Prevalence and Antibiotics Susceptibility Profile of *Listeria monocytogenes* Isolated from Processed and Unprocessed Meat Products in Lagos, Nigeria

Ohue LA, Enurah LU, Aboaba OO

Department of Microbiology, Faculty of Science, University of Lagos, Akoka, Lagos, Nigeria

**Article History**
Received: 04 October 2014
Accepted: 23 November 2014
Published: 1 January 2015

**Citation**

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**ABSTRACT**
Antibiotics susceptibility pattern of *Listeria monocytogenes* isolated from processed and an unprocessed meat was investigated. A total of fifty (50) retail meat samples consisting of 20 raw meat, 15 fresh processed meat samples and 15 processed ready- to-eat samples were cultured on *Listeria Selective Agar* (Oxoid) and *Listeria Chromogenic Differential Agar* (Oxoid) after pre-enrichment in Buffered *Listeria Enrichment Broth*. *Listeria* spp. were isolated from 29 (58%) of the samples, out of which 14 (28%) were *Listeria monocytogenes*. *Listeria monocytogenes* was significantly higher in unprocessed meat 9 (45%) than in processed ready-to-eat meat products which were 5 (33%). No isolate was found in fresh processed meat products comprising of smoked bacon, sausages, beef mortadella, minced meat and beef salami. The antibiotic susceptibility of the fourteen *Listeria monocytogenes* strains was determined by disc diffusion method. High susceptibility was found in Ciprofloxacin (100%), Pefloxacin (100%), Gentamycin (100%), Streptomycin (92.9%), Erythromycin (92.9%), Sulphamethoxazole (71.4%) and Amoxicillin (64.9%). Resistance to Ampiclox was the most common and was encountered in 13 (93%) of the strains. The study shows that *Listeria monocytogenes* from meat samples are susceptible to the antibiotics commonly used in veterinary and human listeriosis treatment.

**Key words:** *Listeria monocytogenes*, prevalence, antibiotic susceptibility, processed, unprocessed, meat products.
1. INTRODUCTION

Listeria spp. are rod shaped, gram positive, facultative anaerobic, non-spore forming bacterium. The genus Listeria consists of ten species: Listeria monocytogenes, Listeria ivanovii, Listeria seeligeri, Listeria innocua, Listeria welsehimeri, Listeria grayi, Listeria marthii, Listeria rocourtiae, Listeria fleischonii and Listeria welshenonpheniasis (Zhang et al., 2007; Halter et al., 2012). Among these species only L. monocytogenes and L. ivanovii are pathogenic, and the rest are non-pathogenic (Liu, 2006). L. monocytogenes is an intracellular foodborne pathogen that causes listeriosis and severe infections in humans with high mortality rate, mainly in high risk groups including pregnant women, neonates, the elderly, HIV/AIDS and cancer patients. L. monocytogenes has been isolated from soil, surface water, vegetation, the environment and various foods (Kuhn et al., 2008, Liu 2008).

In the United States of America, about 2500 cases of listeriosis occur each year with 20–30% mortality regardless of antimicrobial treatment (Mead et al., 1999). Thus, it indicates that the prevalence of Listeria monocytogenes in foods poses a significant danger. The incidence of listeriosis in European Union in 2007 was reported to be 0.3 cases in every 100,000 population (Lindback, 2011). In Nigeria, few sporadic cases of listeriosis have been reported (Chukwu et al., 2006), there is no data on outbreak of human listeriosis and the sources of contamination were unknown. Various food surveys conducted in Nigeria had reported on the detection of L. monocytogenes in different food products, including raw milk, smoked fish (Salihu et al., 2008), beef, pork, goat meat, poultry, fish and vegetables (Ikeh et al., 2010) products. Inspite of all these studies, there is no data for prevalence of L. monocytogenes in processed and unprocessed meat products in Lagos and needs to be investigated as these products are highly consumed. Listeria monocytogenes has fair stability over antibiotic susceptibility, but in relatively recent time, reports of emergence of antibiotic resistant Listeria monocytogenes recovered from food, environment and from sporadic cases of human listeriosis have remained of significant public health concern. Currently, the treatment of choice for listeriosis is a β-lactam antibiotic (e.g penicillin or ampicillin, alone or in combination with an amino glycoside (e.g gentamycin) in case of immunocompromised patients (Hof, 2003). The second choice is the combination of trimetoprim and a sulfonamide (e.g sulphamethoxazole), specially for patients allergic to β-lactam. But multidrug resistance to erythromycin, tetracycline, dicloxacillin and trimetoprim-sulphamethoxazole has been reported (Rodax-saurex et al. 2000, Brooke et al., 2004). In Northern Nigeria and North Africa, it was reported that most strains of Listeria monocytogenes were sensitive to ampicillin, erythromycin and other common antibiotics. Surprisingly, the same research reported that the organism was found resistant to cephalosporin, nitrofurantoin, tetracycline an chloramphenicol at in vitro levels (Oyemelukwe et al., 1983, Cherubin et al. 1991, Adetunji and Adegoke, 2008). In Western Nigeria, a multi-antibiotic resistance of Listeria monocytogenes has been reported (David ad Odeyemi, 2007).

2. MATERIALS AND METHODS

2.1. Isolation and identification

Fifty (50) retail meat samples consisting of (20) raw meat samples were collected from five open-air markets in Lagos metropolis, (15) fresh processed meat samples including beef salami (3), sausages (3), smoked flavored bacon (3), minced meat (3) and beef mortadella (3), were collected from retail stores and supermarkets in Lagos and 15 processed ready-to-eat meat samples consisting of packaged Kilishi (4), unpackaged Kilishi (4), suya (4) and stick-peppered suya (3) were collected from open markets in Northern, Eastern, Western and Southern parts of Lagos city, Nigeria. For detection of L. monocytogenes, ISO 11290-1 method was applied as described by Ennaji et al. (2008). Twenty-five grams of each sample was homogenized in 225ml of primary enrichment culture of Listeria without supplement (Buffered Listeria Enrichment broth, Oxoid, England) in sterile stomacher bag and was incubated at 30°C for 24h. One ml of the primary enrichment culture was then added to 9ml of enrichment broth with supplement (Buffered Listeria Enrichment broth, Oxoid, England), and it was incubated at 37°C for 24h. A loop full of the enrichment broth was streaked onto Listeria selective agar with supplement (Oxoid, England). The plates were incubated for 24 to 48h at 37°C. The presumptive colonies from the culture medium were identified using cultural, morphological and biochemical tests. API Listeria test kit (Oxoid Biochemical Identification System, O.B.I.S mono) and Listeria chromogenic differential agar with supplements (Oxoid, England) were used for confirmation of L. monocytogenes. For aerobic plate count, 0.1ml each of the primary enrichment culture was plated on nutrient agar and incubated at 37°C for 24h. The resultant colonies were counted using Galenkamp colony counter. Similarly, for total Listeria spp. count, 0.1ml each of primary enrichment culture with supplement was plated on nutrient agar and incubated at 37°C for 24h. Developed colonies were counted also with colony counting machine.

2.2. Antibiotic susceptibility test

Antibiotic susceptibility of isolates was performed by Kirby-Bauer disk diffusion method using Mueller-Hinton agar (Oxoid, England), according to Clinical Laboratory Standards Institute (CLSI, 2000) guidelines. The plates were prepared and incubated at 35°C for 24h. Implanted Gram positive antibiotics were rocephin (25µg), ciprofloxacin (10µg), streptomycin (30µg), sulphamethoxazole-trimethoprim (30µg), erythromycin (10µg), pefloxacin (10µg), gentamycin (10µg), ampiclox (30µg), zinnacef (20µg) and amoxicillin (30µg). The interpretation of susceptibility results were done according to CLSI (2000) guidelines.

2.3. Analysis of results

Duplicate plates showing 30-300 colony forming unit (cfu) were counted and the means determined. The bacterial counts were expressed as log cfu/g of food. Prevalence of Listeria monocytogenes in the meat products was defined as (number of positive
samples ÷ total number of samples) x 100. The percentage of antibiotic susceptibility pattern of *Listeria monocytogenes* was defined as (number susceptible, intermediate or resistant ÷ total number of isolates) x 100. Graphs were plotted using Microsoft Excel 2007.

3. RESULTS

3.1. Aerobic plate count

The total aerobic bacterial count of the meat products was evaluated by aerobic plate count (APC) on nutrient agar and the mean total aerobic plate count for unprocessed meat samples was $8.10 \log_{10} \text{cfu/g}$ and had ranges from $7.79 - 8.26 \log_{10} \text{cfu/g}$, that of fresh processed samples was $5.67 \log_{10} \text{cfu/g}$ with ranges $5.42 - 5.86 \log_{10} \text{cfu/g}$ and the mean total aerobic plate count of processed ready-to-eat samples was $5.88 \log_{10} \text{cfu/g}$ and ranged from $5.72 - 6.05 \log_{10} \text{cfu/g}$ (Figure 1).

![Mean Total Aerobic Plate Count](image1)

**Figure 1**
Mean Total Aerobic Plate Count

![Mean Total *Listeria* spp Count of Meat Samples](image2)

**Figure 2**
Mean Total *Listeria* spp Count of Meat Samples
3.2. Total *Listeria* spp. count
Unprocessed meat samples had the highest mean total of *Listeria* spp. count which was $5.97 \log_{10}$ cfu/g, the lowest was $5.48 \log_{10}$ cfu/g and the highest was $6.25 \log_{10}$ cfu/g. The fresh processed meat samples had no *Listeria* spp. count. Mean total *Listeria* spp. count for the processed ready-to-eat meat samples was $5.55 \log_{10}$ cfu/g, the lowest being 5.28 and the highest was $5.86 \log_{10}$ cfu/g (Figure 2).

3.3. Identification of isolates
Macroscopic examination of *Listeria monocytogenes* and other *Listeria* species cultures on *Listeria* Selective agar showed colonies that were grayish in colour surrounded by black halos and sunken centres due to the hydrolysis of aesculin indicator component of the medium to aesculin. The isolates showed beta haemolysis on blood agar. Microscopically, they were motile Gram-positive rods and biochemical reactions were catalase positive, oxidase negative but did not ferment D-xylose sugar. The CAMP test revealed an enhanced haemolysis like an arrow head near the *Staphylococcus aureus* streaked line. The confirmatory O.B.I.S. mono test showed no purple colouration which depicts a negative reaction confirming the isolates to be *Listeria monocytogenes* while on chromogenic *Listeria* agar, *Listeria* colonies appeared green blue in colour and *Listeria monocytogenes* strains appeared greenish-blue colonies surrounded by an opaque white halo. Detail results of morphological, physiological and biochemical properties of strains of *Listeria* isolated from processed and unprocessed meat products are shown on Table 1.

**Table 1**
Morphological, Physiological and Biochemical Properties of *Listeria* Isolated strains from Processed and Unprocessed Meat Products

<table>
<thead>
<tr>
<th>Isolates</th>
<th>Gram reaction</th>
<th>Catalase</th>
<th>Oxidase</th>
<th>Haemolysis</th>
<th>Motility</th>
<th>CAMP</th>
<th>Xylose</th>
<th>O.B.I.S</th>
<th>Identified organism</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>G +ve rods</td>
<td>+</td>
<td>-</td>
<td>β</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td><em>Listeria</em> spp.</td>
</tr>
<tr>
<td>C1</td>
<td>G +ve rods</td>
<td>+</td>
<td>-</td>
<td>β</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td><em>Listeria</em> spp.</td>
</tr>
<tr>
<td>C2</td>
<td>G +ve rods</td>
<td>+</td>
<td>-</td>
<td>β</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td><em>Listeria</em> spp.</td>
</tr>
<tr>
<td>D</td>
<td>G +ve rods</td>
<td>+</td>
<td>-</td>
<td>β</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td><em>Listeria</em> spp.</td>
</tr>
<tr>
<td>F1</td>
<td>G +ve rods</td>
<td>-</td>
<td>-</td>
<td>β</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td><em>Listeria</em> spp.</td>
</tr>
<tr>
<td>F2</td>
<td>G +ve rods</td>
<td>-</td>
<td>-</td>
<td>β</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td><em>Listeria</em> spp.</td>
</tr>
<tr>
<td>G1</td>
<td>G +ve rod</td>
<td>-</td>
<td>-</td>
<td>β</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td><em>Listeria</em> spp.</td>
</tr>
<tr>
<td>G2</td>
<td>G +ve rod</td>
<td>-</td>
<td>-</td>
<td>β</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td><em>Listeria</em> spp.</td>
</tr>
<tr>
<td>H1</td>
<td>G +ve rods</td>
<td>-</td>
<td>-</td>
<td>β</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td><em>Listeria</em> spp.</td>
</tr>
<tr>
<td>J</td>
<td>G +ve rods</td>
<td>-</td>
<td>-</td>
<td>β</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td><em>Listeria</em> spp.</td>
</tr>
<tr>
<td>L</td>
<td>G +ve rods</td>
<td>-</td>
<td>-</td>
<td>β</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td><em>Listeria</em> spp.</td>
</tr>
<tr>
<td>P</td>
<td>G +ve rods</td>
<td>-</td>
<td>-</td>
<td>β</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td><em>Listeria</em> spp.</td>
</tr>
<tr>
<td>Q</td>
<td>G +ve rods</td>
<td>-</td>
<td>-</td>
<td>β</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td><em>Listeria</em> spp.</td>
</tr>
<tr>
<td>S1</td>
<td>G +ve rods</td>
<td>-</td>
<td>-</td>
<td>β</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td><em>Listeria</em> spp.</td>
</tr>
<tr>
<td>S2</td>
<td>G +ve rods</td>
<td>-</td>
<td>-</td>
<td>β</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td><em>Listeria</em> spp.</td>
</tr>
<tr>
<td>K</td>
<td>G +ve rods</td>
<td>-</td>
<td>-</td>
<td>β</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td><em>Listeria</em> spp.</td>
</tr>
<tr>
<td>PR1</td>
<td>G +ve rods</td>
<td>-</td>
<td>-</td>
<td>β</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td><em>Listeria</em> spp.</td>
</tr>
<tr>
<td>PR2</td>
<td>G +ve rods</td>
<td>-</td>
<td>-</td>
<td>β</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td><em>Listeria</em> spp.</td>
</tr>
<tr>
<td>PR3</td>
<td>G +ve rods</td>
<td>-</td>
<td>-</td>
<td>β</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td><em>Listeria</em> spp.</td>
</tr>
<tr>
<td>PR4</td>
<td>G +ve rods</td>
<td>-</td>
<td>-</td>
<td>β</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td><em>Listeria</em> spp.</td>
</tr>
<tr>
<td>PR5</td>
<td>G +ve rods</td>
<td>-</td>
<td>-</td>
<td>β</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td><em>Listeria</em> spp.</td>
</tr>
<tr>
<td>PR6</td>
<td>G +ve rods</td>
<td>-</td>
<td>-</td>
<td>β</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td><em>Listeria</em> spp.</td>
</tr>
<tr>
<td>PR7</td>
<td>G +ve rods</td>
<td>-</td>
<td>-</td>
<td>β</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td><em>Listeria</em> spp.</td>
</tr>
<tr>
<td>PR8</td>
<td>G +ve rods</td>
<td>-</td>
<td>-</td>
<td>β</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td><em>Listeria</em> spp.</td>
</tr>
<tr>
<td>PR9</td>
<td>G +ve rods</td>
<td>-</td>
<td>-</td>
<td>β</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td><em>Listeria</em> spp.</td>
</tr>
<tr>
<td>PR10</td>
<td>G +ve rods</td>
<td>-</td>
<td>-</td>
<td>β</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td><em>Listeria</em> spp.</td>
</tr>
<tr>
<td>PR11</td>
<td>G +ve rods</td>
<td>-</td>
<td>-</td>
<td>β</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td><em>Listeria</em> spp.</td>
</tr>
<tr>
<td>PR14</td>
<td>G +ve rods</td>
<td>-</td>
<td>-</td>
<td>β</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td><em>Listeria</em> spp.</td>
</tr>
</tbody>
</table>

**Table 2**
Prevalence of *Listeria monocytogenes* Isolated from Processed ready-to-eat and unprocessed Meat Products

<table>
<thead>
<tr>
<th>Product Category</th>
<th>Sample Code</th>
<th>Product Type</th>
<th>No of samples Examined</th>
<th>No of positive samples (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unprocessed</td>
<td>A to T</td>
<td>Raw meat</td>
<td>20</td>
<td>16 (80)</td>
</tr>
<tr>
<td>Processed</td>
<td>1 to 15</td>
<td>Fresh processed meat</td>
<td>15</td>
<td>0</td>
</tr>
<tr>
<td>Processed</td>
<td>PR1 to PR15</td>
<td>Processed ready-to-eat meat products</td>
<td>15</td>
<td>13 (86.7)</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>50</td>
<td>29 (58)</td>
</tr>
</tbody>
</table>

3.4. Prevalence of *Listeria monocytogenes*
A total of fifty (50) samples of meat and meat products were examined, 29 (58%) were positive for *Listeria* spp. out of which 14 (28%) were positive for *Listeria monocytogenes*. Prevalence of *Listeria monocytogenes* was significantly higher in unprocessed meat 9 (45%)
than in processed ready-to-eat meat products which were 5 (33%). No organism was isolated from fresh processed meat products (Table 2). Out of the 14 isolated *Listeria monocytogenes*, 9 (64.3%) were isolated from the unprocessed meat while 5 (35.7%) were isolated from the processed ready-to-eat meat (Table 2).

### 3.5. Antibiotics susceptibility pattern

All *Listeria monocytogenes* strains except one were found to be resistant to one or more of the ten antibiotics used. *Listeria monocytogenes* were highly susceptible to Ciprofloxacin 14 (10%), Pefloxacin 14 (100%), Gentamycin 14 (100%), Streptomycin 13 (92.9%), Erythromycin 13 (92.9%), Sulphamethoxazole-trimethoprim 10 (71.4%) and Amoxicillin 9 (64.3%). Majority of the *Listeria monocytogenes* strains were resistant to Ampiclox 13 (92.9%), followed by Rocephin 11 (78.6%), Resistance to sulphamethoxazole-trimethoprim was found in 4 (28.6%) (Figure 4).

![Figure 3](image1.png)

**Figure 3**
Comparison of *Listeria spp* and *Listeria monocytogenes* isolates from processed ready-to-eat and unprocessed meat products;
- **BLUE**: unprocessed meat products;
- **RED**: processed ready-to-eat meat products

![Figure 4](image2.png)

**Figure 4**
Antibiotics susceptibility pattern of *Listeria monocytogees* strains from processed and unprocessed meat products

### 4. DISCUSSION

In this study, *Listeria monocytogenes* in processed ready-to-eat meat products and unprocessed raw meat products were isolated and antibiotics susceptibility patterns were investigated. The mean total aerobic plate counts (APC) were significantly different
among the different product types studied. Unprocessed meat had the highest mean total APC (8.1 log_{10} cfu/g), followed by the processed RTE meat samples (5.9 log_{10} cfu/g) and fresh processed meat products (5.7 log_{10} cfu/g). They were higher than the acceptable standard (6.0 log_{10} cfu/g) for raw meat and (4.0 log_{10} cfu/g) for processed meat (HPA, 2009). These results are similar to the work of Nel et al (2004) in which APC was reported to be 7.77 log_{10} cfu/g. Aerobic plate count depicts general microbial contamination. The extremely high count found in this could be as a result of high level of unhygienic practices by the abattoir workers, meat sellers and vendors. 

Listeria spp. count for the unprocessed meat was 5.97 log_{10} cfu/g and the processed meat sample was 5.55 log_{10} cfu/g. All the meat products except the fresh processed meat samples had Listeria spp. counts higher than the acceptable level (2.0 log_{10} cfu/g) (HPA, 2009). The concentration of Listeria spp. less than 100 cfu/g can be considered to be low risk to consumers, although the possibility of infection from low numbers, especially among the most susceptible population groups (neonates, the elderly, pregnant women and the immunocompromised) cannot be underestimated. In the present study, 58% of the meat samples examined were positive for Listeria spp. of which 14% (28%) were Listeria monocytogenes. Contamination rates of meat products with Listeria monocytogenes were 9 (64.3%) for unprocessed meat and 5 (35.7%) for the processed RTE meat. This result is in agreement with the results of other authors (Uyttendaele et al., 2001 and Dhanashee et al., 2003) and suggests the presence of a significant public health hazard linked to the consumption of meats contaminated with Listeria monocytogenes. The high occurrence of Listeria monocytogenes in raw meat is expected, because Listeria monocytogenes is ubiquitous in the environment (Vitals et al., 2004). Furthermore, the method of slaughter and evisceration allows ample opportunity for contamination to occur. People handling meat at different levels can also be sources of contamination. This finding is similar to the reports of other studies which reported a 30 to 70% prevalence of Listeria monocytogenes in raw meat (Dhanashee et al., 2003; Vitals et al., 2004). It is also in accordance with the incidence of 38-50% reported by McGowan et al. (2004). However, other studies have shown a lower incidence of the pathogen in raw meats (5% and 17%) (Rorvik et al., 2001; De Simon et al., 2002). It is very necessary to improve hygiene and provide adequate storage conditions from slaughter houses through the meat sellers to avoid growth of the pathogen to high levels, because cross contamination represents the major factor in the introduction of Listeria monocytogenes to meats (Tompkins et al., 1992). In this study 33% of RTE meat samples analyzed contained Listeria monocytogenes, which reflected the need for better control of post-processing environment. The occurrence of Listeria monocytogenes in suya and kilishi is of public health significance because these products are eaten without further processing. The result of this study suggested that the overall incidence of antibiotic resistance in Listeria monocytogenes is still relatively low. There has been a continuing pattern of the emergence of strains of Listeria spp. isolated from food and clinical cases of listeriosis which are resistant to one or more antibiotics (Chukwu et al., 2006; Safdara and Armstrong, 2003). Although the incidence of antibiotic resistance is currently low, the range of antibiotics to which resistance has been acquired is wide. It is of concern that this expanding range now includes a number of antibiotics used in the treatment of listeriosis, e.g. penicillin, ampicillin, tetracycline and gentamycin. However, the isolation of resistant strains of Listeria monocytogenes is not so high, evidence of the emergence of resistant strains from various sources has been reported (Liu, 2006). Ampicillin or penicillin and gentamycin remain the treatment of choice for most manifestation of listeriosis. Sulphamethoxazole-trimethoprim is considered to be a second choice therapy; vancomycin and erythromycin are also used respectively to treat bacteremia and pregnant women diagnosed with listeriosis (Charpentier and Courvalin, 1999). Results from this study showed that Listeria monocytogenes strains are susceptible to the first choice antibiotics used in the treatment of listeriosis which are ampicillin (65%) and genamycin (100%) and also susceptible to Sulphamethoxazole-trimethoprim (71%) used as second choice antibiotics in the treatment of listeriosis especially in patients allergic to penicillin. The majority of strains isolated in this study are susceptible to the antibiotics commonly used in veterinary and human listeriosis, even though more than one strain was resistant to amoxicillin, erythromycin and sulphamethoxazole-trimethoprim. A similar pattern of resistance has also been found by other authors (Aurelli et al., 2003) suggesting the worldwide increase in antibiotic resistance. Listeria monocytogenes strains isolated in this study were highly resistant to ampiclox (93%). The widespread use of ampiclox in human and veterinary therapy, alongside the length of time over which it has been available in Nigeria and other countries of the world could account for this trend. I is known that L. monocytogenes can either acquire or transfer antibiotic resistances’ genes from plasmid and transposons of other bacterial species including Enterococcus spp. either in vivo or in vitro in the intestinal tract (Pourshahban et al., 2002). This is very important because bacteria that acquire new resistance are not disrupted by antibiotics during a therapy.

A continued surveillance on Listeria monocytogenes prevalence and on emerging antibiotics resistance is important. This will identify foods that can represent a risk for the population and ensure effective treatment of listeriosis. The results obtained from this study provide an important baseline for the contamination status of meat products with L. monocytogenes and preliminary pattern of its susceptibility to commonly used antibiotics. The data will be useful for food producers and for epidemiological and public health studies concerning the antibiotic susceptibility of L. monocytogenes.

REFERENCE


