

# Detection of Salmonella on Chicken Meat Using Immunomagnetic Separation and Conventional Methods from Traditional Market in Surabaya, East Java, Indonesia

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## Detection of *Salmonella* on Chicken Meat Using Immunomagnetic Separation and Conventional Methods from Traditional Market in Surabaya, East Java, Indonesia

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### Abstract

The purpose of this study was to compare the detection of *Salmonella* in chicken meat from traditional market Surabaya using immunomagnetic separation and conventional methods. Total of 12 samples each from chicken meat were isolated from five traditional market in Surabaya. There are Keputran, Wonokromo, Gubeng, Wiyung and Pabean. Each sample was tested by immunomagnetic separation and conventional methods. The results showed that the immunomagnetic separation methods positive for *Salmonella* (35%), higher than the conventional methods (18,3%).

**Key words:** Chicken meat, *Salmonella*, conventional methods, immunomagnetic separation

*Salmonella* is still among the most frequently reported zoonotic agents causing food-borne infections worldwide (Parry and

Threlafall, 2008). Poultry are one of the most important reservoirs of *Salmonellae* that can be transmitted to humans through the food-chain (Anumolu and Lakkikeni, 2014, Saravanan *et al*, 2015). Chicken which is permitted for consumed must be free of *Salmonella* (Gorman *et al.*, 2002). The purpose of this study was to compare the detection of *Salmonella* in chicken meats from traditional market Surabaya, using conventional and immunomagnetic separation methods.

### Materials and Methods

Total of 60 samples of chicken meat were taken at 5 traditional market in Surabaya, which are Keputran, Wonokromo, Gubeng, Wiyung, and Pabean. The carcass samples obtained were 12 samples for each traditional market. 25 mg chicken meat samples isolated by immunomagnetic separation and conventional methods. Immunomagnetic separation methods used Dynabeads<sup>®</sup> anti-Salmonella (Thermo Fisher

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Scientific) (Favrin *et al.*, 2003) and cultured in Salmonella Shigella Agar (SSA) media. The conventional method was used pre-enriched in 225 ml buffered peptone water, then transferred to tetrathionate broth for selective enrichment and cultured in Salmonella Shigella Agar (SSA) media. Presumptive Salmonella colonies from each methods were confirmed by biochemical test (El-Aziz, 2013). The test was to ascertain the suspected *Salmonella* obtained in immunomagnetic separation and conventional methods. The data were presented descriptively.

### Results and Discussion

The results showed an increase in the accuracy of detection of *Salmonella* by using immunomagnetic separations on each market that had been sampled. In Table I, 21 (35%) samples positive *Salmonella* from 60 samples were tested by immunomagnetic separation and 11 (18,3%) samples positive *Salmonella* were tested by conventional methods with same samples. Dynabeads® anti-*Salmonella* is designed to bind *Salmonella* concentrations quickly and selectively. Dynabeads® anti-*Salmonella* binds to *Salmonella* antigens because they are supported by a suspension of phosphate buffered saline (PBS) pH 7.4 with 0.1% bovine serum albumin (BSA) and 0.02% sodium azide. Bonding occurs between the anti-*Salmonella* antigen and the same polyclonal antibody (labeled biotin) and (Ru(bpy)<sub>3</sub><sup>2+</sup>-labeled antibody) in the immunomagnetic separation sandwich (Niu *et al.*, 2011).

In the poultry industry, enteric bacterial pathogens pose a threat to intestinal health and can contribute to the transmission of zoonotic diseases through poultry meat (Anderson *et al.*, 2016, Attia *et al.*, 2012). The carcass consumed must be free from food borne disease agents. Risk factors for transmission of foodborne diseases are caused by the lack of quality and

safety of hygienic carcasses (Fikri *et al.*, 2018). *Salmonella spp* bacteria have high pathogenicity which is one of the cause of foodborne disease (Pui *et al.*, 2011).

Twenty per cent of world poultry products are contaminated with *Salmonella*, and they can persist for a long time in the animal and human environments and facilities through biofilm formation (Vestby *et al.*, 2009). Some non-European countries (Vietnam, Pakistan) reported the prevalence of *Salmonella* in tail chicken meat to be about 40% (Soomro *et al.*, 2010; Ta *et al.*, 2014). The unhygienic handling during poultry slaughtering and processing of chicken meat using unclean equipment and contaminated water were the risk factors associated with presence of *Salmonella* in chicken meat due to cross contamination (Javadi and Safarmashaei, 2011). Thus, controlling enteric bacterial disease in poultry is essential to maintain efficient production and improve food safety (Attia *et al.*, loc cit).

### Summary

It can be concluded that there was an increase in the accuracy of detection of *Salmonella* by immunomagnetic separation method. Total of 21 (35%) positive samples were higher than the conventional method of 11 (18,3%) positive samples from 60 samples.

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**Table I.** Data of comparison of *Salmonella* isolation in conventional and immunomagnetic separation methods

Methods	Positive Samples of Each Market (%)					Total (%) n of 60
	Keputran n of 12	Wonokromo n of 12	Gubeng n of 12	Wiyung n of 12	Pabean n of 12	
Conventional methods	2 (16,7%)	3 (25%)	3 (25%)	3 (25%)	0 (0%)	11 (18,3%)
Immunomagnetic separation	2 (16,7%)	7 (58,3%)	3 (25%)	4 (33,3%)	5 (41,6%)	21 (35%)

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