



**APPLICATION:** Water Disinfection // **SITE:** Meat Processing Plant in Omaha, Nebraska, USA

## Aquafine Ultraviolet Water Disinfection Units for the Meat and Poultry Industry

### Abstract

This technical bulletin describes a pilot study carried out by Aquafine Corporation for a novel application of disinfecting a meat & poultry wash/rinse water stream. The study was carried out at a meat processing and packaging facility located in Omaha, Nebraska, USA. The objective of the pilot-study was to study the effectiveness of UV technology to disinfect water that had been used to wash/rinse meat & poultry, so that the water could be recirculated and reused.

The pilot study demonstrated that UV technology can be successfully applied to disinfect water used to wash meat & poultry and vegetables. This method can also significantly reduce the use of fresh water, thus resulting in water conservation. It can also significantly reduce the use of lactic acid to disinfect the water.

### Introduction

Ultraviolet light treatment is an excellent method of disinfection of water and has several advantages over other disinfection methods, such as chlorination, ozonation etc. UV light does not add anything to the water, nor does it generate harmful by-products or alter the aesthetic appearance and quality of the meat, it only adds energy in the form of ultraviolet radiation. Also, UV disinfection only requires a fraction of the contact time required by other disinfection methods. It is fast, efficient, effective, economical and environmentally - friendly. One of the conventional disinfection methods currently employed is the use of lactic acid to disinfect the water and thereby help keep the meat free of microorganisms. However, the use of lactic acid has some severe inherent drawbacks.

The USDA (U.S. Dept. of Agriculture) is tightening its regulations with regard to meat inspection for bacterial contamination, especially in the wake of deaths in the Pacific Northwest a couple years ago arising from consumption of E.coli-contaminated meat at a fast food restaurant. The USDA announced at that time that it was going to scrutinize

the meat industry practices more closely. This action adds a new dimension to the use of UV to disinfect water to

### Process Description

Although UV has conventionally been used to treat water that is clear and fresh or better in quality and clarity, it could also be used to effectively disinfect not-so-clear water streams, provided the UV equipment is sized appropriately to account for the difference in water quality. Also, appropriate prefiltration will have to be incorporated in order to address the inferior UV transmittance value of the water stream and thereby enhance efficiency of the UV light.

The pilot study involved treating meat and poultry washwater stream. City water was used to thoroughly wash the meat and poultry, from this mainstream, a low flow rate side stream was drawn. It was then pre-filtered by a 25 mm filter followed by a 5 mm filter and then was treated by an Aquafine UV disinfection unit fitted with sample ports at the inlet and outlet to draw water samples. The side stream flow rate was controlled by a valve and water samples were collected at the inlet and outlet to the UV for various flow rates. The samples were sent to a professional

### Conclusion

The pilot study clearly demonstrated that UV could be effectively used to treat the pre-filtered washwater stream and the water thus treated could be recirculated to be blended into the main closedloop to process the next batch of meat and poultry. This reduces the frequency of infusion of fresh water to the process and consequently saves valuable amount of precious water and also cuts the water bill. The pilot study also clearly demonstrated that the use of lactic acid to disinfect the water (as in the previous process) could be greatly reduced, thus overcoming the main drawback of the use of lactic acid, namely that it imparts an undesirable taste and unaesthetic appearance of the surface of the meat. The use of UV technology would render the meat more acceptable to the consumer.