Microbial Quality Of Prawns Offered For Sales At Some Locations and Sales Outlets In Ibadan South Western Nigeria.

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ABSTRACT

Microbial risk assessment of ready to eat prawns offered for sales at different locations and sales outlets in Ibadan Western Nigeria was carried out. Samples obtained were microbiologically analyzed for the presence of microorganisms. Total plate counts, enterobacteriaceae counts and Salmonella-Shigella (SS) counts were enumerated using Plate Count Agar (PCA), Eosin Methylene Blue (EMB) Agar and Salmonella-Shigella Agar (SSA), respectively. The total counts for all the samples from the different locations ranged between $1.10 \times 10^2$ to $3.05 \times 10^4$ cells. These were generally high exceeding the limit of $1.0 \times 10^2$ CFU/ml. The coliform count ranged between $0.59 \times 10^2$ to $1.47 \times 10^4$ cells. Salmonella-Shigella (SS) count ranged between $0.37 \times 10^2$ and $0.91 \times 10^4$ cells. Twenty-eight (28) isolates were identified and characterized in this study and belong to five genera (Flavobacterium sp (25.0%), Enterobacter aerogenes , (25.0%) Bacillus cereus (21.4%) Salmonella sp.(17.9%) and Shigella sp (10.7%). The health implication to consumers and the public health importance is presented.

Key words: Food safety, public health, foodborne pathogens, microbiological

INTRODUCTION

The term seafood product includes all fresh or salt water organisms examples are: finfish, mollusk, crustacean and other forms of aquatic animal life. Generally, seafood products are very safe to eat. But no food is completely safe, and problems do occur. In Nigeria, large numbers of sea food processing plants are abundant in the country where considerable number of people buy seafood product daily. Serious consequence relating to national productivity and development can arise from lack of hygiene and sanitation in such outlets. Frozen food consumed raw can
endanger the health of the consumers especially when there is presence of microorganism such as bacteria, virus, parasites which are pathogenic. (1)

Seafood from polluted water may also carry bacteria derived from human and animals. (2) indicated that the microbial flora of fish is a function of the environment in which they contain while these microorganism may not be pathogenic to the aquatic life. The role of cultured seafood in the possible transfer of pathogens between livestock and human is important particularly in less developed countries. (3). Proper handling of prawn between capture and delivery to the consumer is crucial element in assuring quality of the final product. Standards of sanitation, method of handling, time and temperature of holding the prawn are all significant factors to assure quality of the prawn.

Pathogens can affect human health through both active and passive contact. Seafood are involved in both passive and active transfer of a range of bacteria, parasites and diseases to humans, broadening the need of risk assessment (3). Linkages have been made between aquatic life, livestock production and health in terms of communicable diseases, on-communicable diseases, malnutrition and injury. (4). Threats to public health from both livestock and aquaculture are diverse (3) as well as the negative impact on marketability, trade and consumers confidence (5). FDA (6,7,8) recommends a continuous prioritization of all manufacturers of high risk fishery products for animal inspection as well as processors and importers of aquaculture products to undergo increased inspection and training.

The potential of seafood and water to harbour microbial pathogens and causing subsequent illness is well documented for both developed and developing countries (9). Water related diseases continues to be one of major health problem globally. It is estimated that 80% of all illness are linked to use of food and water of poor microbiological quality (10). Reduction of risk for human illness associated with raw produce can be better achieved through controlling points of potential contamination in the field, during harvesting, processing, distribution, retail market, food service, facilities and home (6,11).

The microbiological safety of food is achieved by as far as possible ensuring the absence of pathogenic microorganisms and by all means preventing their multiplication (12). The Hazard Analysis Critical Control Point (HACCP) concept is used to identify microbiological vulnerable points in the food production process and processing, to determine the most appropriate methods of control to be applied, usually such methods as improved handling techniques, monitoring of temperature and more intensive supervision (12). This study aimed to isolates and identifies bacteria from prawn offer for sales at different sales outlets in Ibadan and also compares the bacteria load and isolates from the different sales outlet with a view to providing potential approaches to improve their quality, consumer safety and sanitary standard.

**MATERIALS AND METHODS**

Ready-to-eat prawns were purchased from different sales outlets (location) in Ibadan. These ready to eat prawn were washed with sterile distilled water. Duplicate samples of each of the ready-to-eat prawn were used in this study. Each sample that was bought from the different sale
outlets was kept in different polythene bags and brought to the laboratory for analysis. The different samples from the sales outlets were identified as: 1, 2, 3, 4, 5, 6 and 7. The distilled water obtained after washing of the ready to eat prawn were inoculated on plate count agar (PCA), Eosin methylene Blue (EMB) Agar and Salmonella–Shigella Agar (SSA) plates and the plates were incubated at 37°C for 24 – 48hrs.

Alongside the microbial evaluation of the distilled water washing obtained, the washed ready to eat prawn were also accessed for bacterial growth. This was done by mutilating and macerating the ready to eat prawn into small pieces and a piece was introduced to the surface of the prepared plate count agar (PCA), Eosin methylene blue (EMN) Agar and salmonella shigella Agar (SSA) plates. Different Nutrient agar (NA) Eosin methylene Blue (EMB) Agar and Salmonella- shigella Agar (SSA) plates were used for different samples and the plates were incubated at 37°C for 24 - 48 hour for evidence of growth. Pure isolates of resulting growth were identified using biochemical methods as described by (13).

RESULTS

The total counts, coliform count and Salmonella-Shigella count of different processed ready to eat prawn samples offered for sales at the different locations (1,2,3…7) is as shown in Table I. The total counts for all the prawn samples were generally high exceeding the limit of 1.0 x 10² CFU/ml (Table I). The counts ranged between 1.10 x 10² to 3.05 x 10⁴ cells (Table 1). From table I sample from location 7 has the highest count (3.05 x 10⁴); followed by location 6 (3.01 x 10⁴) though there is no significant difference between these two locations unlike other locations where the total counts varies significantly at P ≤ 0.05 . Locations 1,2,3,4 and 5 have the following counts respectively 1.98 x10⁴, 1.10 x10², 2.84 x 10⁴, 1.90 x10⁴ and 2.01 x 10². The lowest count was obtained at location 2 followed by 4. (Table I)

The coliform count has a range of 0.59 x 10² to 1.47 x 10⁴ cells, also exceeding the limit of zero CFU/ml (Table I). Location 6 has the highest count of (1.47 x 10⁴), followed by location 7 (1.42 x 10³), location 3 with counts of 1.38 x 10⁵. The lowest coliform count was from location 2 . (Table I). The Salmonella-Shigella (SS) count ranged between 0.37 x 10² and 0.91 x 10⁴ cells, also exceeding the limit of 1.0 x 10² CFU/ml (Table I). This shows that location 3 had the highest SS count (0.91 x 10⁴), followed by locations 7 and 6 with counts of 0.86 x 10⁴ and 0.85 x 10⁴ respectively

The different bacteria isolated and identified from the different locations where samples were collected in Ibadan are as presented in Table II. Flavobacterium sp [7 (25.0%),] Enterobacter aerogenes [7 (25.0%)] Bacillus cereus [6 (21.4%)], and Salmonella sp. [5 (17.6%)] were most frequently isolated from samples from all the locations. Flavobacterium sp and Enterobacter aerogenes were isolated from samples from all the allocations. Shigella sp. [3 (10.7%)] was only isolated from samples from location 1 and 5.

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Table I: Total counts, Salmonella-Shigella (SS) counts and Most Probable Number (MPN) of Coliform/100ml of samples from the different 7 locations in Ibadan

<table>
<thead>
<tr>
<th>Sample Location</th>
<th>Total Count CFU/ml</th>
<th>Coliform CFU/ml</th>
<th>Salmonella-Shigella Count CFU/ml</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1.98 x 10^7</td>
<td>0.65 x 10^7</td>
<td>2.44 x 10^4</td>
</tr>
<tr>
<td>2</td>
<td>1.10 x 10^7</td>
<td>0.59 x 10^4</td>
<td>0.46 x 10^4</td>
</tr>
<tr>
<td>3</td>
<td>2.84 x 10^9</td>
<td>1.38 x 10^4</td>
<td>0.91 x 10^4</td>
</tr>
<tr>
<td>4</td>
<td>1.90 x 10^7</td>
<td>0.82 x 10^4</td>
<td>2.30 x 10^4</td>
</tr>
<tr>
<td>5</td>
<td>2.00 x 10^7</td>
<td>1.15 x 10^4</td>
<td>0.37 x 10^4</td>
</tr>
<tr>
<td>6</td>
<td>3.01 x 10^7</td>
<td>1.47 x 10^4</td>
<td>0.85 x 10^4</td>
</tr>
<tr>
<td>7</td>
<td>3.05 x 10^7</td>
<td>1.42 x 10^4</td>
<td>0.86 x 10^4</td>
</tr>
</tbody>
</table>

DISCUSSION

Bacteria from five different genera were isolated and identified from the ready to eat prawns from the different sales outlet in this studies: Flavobacterium sp (25.0%) Enterobacter aerogenes, (25.0%) Bacillus cereus (21.4%) Salmonella sp. (17.6%) and Shigella sp 10.7%

Most of the organisms found on these seafood products are those commonly found in soil and water. Though the most frequent isolated index of water quality and indicators of faecal contamination E.coli and Streptococcus faecalis were not reported in this study, the presence of other indicator organisms like Enterobacter aerogenes and Salmonella sp might be the result of possible contamination during sales or unhygienic handling of the prawns by the food vendors who usually display the seafood openly without covering at different car parks and sales outlets in the town. The presence of these organisms reported in this study could also be an indication of faecal contamination of the water used for processing; this might have far reaching effect on the health of the consumers and public health

In a similar study conducted by (14) in fruits and vegetables sampled from Sango, Ota, Nigeria bacteria belonging to ten genera were identified Bacillus (24.5%) was most frequently isolated followed by E.coli (11.8%) Pseudomonas (11.8%) Staphylococcus (10.9%) Enterobacter (9.0%) Streptococcus (6.4%) Klebsiella (5.4%) Citrobacter (3.6%) and 12.7% remain not identified.
(15) reported the isolation of *S. aureus*, *B. cereus*, *E. aerogenes* and other organisms in their studies on fresh and roasted edible worms (*Rhynchophorus phoenicus*) larvae collected from 5 locations in Delta and Edo state of Nigeria. The presence of *S. aureus* and *Salmonella* sp. in sausage has also been reported in studies conducted in Abeokuta and Benin by(16) according to their report sausage sold as ready-to-food; pose health risk to consumers, making it imperative to institute not only sanitary measures during its production and sales. The total counts in this study ranged between $1.10 \times 10^2$ to $3.05 \times 10^4$ CFU/ml and this is similar to findings by previous authors (14,17)Most of the organisms found on these seafood products are those commonly found in soil and water. The microorganisms present in ready to eat seafood has been suggested to be a direct reflection of the sanitary quality of the cultivation water, harvesting, transportation, storage, and processing of the produce (18).

In conclusion, this study provides a general overview of the microbiological quality of ready to eat prawns sold at different location in Ibadan the largest city in Nigeria. The results in the present study clearly indicate that the consumers are at risk of contacting food borne infections as a result of poor hygiene during handling and sales of this seafood at the various locations. While the practice of consumption of prawns cannot be stopped on nutritional grounds, therefore measures should be taken to spread awareness amongst the vendors about the safe and hygienic practices and Government agencies can take initiatives in this direction to lay out guidelines for selling of prawns and other seafood. As consumers, we need to recognize that food safety is important. Food from sources like super markets may be protected from contamination and spoilage during subsequent handling, packaging, storage and while it transit. Before purchase, ready to eat prawns and other seafood from the open market it is essential to considers the safety measures.

REFERENCES


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