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Brahima Sacko

(1) Department of Biology,
Faculty of Science and
Technology, University of
Science, Techniques and
Technology, Bamako, Mali
(2) Diagnostic and Research
Service, Central Veterinary
Laboratory, Bamako, Mali

Satigui Sidibe

Diagnostic and Research Service,
Central Veterinary Laboratory,
Bamako, Mali

Modibo Kouyate

Department of Biology, Faculty
of Science and Technology,
University of Science,
Techniques and Technology,
Bamako, Mali

Amadou Hamadou Babana

Department of Biology, Faculty
of Science and Technology,
University of Science,
Techniques and Technology,
Bamako, Mali

Corresponding Author:

Brahima Sacko

(1) Department of Biology,
Faculty of Science and
Technology, University of
Science, Techniques and
Technology, Bamako, Mali
(2) Diagnostic and Research
Service, Central Veterinary
Laboratory, Bamako, Mali

Bacteriological prevalence of *Salmonella* in poultry carcasses slaughtered in the district of Bamako

Brahima Sacko, Satigui Sidibe, Modibo Kouyate and Amadou Hamadou Babana

Abstract

This study conducted in 2016 was to assess the bacteriological prevalence of *Salmonella* in poultry slaughtered bodies in the District of Bamako. It focused on 150 samples of organs (112 hens and 38 guinea fowl organs collected from poultry carcasses slaughtered in eight (08) poultry slaughterhouses spread over the banks right and left. The individual samples were first seeded on a preenrichment medium and then follow enrichment media for the isolation of the bacteria on selective media and identification by biochemical tests. The work has established a comprehensive bacteriological prevalence rate of 16.67% which has varied depending on the bank, of the species of poultry and the type of organ tested (21.33% for the markets of the left bank and 12% for the right bank markets, 18.80% for chickens and 10.5% for guinea fowl, 20.21% for the intestines and 10.71% for the liver.).

Keywords: Prevalence, *Salmonella*, poultry, Bamako

1. Introduction

The poultry meat is the most balanced human reference food. It is an excellent source of quality protein, vitamins, minerals. However, this meat is likely to be a source of pathogenic microorganisms in general and especially *Salmonella* responsible for cases of food poisoning in humans [1, 4, 5]. Food borne diseases are not well known in Mali and are not subject to mandatory reporting [1]. Contamination of poultry meat *Salmonella* is a public health problem [10, 3] and is related generally to the presence of salmonellosis infection in livestock. Cases of contamination can take place during the evisceration of birds step when the hygienic conditions are not acceptable [5, 8, 11, 15].

2. Material and Methods

2.1. Biological Material

As biological material we used mainly poultry organs (liver, intestine).

2.2. Methods

2.2.1. Characteristics of the study area

Located on the banks of the Niger River, called Djoliba (blood river), the city of Bamako is built in a basin surrounded by hills. It stretches from west to east about 22 km and from north to south about 12 km, an area of 267 km². The Bamako district has a forest reserve, the Koulouba which extends over an area of 2010 ha.

2.2.2. Selection of study sites

We chose four abattoirs in the left bank (Hamdallaye Boulkassoumbougou, Medina Coura, Bamako Coura) and four to the right bank (Niamakoro, Badalabougou, Kalabancoro, Banankabougou). The choice of these slaughterhouses was made on the basis of certain criteria, which are: the importance of poultry numbers available for slaughter, responsiveness of staff responsible for the slaughter and the degree of safety sites.

2.2.3. Type and period of the study

This is an exploratory study which took place during the period from June to October, 2016.

2.2.4. Sampling and samples collection

The study focused on the analysis of 150 samples of organs from slaughtered poultry carcasses

in different markets spread over the banks right (Banankabougou, Niamacoro, Kalabancoro, Badalabougou) and left (Boukassoumbougou, Hamdallaye, Medina, Bamako Coura) Bamako district. Before going in slaughterhouses, we carry a sterile cooler with ice, sterile gloves and sampling bags with labels. The samples were collected at 75 on each side. These samples were packed in ice and sent to the Central Veterinary Laboratory for carrying out laboratory tests.

2.2.5. Experimental Protocol

The samples were first seeded onto liquid media (tetrathionate broth and broth rapaport) incubated in an oven at 37 °C for 24 h. On the second day, there shall be sowing on solid media (MacConkey agar and agar *Salmonella* Shigella) cultures obtained on liquid media. Then *Salmonella* suspect colonies appeared on the agar are transplanted on tryptic soy agar to obtain pure cultures. The pure cultures obtained on tryptic soy agar are transplanted on classic Identification media for biochemical identification.

2.2.6. Data Analysis

The data were entered with Excel 2010 software and the SPSS.20 software was used for statistical analysis. To compare the values of different variables, we used the chi test both Pearson at probability level $p = 5\%$

3. Results

The results showed that the prevalence of *Salmonella* significantly varies across banks (right and left) and according to the species of poultry (hens and guinea fowl). The Results Obtained are Shown in Tables 1, 2, 3.

3.1. Distribution of *Salmonella* by sites

The different results obtained are based on whether the site is on the left bank or the right bank.

Table 1: *Salmonella* distribution by sites

Sites levies	Positive	Negative	p-value
Left Bank	16 (21, 33%)	59	0 001
Right bank	9 (12%)	66	

From the examination of Table 1 show that of the 150 bodies collected in different poultry slaughter, 25 gave positive cultures of *Salmonella* (21 33%). The Highest contamination rates were recorded in the slaughterhouses of the left bank. The results showed that the prevalence of *Salmonella* significantly varies across banks ($p < 0.05$).

3.2. Distribution of *Salmonella* according to the species of poultry

The analysis included 112 hens and 38 guinea fowl organs from both sides. The results are shown in Table 2

Table 2: Distribution of *Salmonella* according to the poultry species

Poultry species	Positive	Negative	P-value
guinea fowl	4 (10.5%)	34	
Hen	21 (18.8%)	91	

It Exam Table 2 shows that of 112 samples tested chickens, 21 gave positive cultures of *Salmonella* (18.8%) and of the 38 samples tested guinea fowl, 4 gave positive cultures of *Salmonella* (10, 5%).

3.3. Distribution of *Salmonella* according to the nature of the organs of slaughtered poultry.

Table 3: Distribution of *Salmonella* according to the nature of the Organs

Organs	Positive	Negative	P-value
Liver	6 (10.71%)	50	0, 3
intestine	19 (20, 21%)	75	

Analysis of Table 3 shows that of 56 tested livers, 6 gave positive cultures from *Salmonella* (10.71%) and 94 intestines tested 14 were positive for *Salmonella* (20.21%).

4. Discussion

This study established a *Salmonella* prevalence rate of 16.67% in poultry organs slaughtered in abattoirs (slaughter) of Bamako. This rate is higher than that obtained by Ch, Quinet ^[6], in 2003 which was Ciney of 12%. Meanwhile, a study by Fuzihara *et al.* ^[7] in 2000 Brazil gave a prevalence rate of 42% which is much higher than the results in our study. This result can be explained by the non-observance of hygienic conditions during transport of poultry to slaughterhouses and also the bad conditions slaughter of its poultry. The prevalence rate observed in this case hen was 18.8% and that of the guinea fowl species was 10.5%. The prevalence rate in this case hen significant turns out that in this case fowl. The same was done by Keita in 2008 ^[9] in Mali obtained a prevalence of fowl species of 2.66% and 1.33 for the species guinea fowl. Most hens that were submitted to our analysis are hen breeds. This result could be explained by the poor quality followed chickens from the farm (for most if the hens are abandoned to themselves in search of food). This can promote contamination of chickens by many pathogenic bacteria including *Salmonella* [2.13]. Among poultry organ harvesting sites, slaughter of Medina Coura provided the highest infection rates (35%). This is probably due to the epizootic situation of salmonellosis in farms from slaughtered poultry. Prevalence rates observed in the liver and intestine were 10.71% and 20.21% respectively. The intestines of prevalence rate is more than that of the liver. This can be explained by the fact that *Salmonella* are bacteria in the digestive tropism. The isolated *Salmonella* strains were *Salmonella* arizona (4%) and *Salmonella* spp (12.66%). This rate is low compared to that obtained by Sidibe *et al.* ^[12] in 2013 in Mali, which is 20, 48%. Van Immerseel *et al.* ^[14] in 2003 achieved a 71.6% frequency of isolation of *Salmonella* Enteritidis and *Salmonella* Typhimurium of 19.4%. Ch, Quinet ^[6], in 2004, obtained a frequency of *Salmonella* spp 12%. *Salmonella pullorum* / *gallinarum* is deemed to be responsible for cases of pullorum disease in chickens and typhoid in adult birds. Most data available on the subject confirms that these strains are not pathogenic for humans unlike *Salmonella* arizona which is responsible for cases of poisoning in humans. *Salmonella pullorum* / *gallinarum* is deemed to be responsible for cases of pullorum disease in chickens and typhoid in adult birds. Most data available on the subject confirms that these strains are not pathogenic for humans unlike *Salmonella* arizona which is responsible for cases of poisoning in humans. *Salmonella pullorum* / *gallinarum* is deemed to be responsible for cases of pullorum disease in chickens and typhoid in adult birds. Most data available on the subject confirms that these strains are not pathogenic for humans unlike *Salmonella* arizona which is responsible for cases of poisoning in humans.

5. Conclusion

This study confirms that poultry carcasses slaughtered in the District of Bamako are contaminated with *Salmonella*. So to reduce the risk of food poisoning, it must respect the rules of hygiene in the preparation and cooking of poultry meat.

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