

Method of analysis influences detection of Salmonella on poultry

The detection of *Salmonella* on poultry carcasses is influenced by the method of analysis and in particular by the method used for sample preparation and pre-enrichment. This is the conclusion of experiments published early 2008 in 'Letters in Applied Microbiology'.

Part 1: Evaluation of three methods of detection

The investigators compared the sensitivity of two detection methods which are routinely used in Australia (the Australian Standard method and the Australian Industry method) with the method used by the 'United States Department of Agriculture' (USDA method). In the experiment 90 randomly selected industrially processed broiler carcasses were analysed for *Salmonella*. The details of the three methods are shown in Table 1.

Table 1. Details of the methods of analysis used for detection of *Salmonella* on poultry carcasses by the USDA method, the Australian Standard method and Australian Industry method

	USDA method	Australian Standard method	Australian Industry method
Carcass wash procedure	1 min wash	2 min wash	2 min wash
Pre-enrichment fluid	30 ml wash fluid + 30 ml sterile BPW	50 ml wash fluid + 50 ml sterile BPW	400 ml wash fluid undiluted
Pre-enrichment	Overnight at 37 °C		
Enrichment ¹⁾	500 µl in TTBA at 42°C 100 µl in RV at 42°C	100 µl in RV at 42°C 1 ml in MSC at 37°C	10 ml in MSC at 42°C 10 ml in TTBA at 37°C
Isolation ²⁾	XLD at 35°C ≤ 48 h MBG at 35°C ≤ 48 h	XLD at 37°C 18 h MC at 37°C 18 h	XLD at 37°C 18 h BS at 37°C 18 h

¹⁾ TTBA = tetrathionate broth; RV = Rappaport Vassiliadis broth; MSC = Mannitol selenite cystine broth

²⁾ XLD = xylose-lysine-desoxycholate agar; MBG = modified brilliant green agar; MC = MacConkey agar; BS = bismuth selenite agar

The results: The most important results of the study are presented in Table 2.

Table 2. Detection of *Salmonella* on naturally contaminated broiler carcasses

Experiment	USDA method	Australian Standard method	Australian Industry method
Carcasses positive (n = 90)	18 (20%)	34 (38%)	43 (48%)

The data clearly show that both Australian methods yielded a substantially higher number of *Salmonella* positive carcasses than the Australian Standard method and the USDA method, although the difference between the Australian Industry method and the Australian Standard method was not statistically significant. In addition, the Australian Industry method was the only method which yielded two serotypes of *Salmonella* in a number of carcasses. The Australian standard method also yielded a significantly higher number of *Salmonella* positive carcasses than the USDA method.

Part 2: detection level of the methods of analysis

The detection of level of the three methods of analysis was determined by spiking a *Salmonella* negative carcass wash fluid with a known number of *Salmonella* Typhimurium. The spiked standard solutions were analysed for *Salmonella* with each of the three methods of analysis described above. The data showed that the detection limit of the two Australian methods was 1 – 3 colony forming units (cfu)/ml whereas the detection limit of the USDA method was 10 – 30 cfu/ml.

Conclusion

The experiments have shown that both Australian methods are suitable for accurate detection of *Salmonella* contamination on poultry carcasses.

Source

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Editorial note: The vigorous massaging during the carcass wash procedure in both Australian methods, with special attention for the carcass cavity, has apparently resulted in release of a higher number of skin attached *Salmonella* organisms into the wash fluid. In addition, the higher quantity of wash fluid used for pre-enrichment in both Australian methods will further increase the probability of detecting *Salmonella* contaminated poultry carcasses.