperature, scald water pH, and good counter flow of water.

Scald Water Temperature

The proper temperature at each stage of the scalder is important and it can vary based on the objectives desired at each plant. Typically, the lowest temperature occurs in the first stage with a temperature increase in both the second and third stages. To control microbial growth by temperature alone, the temperature should be kept at least 10°F higher than your target organism. Because Salmonella growth occurs up to a temperature of 113°F, scald water typically has been kept above 123°F to prevent Salmonella growth from occurring. The final stage of the scalder is often run at a temperature between 132°F and 140°F. In addition, too low of a temperature in the absence of scalder additives can make picking more difficult, causing yield loss through carcass damage.

In some establishments, the use of these higher scald temperatures causes an unacceptable loss of yield due to the loss of subdermal fat. Because poultry fat is unsaturated, it liquefies at temperatures above 130°F. This liquefied fat under the skin of the carcasses begins to drain from the birds as they move down the processing line. The loss of this liquefied fat can intensify in the chiller causing a build-up of fat residue in the chiller. This greatly increases the organic load within the chiller making it very difficult to properly manage chlorine levels in the chill water. In addition, this emulsified fat coats equipment and carcasses protecting any Salmonella cells that are present reducing the effectiveness of On-Line Reprocessing (OLR) systems.

Scalder Water pH

The way to combat this yield loss without increasing pathogen loads is to combine lower scald water temperatures with low water pH. By using acidic processing aids as scalder additives, the pH of the scald tanks can be maintained at a pH of 3.0 or below combating any microbial bloom that would otherwise occur due to the low temperatures. This way, scald temperatures of 110°F-125°F can be used for increased yield without incurring microbial growth. In a recent University of Georgia Processing Tip, Dr. Scott Russell shared the results of two in-plant trials where acidic scalder additives were used to maintain scalder pH at 2.0-4.0 in conjunction with low scalder temperature. In those trials, an average yield increase of over 1% was observed without negatively impacting microbial numbers.

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If the scalders are being run at temperatures below 123°F, then it is important to maintain scalder pH at a 3.0 or below for all three stages of the scalder. This acidic pH counterbalances any negative impact that might occur due to these low temperatures. The usage of acids to maintain the water pH below a 3.0 also allows the picking fingers to grasp the feathers more efficiently for easier removal. This contrasts with the use of alkaline scalder additives such as caustic soda which raise the pH above a 9.0, making the birds very slippery and often causing picker damage.

Maintaining scald water pH is not as easy as maintaining chill water pH due to the massive amounts of organic material in the scalder system. In addition, the incoming load of fecal material varies greatly from flock to flock and season to season. Because of this, the addition rate of acids can vary greatly as the shift progresses due to the incredible buffering capacity of fecal material. Automatic feedback systems that adjust pH in real time can be very useful in this application and are the preferred delivery method to ensure tight pH control throughout the shift as the buffering capacity of the fecal material in the scalder varies. In addition, plants should take manual pH readings on an hourly basis to verify the proper functioning of the automatic system.

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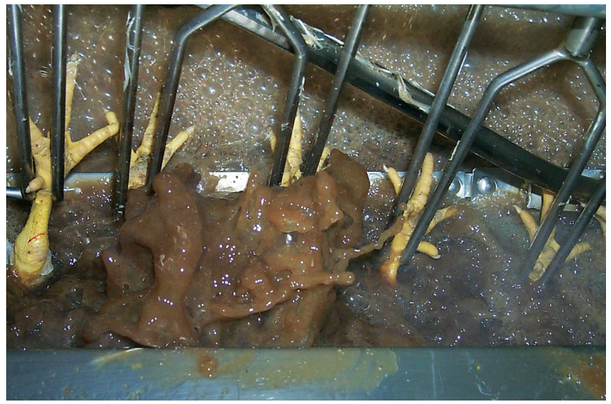

The use of SAS® process water acidifier in the scalder is meant to counterbalance the pH increase that occurs due to the presence of fecal material.

Counter Flow of Scald Water

Good counter flow of scald water is a must regardless of what targets are desired for the other two characteristics. Often scalders resemble more of a stagnant water bath than a constant flowing stream. In order to maintain good counter flow, establishments need to have an accurate measure of the water flowing through the system. It is not uncommon for management to grossly over or under estimate the turnover rate of the scald water. Accurate water measurements are needed in order to monitor overflow rate throughout the processing shift and to be able to make adjustments as needed. This becomes even more important if chemical additives are being used in the scalder in order to maintain proper concentration of any additives throughout the shift.

The higher the rates of water overflow, the more the birds are being washed and the attached fecal matter is being diluted. This is especially important as fecal material will build up at the bottom of the scalder tanks as the shift progresses. The more stagnant the water is, the deeper the fecal sludge that accumulates at the bottom of the tank. Because water temperature within the scald tank decreases from the top to the bottom of the tank, the temperature within this fecal layer may be only 105°-110°F, allowing for Salmonella growth within the tank. In addition, the increasing buffering capacity within the tank as this fecal material accumulates will make it more difficult to regulate chemical additions to the scalders as the shift progresses. Pre-scald brushes are used by some facilities to remove balls of fecal material attached to the feathers prior to the birds entering the scalder. In most instances, the benefit of lower fecal material in the scalder outweighs the risk of cross-contamination of carcasses using the brushes.

SAS® Process Water Acidifier

SAS® Process Water Acidifier is a natural mineral acid salt approved as a processing aid for pH control of processing water in meat and poultry plants. SAS is manufactured under FDA's Good Manufacturing Practices and HACCP program. The facility where SAS is manufactured is in compliance with ISO 9001-2000 and received a "Superior" rating from the American Institute of Baking. SAS purchased from Jones-Hamilton Co. includes a license for use in applications covered by U.S. patents 5,958,491, 6,132,792, and 6,620,445 BI.

Whether plants use a high or low-temperature scald process, SAS® is easily capable of keeping scald water at a pH of 2.0-4.0.

SAS can be used in all processing water to maintain proper water pH for the particular stage of the process. Many facilities are familiar with SAS usage in chill tanks, for example. Because SAS is a processing aid, it can be used in any location of the plant without additional labeling requirements. The usage of SAS in scalders allows plants to maintain scald water pH at the proper target pH for that facility. Whether plants use a high or low-temperature scald process, SAS is easily capable of keeping scald water at a pH of 2.0-4.0. SAS application allows plants to maximize scalder performance in terms of picking and yield without sacrificing other performance parameters.

The addition of SAS® for pH control is a simple matter and can be done with a number of commercially available systems. Care should be taken with the management of the equipment to insure proper control. It is also important to determine the typical conditions of the water through manual testing to establish the proper set points for the equipment. In all cases the use of automated equipment cannot eliminate the need for regular manual testing to verify the proper operation of the delivery equipment.

Unlike other scalder acidifiers, the classification of SAS® as a processing aid gives establishments maximum flexibility in customizing a complete scalder program that best fits their operations. It allows the scalder program to be a dynamic one that can easily change as the plant's needs change without any regulatory usage restrictions.