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Isolation, Identification, and Antibiotic Resistance of Salmonella Spp. Strains Isolated From Broilers and Layer Hens In The Central Region of Algeria

Guechtouli Sihem[1,4], Messai Chafik Redha[2,4], Morsli Amirouche[*1,5], Hamdi Taha Mossadak[4] and Khelef Djamel[3]

[1.] *Departement of Agricultural Sciences, Faculty of Sciences, M'Hamed Bougara University, Boumerdes, Algeria.*
[2.] *Department of Biology and Agronomy, University Mohamed El Bachir El Ibrahimi, Bordj Bou Arreridj, Algeria.*
[3.] *Laboratory of Health and Animal Production (SPA), High National Veterinary School, Algiers, Algeria.*
[4.] *Laboratory of Food Hygiene and Quality Insurance System (HASAQ), High National Veterinary School, Algiers, Algeria*
[5.] *Laboratory of Bioinformatics, Applied Microbiology and Biomolecules (BAMB). M'Hamed Bougara university, Boumerdes, Algeria.*

Abstract

THE AIM of this work is to isolate strains of *Salmonella* spp from broiler chickens and layer hens to identify their serotypes and to study their resistance profile.A total of 270 samples including liver and spleen were collected from 26 broiler farms and 25 layer hen farms. These samples include 140 broiler samples and 130 layer hen samples collected from different poultry farms in central Algeria. Strains of *Salmonella* spp were isolated and identified according to their macroscopic, microscopic and biochemical characteristics. The identification of the isolated strains was followed by serotyping of the isolates. Using Mueller-Hinton agar and the disk diffusion method, the resistance of the isolates to twelve antibiotic compounds was investigated. Among the 270 samples, 80 were positive (29.63%). In broiler chickens, 34 (24.28%) samples were confirmed positive, while in layer hens 46 (35.38%) samples were confirmed positive. Two serotypes from the 80 strains of *Salmonella* were identified with a predominance of the *Salmonella* Gallinarum serotype with a prevalence of 100% in layer hens and 79% in broiler chickens, followed by the *Salmonella* Enteritidis serotype. The highest resistances were recorded for Nalidixic acid NA (79.41%/100%), enrofloxacin ENR (41.18%/73.91%) and tetracycline Tcy (8.82%/54.35%), respectively in broiler chickens and the layer hen. However, no resistance to colistin was recorded in either species.48 isolates (60%) were multi drug resistant (MDR), and 3 antibiotic resistance profiles were recorded, with a multi-antibiotic resistance index (MARI) of 0.2 to 0.6.These findings demonstrated the risk that chicken farming poses to the persistence and spread of *salmonell*a strains that are resistant to several antibiotics

Keywords: *Salmonella*; broiler chicken; layer hen; multidrug resistance; serotype.

Introduction

Globally, *Salmonella* is acknowledged as a significant foodborne pathogen; the majority of isolates in the genus are non-typhoidal, and they are the primary cause of infectious gastroenteritis worldwide [1]. To far, more than 2,500 serotypes have been found among the two primary species, enterica and bongori. The enterica species are thought to be the most frequent foodborne pathogens that infect humans, together with the serovars Enteritidis and Typhimurium [2]. Generally speaking, there are two types of *salmonella* in chicken depending on the illnesses they produce. *Salmonella* of the chicken host that have evolved, become virulent, and become immobile make up the first category. Avian typhoid is caused by S. Gallinarum, whereas S. Pullorum causes pullorosis in poultry [3]. The two primary motile serotypes of *salmonella* that cause human illness are found in the second category of *salmonella*, called paratyphoid *salmonella*: *S.* Typhimurium and *S.* Enteritidis [4]. For serotypes *S.* Typhimurium and *S.* Enteritidis,

*Corresponding authors: Amirouche Morsli, E-mail: a.morsli@univ-boumerdes.dz Tel.: +213542080664
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infection generally remains subclinical in birds [5]. Throughout the food chain, salmonellosis can spread, especially in chicken products if proper hygiene and infection control procedures are not followed [6]. The major producing nations of chicken meat in Africa are Algeria, Egypt, Morocco, Nigeria, and South Africa. [7]. Algeria has experienced significant development in the poultry industry over the last decade and chicken meat is the most consumed due to its relatively low price and easy digestibility [8, 9] is frequently disrupted in low-resource developing nations like Algeria by the widespread occurrence of infectious illnesses. These diseases' emergence, which has resulted in enormous losses due to a decrease in the quality of the product produced and the expense of treatment, is caused by poultry farms' disregard for good agricultural practices (GAP), inadequate biosecurity, and inadequate hygiene standards. [10]. Poultry farming sector is suffering significant financial losses due to *Salmonella*. *Salmonella* infections in poultry farms cause considerable losses to poultry producers. Young chickens can suffer from stunted growth and even death from infections they acquire either horizontally in the hatchery or vertically from their parents. For chicken farmers, preventing the spread of *Salmonella* to offspring or to the population can be costly [11]. Indeed, the poultry industry is known for its wide use of antibiotics as prophylactic and therapeutic agents. The growth and emergence of resistant bacteria has been facilitated by the indiscriminate and widespread use of antibiotics [12]. The rise of multi-antimicrobial resistance cases has turned into a major global public health issue [13] and a number of scientists have documented the appearance of multiresistant bacteria that have been identified from poultry products [14, 15]. Due to the lack of precise data in the central region of Algeria on the antimicrobial resistance profile and the serotypes of *Salmonella* sp. circulating in layer hens and broiler farms. Although much work has been carried out in Algeria on these microbial germs and their resistance to antibiotics, this research has not been updated to date. The present study was planned to phenotypically characterize *Salmonella* isolates from the broiler and layer hen population and to research their antibiotic resistance profile.

Material and Methods

Ethical approval:

Experimental procedures was approved by the Institutional Committee for the Protection of Animals of the National Administration of Higher Education and Scientific Research of Algeria (98-11, Act of 22 August 1998).

Study location and population

The study spanned a period of two years, from March 2018 to March 2020 and included 51 farms, including 26 industrial-type broiler farms and 25-layer hen farms. Their breeding capacities vary from 2400 to 10,000 individuals per building, located in the central and north-eastern region of Algeria (provinces of Bordj Bou Arreridj, Bouira, Boumerdes and Algiers) having kindly participated voluntarily in the work. Five chickens were selected from each farm. Our choice fell on this region because the majority of industrial poultry production is found there. It therefore seemed to us to be a potentially risky area for the circulation and transmission of pathogens in poultry, and therefore particularly suitable for carrying out our study. The farms where we took the samples were targeted, for the sake of convenience and budget.

Sampling and collection

A total of 270 liver and spleen were collected asepticallyafter necropsy from 270 broiler and layer hen freshly dead, originating from farms withmortality rates.The sampled animals presented clinical signs and lesions at necropsy of avian typhoid (Figure 1,2,3,4), namely:diarrhea yellow like egg yolk, necrotic focion the liver and spleen, enlarged, dark and crumbly liver with a distinctive copper color, bronze sheen like those reported in literature [16]

Bacteriological analysis of samples

Isolation and identification of Salmonella spp.

The procedure for the identification of *salmonella* in food and animal feed (EN/ISO 6579 2002/Amd1:2007) was followed in the bacteriological analyses [17]. The autopsies are carried out in an aseptic manner, then the organs (livers and spleens) are removed sterilely, placed in sterile jars and are transported in a cooler under positive cold cover at + 4°C to the laboratory for bacteriological examinations. The two samples were combined before to being identified and isolated. After pre-enriching, 25 gof the liver and spleen mixture with 225 ml of buffered peptone water (BPW) (Bioscan, Algeria). The mixture was incubated for 18 to 20 hours at 37°C. Using selenite cysteine (SC) and rappaport vassiliadis (RV) enrichment broth, a double selective enrichment is performed. The inoculation process involves adding 1 ml of BPW to the SC tube and 0.1 ml to the RV tube. The tubes are then incubated for 18 to 24 hours at 37°C for the SC and 41.5°C for the RV. The enriched samples were then seeded by the exhaustion technique onto Hektoen agar (Pasteur Institute of Algeria) and Xylose-Lysine-Deoxycholate (XLD) agar (Fluka analytical Steinheim, Buchs, Switzerland), and incubated for 24 hours at 37°C.

Biochemical confirmation is carried out using classic biochemical tests such as the T.S.I. test: Tri-SugarIron Medium (Biokar, Beauvais, France). Biochemical tests using the API 20E gallery was used to confirm the identification of the *Salmonella* isolates (BioMérieux,France) . Serological tests (the rapid agglutination slide) were performed using specific sera in order to determine *Salmonella* serovars following the Kauffmann-White-Le Minor scheme [18].

Antimicrobial susceptibility testing:

The 80 isolates of *Salmonella* that were found were subjected to antibiotic susceptibility testing using the disk diffusion method on Mueller-Hinton agar and 12 antibiotics (Biorad, France). The results were interpreted in accordance with CLSI recommendations (2020) [19]. Three categories for isolates were established: susceptible (S), intermediate (I), and resistant (R). Gentamycin (GEN10µg), trimethoprim-sulfamethoxazole (SXT, 1.25/23.75 µg), cefotaxime (CTX 30µg), chloramphenicol (CHL30µg), ampicillin (AMP10µg), amoxicillin+clavulanic acid (AUG 20/10 µg), tetracycline (TE 30µg), nalidixic acid (NA, 30 µg), enrofloxacin (ENR 10µg), colistin sulfate (CS: 10µg), Nitrofurantoin (NIT, 300 µg), and Neomycin (NEO 30µg) were among the antibiotic discs tested. For quality control, Escherichia coli ATCC 25922 was employed. The formula for calculating antimicrobial resistance indices (MARI) is a/b, where "a" is the number of antibiotics to which a specific isolate proved resistant and "b" denotes the total number of antibiotics tested [20].

Serotyping of isolates

Serological confirmation was made by slide agglutination tests and consisted of the use of multivalent anti O and anti H serums (Diagnostic Pasteur, Paris, France) according to the Kaufmann-White scheme [21]

Analytical statistics

The data were exported to the computer application Statistical Package for Social Scientists (SPSS, version 2020) for additional data analysis once the database was created.

The degree and direction of a linear link between two continuous variables are determined by Pearson's correlation coefficient, or r. With r=1 denoting a perfect positive linear connection and r=−1 denoting a perfect negative linear relationship, it lies between -1 and 1. There is no linear connection when r=0.

Results

Frequency of isolation of *Salmonella* strains in broilers and layer hens:

Out of 270 samples, the genus *Salmonella* was identified in 80 (29.63%) samples. In broilers out of a total of 140 samples, 24.28% (n = 34) were confirmed positive for *Salmonella* sp. While in layer hens, among the samples collected (N = 130), 35.38% (n = 46) were confirmed positive for *Salmonella* sp. hence *Salmonella* sp. was more common in layer hen farms than in broiler farms.

Serotyping of isolated strains

Two serotypes from eighty strains of *Salmonella* were identified with a predominance of serotypes *Salmonella* Gallinarumwith a rate of 100% in layer hens and 79% in broilers, followed by *Salmonella* Enteritidis only in broilers with a frequency of 18 % (Table II).

Antibiotic resistance profile

Varying rates of resistance of *Salmonella* strains were observed against 12 antibiotic molecules (Table III).

Resistance to various antibiotic molecules has been recorded in both broiler chickens and layer hens, however no resistance to colistin was recorded in these two species. The main antibiotics affected by this resistance belong to the family of quinolones, betalactams and tetracyclines. Furthermore, other resistances were quantified to certain families of antibiotics which are not used in the veterinary field such as gentamicin (in layer hens) and to antibiotics belonging to the furan family.

Resistance phenotypes

A total of 48 isolates (60%) were multi-resistant (resistance to at least three antibiotic classes), and 13 antibiotic resistance profiles were recorded, with a multi-antibiotic resistance index (MARI) of 0.2 to 0.6 (Table IV).

Discussion

An isolation rate of 24.28% (34/140) was recorded in this study; the average rate of positive *Salmonella* in this study is similar to that found in Egypt (120/420, 28.6%) [22], in Libya (21%) [23], in Tunisia 19.9% [24] , but higher than that found in Uganda (13.46%) [25], Kwara State, north-central Nigeria (58 /900, 6.4%) [26], and in the EU (1.89%) [27]. Higher rates were recorded in Algeria with a value of 34.37% [28] and in Egypt 64% [29].

The higher prevalence of *Salmonella* sp. (35.38%) in layer hen farms may be explained by the physiological stress that layer's experience when confined in cage systems, especially during the production of eggs. This rate is close to that found by [30], where 28% were confirmed positive for *Salmonella* sp. Our result is significantly higher than that reported in Algeria by [31], which was 0.68%. A

prevalence of 60% has been reported in northeastern Algeria [32]. *Salmonella* was significantly more frequent in layer hen farms (35.38%), than in broiler farms (22.14%), with a positive correlation between the type of breeding and the isolation rate (r=0.321), which agrees with a previous observation [33], which demonstrated that layer hens had the largest percentage of positive samples, in contrast to [34] who discovered that broilers had a noticeably greater frequency of *Salmonella* than layers. The absence of a *Salmonella* infection management strategy is the cause of this high incidence (particularly in healthy chicken farms) [35]. The frequency of *salmonella* can be directly impacted by a number of variables. These overall variations in the prevalence of *Salmonella* could be explained by the henhouses under study having poor hygiene standards and their design, particularly since some of them are uncontrolled, hoop-shaped breeding structures. Risk factors that can lead to *Salmonella* contamination in layer hens include easily accessible layer houses, lack of disinfection prior to pulling pullets, inadequate ventilation, corpse storage on the farm, presence of rats, and dry cages cleaned before pulling pullets.[31].

Knowledge of the serotypes involved in these infectious episodes of *Salmonella* in poultry is of the utmost importance in the fight against its spread. Two *Salmonella* serotypes were found in the samples used in this investigation, with S. Gallinarum and S. Enteritidis having the highest prevalences. This last serotype, which causes human salmonellosis, is one of the most prevalent serotypes and has been detected in several research [36]. *Salmonella* Gallinarum was more frequent in both animal species, in layer hens the rate was 100%, with a negative correlation between the type of farming and the serotype (r= -0.410). Our results do not join those found in Algeria where six serotypes were isolated in this species with predominance of *S.* Enteritidis and *S.* Kentucky [31]. In Egypt, isolates belonged to the serotypes S. Enteritidis, S. Typhimurium and S. Gallinarum [37]. In broiler chickens, [38] reported a predominance of serovars in descending order Kentucky, Enteritidis followed by Heidelberg, Virchow, Manhattan. *Salmonella* Heidelberg (24%), *Salmonella* Enteritidis (20%), *Salmonella* Albany (16%), and *Salmonella* Typhimurium (9%), among other common serotypes, were identified for [39]. These results corroborate with those carried out previously where 92.99% were confirmed as being *Salmonella* Gallinarum [30]. The presence of S. Enteritidis was 18% only in broiler chickens; this result is higher than that found in Algeria [28]. In Libya the prevalence of S. Enteritidiswas 7% [23], in Egypt where *Salmonella* Enteritidiscomes in third position (5.45%) [29]. And lower than that found in Pakistan (23.33%) by [40]. *Salmonella* Enteritidis and S. Typhimurium were previously [1] not found from chicken samples in Algeria, although they were commonly isolated from broiler farms. Several authors revealed that the predominant serotype from poultry was S. Gallinarum, followed by S. Enteritidis [41]. The detection of S. Enteritidisin cases of avian typhoid is becoming increasingly important from a public health perspective. One isolate (3%) remained untypeable, confirmed by serotyping and categorized as such [42]. It can be inferred that there were rough mutant strains present that lacked the particular side chains that are crucial for 'O' specificity, or that there were further abnormalities in the core structure.

The highest resistance was recorded for Quinolones in two species with values of (100%) in layer hens and (79.41%) in broilers, with a positive correlation (r= 0.299). Our findings concur with those of many Algerian research [31]. In Tunisia [24] where the greatest resistance was recorded for quinolones, while in Korea where the highest resistance rates were detected for Nalidixic acid (NA) [43]. On the other hand, low resistance was recorded in Egypt [37]. This high resistance can be explained by their abusive use in poultry production. Given that quinolones are an antibiotic class that makes about a third of prescribed medications in the field of human medicine, the high prevalence of resistance to these treatments in this study is very concerning [44]. Resistance to the fluoroquinolones tested (Enrofloxacin) was recorded in the two broiler and layer hens species respectively (41.18%/73.91%), with a positive correlation (r= 0.265). This corresponds to the results found in Algeria by [45]. This is all the more worrying since fluoroquinolones are among the most widely used antibiotics to treat salmonellosis in humans and animals due to their broad spectrum of activity [46]. The rate of resistance to cyclins was significantly higher (r = 0.343) in layer hens than in broilers, these rates correspond to those reported in Algeria by [36] and differ from those reported in broilers (37.6%) by [47]. Among the most common medications used for poultry therapy and prevention are cyclins and sulphonamides [48, 49]. Resistance to β-lactams only concerned ampicillin in broilers (17.64%). associated with amoxicillin clavulanic acid (10.87%), in layer hens with a positive correlation (r= 0.267). Our results differ from those found in Algeria by [43], who reported resistance rates of 47.36%, to ampicillin in broilers. and agrees with those of [50] who reported very low rates of resistance to amoxicillin clavulanic acid (11%). All isolates were sensitive to cefotaxime for both species, this result is consistent whit that found by [51]. The use of cephalosporins is rare in poultry production [52]. The hightlevel of resistance observed in this investigation

is cause for concern. As for sulfonamides, sulfamethoxazole/trimethoprim our result is different from that reported by [22] (100%). In layer hens Our result (6.52%) is close to that found by [53]. All isolates tested were sensitive to colistin, same result found in Algeria by [38] and in Libya by [23] where colistin had the highest sensitivity (72%). unlike [54], who found resistance of 80%. In addition, resistance to antibiotics which are not used in veterinary medicine was recorded, this concerns both gentamicin in layer hens and furans in broiler chickens, thus testifying to fraudulent use. In a similar vein, [55] showed that gentamicin consistently works against *Salmonella*, independent of the study's duration or location. [6] Stated that 4% of isolates of *Salmonella* shown resistance to gentamicin. Despite the fact that furans are no longer recognized in Algeria, we have shown that 35.29% of broilers are resistant to Nitrofuran. This result corresponds to that obtained in 2020 in Chain by [56] and remains high compared to the result of [44], which was 22.64%.

In this study, more than half of *Salmonella* isolates showed resistance to more than 3 classes of antibiotics, and these results are consistent with those found [22]. 48 isolates (60%) were multi-resistant, in addition varied profiles of antibiotic resistance were recorded with a positive correlation between multi-resistance and the type of breeding (r = 0.249). Our results are close to those found by [57, 24] in broiler chickens and [30] in layer hens respectively (70.53%, 87.5%, 66.5%) and differ from those found in Algeria where 15.09% of strains were multi-resistant [39], a lower rate was recorded in layer hens (15.4%) [44], and differs from those of [58] where the number of multi-resistant isolates is relatively low. According to our results, the multi-resistance rate in layer hens (67.39%) is higher than that in broilers (50%), contrary to [59] who found that broilers consume more antimicrobials compared to layers. . This contradiction can be explained by the duration of rearing which is longer in layer hens. The multi-antibiotic resistance index (MARI) in this investigation varied from 0.2 to 0.6. A MARI value of less than 0.2 is regarded as minimal risk, whereas a number more than 0.2 denotes high risk [60]. *Salmonella* serotypes in this study demonstrated 13 different MDR profiles, which is similar to the results of [22]. Since β-lactamines, tetracyclines, sulfaméthoxazole, and quinolones are necessary for the treatment of avian salmonellosis, the MDR phenotypes of *Salmonella* are significant from a therapeutic standpoint [61]. *Salmonella* Enteritidis in our investigation shown resistance to quinolones, furans, and cyclins. Our results agree with those found by [40], which demonstrated multiple resistances to the same molecules in this strain. The spread of this serotype and the emergence of other resistance mechanisms to different classes of antimicrobials may be aided by this multi-resistance. Even if a ministerial directive in Algeria forbids treating avian salmonellosis [62]. The illogical and fraudulent use of these medications for therapeutic, preventive, and growth-promoting purposes may account for the high rate of resistance to antimicrobials that we observed. This practice results in the emergence of antibiotic-resistant bacteria, which are subsequently passed on to humans through the food chain [29]. However, due to the lack of facilities in our phage typing or PCR laboratory, we are unable to further investigate these results.

Conclusion

This study provides data on contamination by *Salmonella* strainsof layer hens and broiler farms in Algeria. The findings show that *Salmonella* infection is common in broiler and layer farms in Algeria's central area and that the bacteria is becoming more resistant to medicines that are crucial to medical treatment. *Salmonella* Gallinarum, and S. Enteritidis were the only serotypes isolated. Because of incorrect use of antibiotics without a prescription, some strains in this research had various antibiotic resistances, which increases the risk of salmonellosis to the public's health and jeopardizes the efficacy of medication in people. Regretfully, there is a lack of public information about the usage of antibiotics on farms in Algeria. In order to prevent *Salmonella* infection in poultry farms, such data requires the development and execution of biosecurity plans in addition to biocontrol methods. In light of this, more investigation into the primary risk factors would be intriguing, and molecular characterization is required to pinpoint the genes implicated in pathogenicity and antibiotic resistance in *Salmonella sp.* isolated from animals meant for human consumption.

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Declaration of Conflict of Interest

The authors declare that there is no conflict of interest.

Ethical of approval

Following an inquiry about their cooperation and readiness to participate, farmers (respondents) gave their verbal agreement. None of the herds sampled had been vaccinated against *Salmonella*.

TABLE I. Percentage of positive samples collected from poultry farms

Breeding	Somme of samples	Positive samples	% positive samples
Broilers	140	34	24,28
Layer hens	130	46	35,38
total	270	80	29.63

TABLE II. Distribution of *Salmonella* serotypes isolated

	Layer hens	Broilers
***Salmonella* Gallinarum**	46 (100%)	26 (79%)
***Salmonella* Enteritidis**	00	6 (18%)
***Salmonella* Spp**	00	1 (3%)

TABLE III. Rate of antibiotic resistance in broiler chickens (34 strains) and layer hens (46 strains)

Breeding	Broiler chickens	Layer hens
Total of strains	N=34 (100%)	N=46 (100%)
Antibiotic	Rate of resistance	
Amoxicillin/Ac clavulanic (AUG,20/10 µg)	0 %	4 (8,7%)
Cefotaxime (CTX,30 µg)	0 %	0 %
Ampicillin (AMP, 10 µg)	6 (17,64%)	5 (10,87%)
Tetracyclin (TE, 30 µg)	3 (8,82%)	25 (54,35%)
Nalidixic acid (NA, 30 µg)	27 (79,41%)	46 (100 %)
Enrofloxacin (ENR, 10 µg)	14 (41,18%)	34 (73,91%)
Gentamicin (GEN, 10 µg)	0 %	5 (10,87%)
Neomycin (NEO,30 µg)	0 %	5 (10,87%)
Colistin Sulfate(CS, 10 µg)	0 %	0 %
Nitrofurantoin (NIT, 300 µg)	12 (35,29%)	1 (2,17%)
Trimethoprim-sulfmethoxazole (SXT, 1.25/23.75µg)	2 (5,88%)	3 (6,52%)
Chloramphenicol (CHL, 30 µg)	5 (14,71%)	0 %

TABLE IV. Multi-resistance profiles observed

Sources	Resistance profile	S. Sérovars	Number of strains	Number of AB	MARI(%)
Broilers	SXT-NA-ENR-TCY	S.Gallinarum	1	4	0.3
	NA-ENR-TCY	S.Gallinarum	3	3	0.2
	AMP-SXT-NIT-NA	S.Gallinarum	1	4	0.3
	NA-ENR-TCY-NIT	S.Gallinarum	2	4	0.3
	AMP-ENR-CHL-NIT	S.Gallinarum	2	4	0.3
	AMP-NIT-CHL	S.Gallinarum	1	3	0.2
	AMP-CHL-ENR	S.Gallinarum	2	3	0.2
	NIT-NA-ENR	S.Gallinarum	2	3	0.2
	AMP-NIT-NA-ENR	S.Gallinarum	1	4	0.3
	NIT-NA-ENR	S.Enteritidis	1	3	0.2
	NIT-NA-TCY	S.Enteritidis	1	3	0.2
Layer hens	SXT-NA-ENR-TCY	S.Gallinarum	6	4	0.3
	NA-ENR-TCY	S.Gallinarum	14	3	0.2
	AUG-AMP-GEN-NEO-NA-ENR-TCY	S.Gallinarum	5	7	0.6
	AMP-NA-ENR	S.Gallinarum	3	3	0.2
	AMP-NA-ENR-TCY	S.Gallinarum	1	4	0.3
	NIT-NA-ENR	S.Gallinarum	1	3	0.2
	NIT-NA-TCY	S.Gallinarum	1	3	0.2

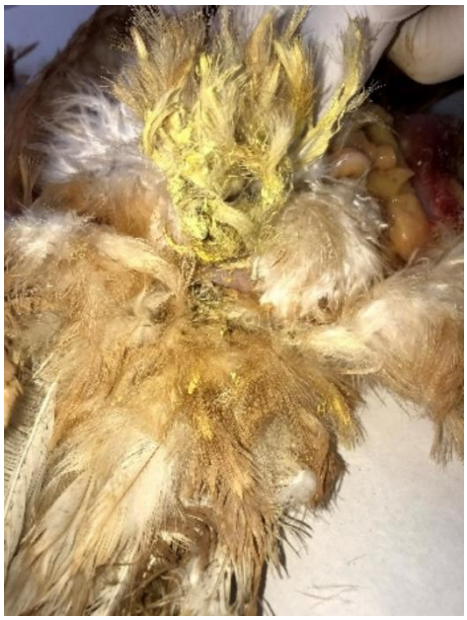

Fig. 1. Yellowish diarrhea sticky to the cloaca of layer hen

Fig. 2. Necrotic foci in the spleen of broiler chickens

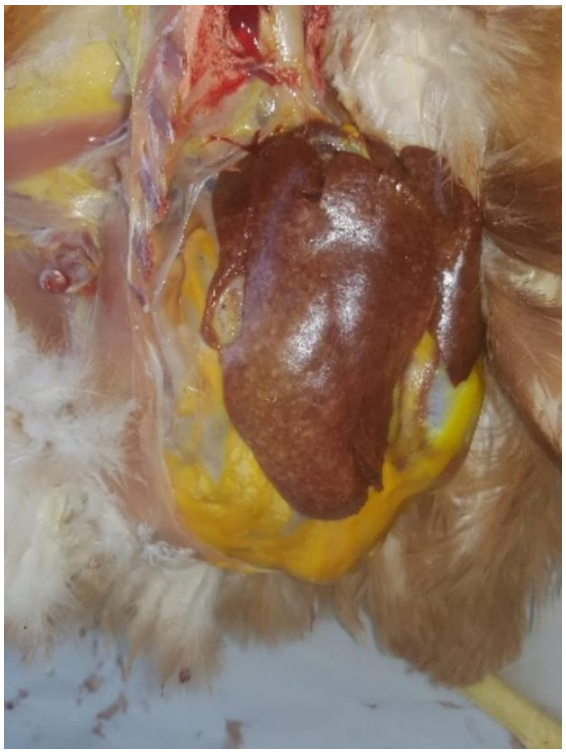

Fig. 3. Enlarged and Necrotic foci in the liver of pullorosis disease in a layer hen

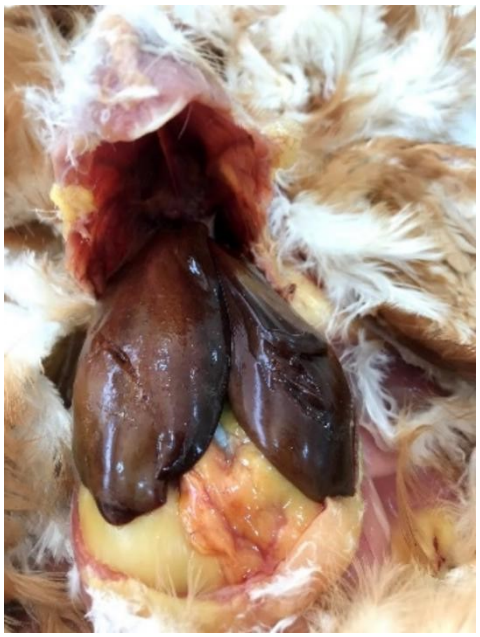

Fig. 4. Enlarged and bronze-green coloration of the liver characteristic of typhoid disease in a layer hen

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عزل وتحديد ومقاومة المضادات الحيوية لسلالات السالمونيلا المعزولة من الدجاج اللاحم والبياض في المنطقة الوسطى بالجزائر

قشتولي سهام [1، 4]، مسعي شفيق رضا [2، 4]، مرسلي اعميروش* [1، 5]، حمدي طه مصدق [3] و خلاف جمال [4]

1. قسم العلوم الفلاحية، كلية العلوم، جامعة محمد بوقرة، بومرداس، الجزائر.

2. قسم البيولوجيا والفلاحة، جامعة محمد البشير الإبراهيمي، برج بوعريريج، الجزائر.

3. مختبر الصحة والإنتاج الحيواني *(SPA)*، المدرسة الوطنية العليا للطب البيطري، الجزائر، الجزائر.

4. مختبر سلامة الأغذية ونظام ضمان الجودة (HASAQ)، المدرسة الوطنية العليا للطب البيطري، الجزائر، الجزائر

5. مختبر المعلوماتية الحيوية وعلم الأحياء الدقيقة التطبيقية والجزيئات الحيوية (BAMB). جامعة محمد بوقرة، بومرداس، الجزائر.

الملخص

الهدف من هذا العمل هو عزل سلالات السالمونيلا من دجاج اللحم والدجاج البياض لتحديد أنماطها المصلية ودراسة ملف مقاومتها. تم جمع ما مجموعه 270 عينة بما في ذلك الكبد والطحال من 26 مزرعة دجاج لحم و 25 مزرعة دجاج بياض. تشمل هذه العينات 140 عينة دجاج لحم و 130 عينة دجاج بياض تم جمعها من مزارع دواجن مختلفة في وسط الجزائر. تم عزل سلالات السالمونيلا وتحديدها وفقًا لخصائصها العيانية والمجهرية والكيميائية الحيوية. تبع تحديد السلالات المعزولة تحديد النمط المصلي للعزلات. باستخدام أجار مولر هينتون وطريقة انتشار القرص، تم التحقيق في مقاومة العزلات لاثني عشر مركبًا مضادًا حيويًا. من بين 270 عينة، كانت 80 عينة إيجابية (29.63٪). في دجاج التسمين، تم تأكيد إيجابية 34 عينة (24.28%)، بينما في دجاج البياض تم تأكيد إيجابية 46 عينة (35.38%). تم تحديد نمطين مصلين من 80 سلالة من السالمونيلا مع غلبة النمط المصلي Salmonella Gallinarum بنسبة انتشار 100% في دجاج البياض و79% في دجاج التسمين، يليه النمط المصلي Salmonella Enteritidis. تم تسجيل أعلى مقاومة لحمض النالیدیکسیك 100%/79.41% (NA)، الأونروفلوكساسين 73.91%/41.18% (ENR) و التيتراسيكلين (Tcy) 54.35%/8.82%، على التوالي في دجاج التسمين ودجاج البياض. ومع ذلك، لم يتم تسجيل أي مقاومة للكوليستين في أي من النوعين. كانت 48 عينة (60%) مقاومة للأدوية المتعددة (MDR)، وتم تسجيل 3 ملفات لمقاومة المضادات الحيوية، مع مؤشر مقاومة المضادات الحيوية المتعددة (MARI) من 0.2 إلى 0.6. أظهرت هذه النتائج الخطر الذي تشكله تربية الدجاج على استمرار وانتشار سلالات السالمونيلا المقاومة للعديد من المضادات الحيوية

الكلمات الدالة: السالمونيلا؛ دجاج التسمين؛ دجاج البياض؛ مقاومة متعددة للأدوية؛ النمط المصلي