

# Sanitisers for commercial use in chicken meat production



Sanitisers are used in food production to reduce the presence of microorganisms, such as bacteria, to levels that minimise the chance that humans will get sick from eating the food.

Internationally, chlorine is commonly used as a food sanitiser because it is readily available, highly effective at destroying bacteria and can be easily rinsed off with clean water. Other sanitisers are available but have not always been as easy to access as chlorine. Therefore, alternative sanitisers to chlorine are not as well understood in the context of Australian chicken meat processing.

A laboratory-based study found that peroxyacetic acid (PAA) and acidified sodium chlorite (ASC) were significantly more effective than chlorine at reducing bacterial load on chicken meat. This project adds to the findings from the laboratory-based study by investigating the potential use of PAA and ASC compared to chlorine on chicken meat sourced from two Australian commercial poultry processing plants. Whole chicken carcasses were collected prior to the inside/outside washing step and post immersion spin chill step. Skin-on/bone-in thighs, drumsticks and Maryland cuts were also obtained after carcass cut-up. After collection, bacterial total viable counts (TVC), *Campylobacter* load, and *Salmonella* load and prevalence were tested, before and after the treatment.

The results suggests that both ASC and PAA can be used to effectively sanitise chicken cuts, but further studies are necessary to optimise the method of application in high-throughput processing plants.

## Acidified sodium chlorite was most effective in reducing bacterial load from whole chicken carcasses

ASC at concentrations of 450ppm and 900ppm (5 °C and 15 °C; 20 seconds wash) significantly reduced bacterial TVC, *Campylobacter* presence and *Salmonella* prevalence and load, compared to water-only treatment for samples collected

prior to the inside/outside washing step and post immersion spin chill steps. Although, 900 ppm of ASC was more effective than 450 ppm post-immersion. Regardless of temperature or concentration, ASC had a significant effect on reducing bacterial load on chicken carcasses.

There was no significant difference between the efficacy of PAA at concentrations of 100 ppm and 200 ppm (5 °C and 15 °C; one minute wash) and ASC observed under the different conditions when compared to water-only treatment. However, ASC concentrations of 450 ppm and 900 ppm were more effective at reducing *Campylobacter* and *Salmonella* loads than either concentration of PAA prior to the inside/outside wash. While 100 ppm PAA had the same efficacy as a water wash in reducing *Campylobacter* load post the immersion spin chill step, neither PAA treatment significantly reduced *Salmonella* prevalence.

When the efficacy of ASC and PAA were compared to chlorine (sodium hypochlorite 4 - 4.99%; 50 ppm; 5 °C; 20 minutes) all wash treatments significantly reduced bacterial TVC, but ASC (900 ppm) and PAA (200 ppm) reduced bacterial TVC significantly more than chlorine prior to the inside/outside wash.

- In the post immersion spin chill step, in general, ASC and PAA treatments appeared to be more effective than chlorine.
- Prior to the inside/outside wash, ASC reduced *Campylobacter* load significantly more than PAA and chlorine, although significant reductions in *Campylobacter* load was observed across all treatments.
- At the post the immersion spin chill step, ASC at 900ppm was most effective.
- Efficacy of the treatments prior to the inside/outside wash regarding *Salmonella* were not able to be determined, except for ASC which reduced *Salmonella* load significantly more than chlorine.



- No culturable *Salmonella* were detected from samples treated with either concentration of ASC post the immersion spin chill step, and there was no significant difference observed between the efficacy of any of the treatments to reduce the prevalence of *Salmonella*.

These results indicate that while ASC, PAA and chlorine are all effective at reducing bacterial load at both processing steps assessed, ASC appears to consistently be more effective and could potentially be used as an alternative to chlorine or integrated as an additional step/s into the processing of chicken carcasses.

### Acidified sodium chlorite and peroxyacetic acid were more effective at reducing bacterial TVC on thigh cuts

The process of cutting whole chicken carcasses into smaller cuts has been linked with increasing the load of both *Campylobacter* and *Salmonella*. In this study, thigh cuts had significantly higher *Campylobacter* load and *Salmonella* prevalence compared with the Maryland and drumstick cuts and were therefore selected for further analysis.

ASC concentrations lower than 225 ppm are recommended as higher concentrations resulted in darkened meat colour on thigh cuts. PAA at both 75 and 100 ppm concentrations resulted in the highest reductions in bacterial TVC compared with the water-only wash, but both ASC and PAA were significantly more effective at reducing bacterial TVC than chlorine. This finding has a significant implication for improving product shelf life because many of the bacterial species measured in the TVC are linked with food spoilage. All ASC and PAA treatments resulted in significant reductions in *Campylobacter* load, but no significant difference was observed between chlorine and PAA treatments. No significant difference was detected between sanitisers in reducing *Salmonella* prevalence.

There was significant variation in the load of *Campylobacter*, *Salmonella* and bacterial TVC across the batches from both processing plants, meaning there was no relationship between the level of bacteria present and the processing plant the meat was collected from.

### More information

#### Read the journal articles

- Peroxyacetic acid and acidified sodium chlorite reduce microbial contamination on whole chicken carcasses obtained from two processing points  
DOI <https://doi.org/10.1016/j.fm.2022.104035>
- The Effect of Sanitizers on Microbial Levels of Chicken Meat Collected from Commercial Processing Plants  
DOI <https://doi.org/10.3390/ijerph16234807>

#### Download the project summary

- Evaluating sanitisers for widespread use in the Australian chicken meat industry (PRJ-010543)  
<https://agrifutures.com.au/wp-content/uploads/2019/11/19-053.pdf>
- Sanitisers for commercial use in chicken meat production (PRJ-011593)  
<https://agrifutures.com.au/wp-content/uploads/2022/03/22-011.pdf>

#### Listen the podcast

- <https://cmeextensionaus.podbean.com/e/sanitisers-for-commercial-use-in-chicken-meat-production-with-dr-kapil-chousalkar/>

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