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**Salmonella prevalence across different pork value chains in Hanoi, Vietnam**

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**Introduction**

In Vietnam, pork and pork products still play an important role in food security which contributes more than 56% of total meat intake [1]. Each Vietnamese consumed approximately 29,1 kg pork/year, among the highest in the world [2]. However, along with the development, the pork value chain has been criticised for its quality degradation and lessened the trust of community, in which microbiology contaminated pork has been a critical issue. Previous studies reveal that salmonella contaminated in pork was so prevalence with 44.4% to 70.7% of pork in markets positive with Salmonella [3, 4], leading to human salmonellosis with 17.7% cases out of whole Vietnamese population [5].

Hanoi is the second biggest city in the country. To response to the high demand of consumer, pork is allocated through many distribution channels, from high-end to common level. However, evidences on the current state of pork across different value chains is still limited. Therefore, this research attempts to determine the Salmonella prevalence in various pork retail type and generate the clear evidence, which will contribute to the ambitious goal to combat with food safety issue in Vietnam.

**Methods**

Row pork was collected in retails from different actors in Cau Giay District, Hanoi from July to November 2018. Each sample was coded with

identification and linked to checklist codes. Every sample was put a aseptic plastic bag with information stucked in, then all samples were preserved in cool boxes and transported to the Laboratory before 24 hours following [6]. Totally, there were 211 samples collected from both tradition (traditional market, wet market) and modern retail (supermarket, convenient store, boutique shop). Salmonella was detected by qualitative method (following ISO 6579:2017) and quantitative method (MPN method). Checklist was also used to observe the hygiene of pork shop and practice of retailers.

**Results**

Out of 211 pork samples, the percentage of sample positive with Salmonella was high with 63%, the average *Salmonella* concentration was 13.2 MPN/g. The modern retail showed a better result in Salmonella with the counterpart; however, supermarket was seen as the worst value chain with 82.9% positive sample while this figure in boutique shop was just 31.8%. Results from observation revealed that pork in modern retail was often wrapped, kept at cool cabinet and sometimes visible stamp by meat inspection authority. By contrast, pork from traditional retail mostly stemmed from suburban areas in the vicinity of Hanoi, be transported with the average distance of 31 km and sold without cover. In addition, hygiene practices of pork sellers were also poor, e.g., only 16% using gloves and 3% wearing hat and no separation between pork and intestines.

**Discussion and Conclusion**

The rate of Salmonella infection in our study (66.9%) in traditional retail was in line with a study of Nhung et al (2017) conducted in Ho Chi Minh city, Vietnam with 72.7% of pork in wet market and 68.4% in supermarket positive with Salmonella [7]. However, the finding of Toan et al (2013) showed that there was only 25% pork in traditional market in Hanoi contaminated with Salmonella. This situation can be attributed to the unhygienic along the value chain,

Table 1: *Salmonella* prevalence across different value chains

Value chain	Sal Y/N	Sal MPN (Mean ± SD)
Modern retail (105)	56.19	15.8 ± 35.2
Supermarket (35)	82.86	16.8 ± 35.4
Convenience store (48)	45.83	19.5 ± 40.0
Boutique shop (22)	31.82	0.5 ± 1.1
Informal retail (106)	66.87	11.1 ± 25.7
Traditional market (54)	81.48	9.1 ± 19.7
Wet market (52)	59.62	13.9 ± 32.5
Total (211)	63.03	13.2 ± 30.2

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