Global duck meat production is dominated by Asia and it is showed to be a reservoir for Salmonella Typhimurium. An effective enrichment broth for the recovery of Salmonella Typhimurium on raw duck wings and an alternative rapid detection method combining real-time PCR and immunomagnetic separation (IMS) were investigated in this study. Healthy or heat-injured S. Typhimurium was inoculated on raw duck wings and nine broths were evaluated by four growth parameters. Immunocapture was optimized and three Taqman primers (Sal, invA and ttr) were evaluated to optimize the real-time PCR protocol.

Most of enrichment broths recovered S. Typhimurium by more than 6 log CFU/ml, except the 85%-injured cells in One-Broth Salmonella (OB)reaching above 7 log CFU/ml. Under optimal IMS conditions (30 min reaction and 3 min separation), 85 and 64 % of Salmonella were captured from pure culture and food suspensions. The optimized PCR-IMS method was significantly (P = 0.0011) better to detect healthy Salmonella after 7-h enrichment than PCR method alone, however there was no significant (P > 0.05) difference between two methods with longer enrichment time (14 h). The diagnostic accuracy of PCR-IMS was shown to be 97.5% through the validation study.

This study suggests that OB may be a suitable enrichment broth for the Salmonella detection and the optimized PCR-IMS method could provide a sensitive, specific and rapid detection for Salmonella.