Online Journal of Animal and Feed Research

Volume 3, Issue 4: 186-188 (2013) *ISSN 2228-7701*

PATHOGENIC MICROORGANISMS ISOLATED FROM PERIWINKLES IN CREEKS SOUTH-SOUTH OF NIGERIA

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ABSTRACT: *One hundred and twenty pieces of periwinkle were obtain each from Yenogoa and Oron Creek. The periwinkle were of two genera namely: Pachymelania aurita obtained from Oronk Creek located in Akwa-Ibom State, while the Tympanotonus fuscatus notably a brackish water habitat was obtained from Yenogoa in Bayelsa state both in south-south Nigeria. Evaluation of possible microbiological isolate was carried out according to Cowan and Steel's Manuel for medical Bacterial identification. The Creek in Yenogoa presented high level of Coliform count 2.6×10^{5}cfug^{-1} while the Oron Creek had an unacceptable load of Salmonella count 6×10^{6}cfug^{-1}. The total bacterial count was highest in Oron Creek 1.46×10^{8}cfug^{-1} from Tympanotonus fuscatus. The microorganisms isolated from both Creeks were Esherichia coli, proteus sp, salmonella sp, pseudomonas sp and Enterobacter sp. Proteus sp was the least isolated while Salmonella sp was the highest.*

ORIGINAL ARTICLE

Key words: *Pathogenic Microorganisms, Periwinkles, South-South, Nigeria.*

INTRODUCTION

Periwinkles are marine mollusks found commonly in mangrove swamps, lagoons and estuaries and consist of two general Tympanotonus and Pachymelania (Buchaan, 1954). Periwinkles are mass consumer products (Ekanem and Otti, 1997). There are very cheap source of protein in Oron, Aklwa-Ibom state and Yenogoa in Bayelsa state south-south Nigeria. Some are found mostly in shallow waters and sometimes in inter-tidal zones where they burrow into the mud in the beds of the river which serves as their habitat (Okon, 1987). The best method to process periwinkles before consumption differs among the populace. Some believe that the shell should be removed and the meat washed thoroughly before cooking, others think otherwise. However, studies on the microbiological quality of shell fishes have shown that they harbour many pathogenic microorganisms (Ukpong and Efuk, 1992). Most times, the accumulation and concentration of pathogenic microorganisms and other toxic materials are usually from untreated human waste and industrial effluents that find their way into the water bodies that are inhabited by these shellfishes (Montgomery and Needselman, 1992). Periwinkles have been implicated in outbreaks of food-borne disease in many parts of the world. These illnesses includes hepatitis, typhoid fever and other digestive disorders Metealf et al. (1973) and (Ekanem and Adegoke, 1995). Shellfishes concentrate in water bodies and industrial waste, hence the likeliness of high pathogen level and toxic contaminants which can present health hazard to consumers Longree (1990).

The need to inform the public on the health hazard associated with the consumption of periwinkle with its shell cooked which could result in ingestion of pathogenic microorganism's lead to this study. The aim of this study is to isolate and identify comparatively the possible microbial organisms present in *T. Fascatus* and *P. aurita* from the two sources and to evaluate their safety on consumption.

MATERIAL AND METHOD

Sample collection of periwinkle *T. fuscatus* and *P. aurita* was carried out in Oron and Yenogoa in the Creeks these areas are notable for producing periwinkle. One hundred and twenty samples of sixty each was collected from Oron and Yenogoa measuring 40.52 – 45.80 mm in length and weighing 3.80 - 5.56g in weight were obtained from earthen pond of Brackish water. They were kept in a plastic aerated container and transported to the Umudike veterinary microbiology laboratory for analysis. The periwinkle were divided into two groups, those obtained from Oron is designated as sample X why that of Yenogoa is sample Y.

To cite this paper: Nwiyi P., Okonkwo C. 2013. Pathogenic microorganisms isolated from periwinkles in creeks south-south of Nigeria. *Online J. Anim. Feed Res.*, 3(4): 186-188.

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The periwinkles were washed, scrubbed and rinsed and the meat carefully extracted from the shell using forceps as described by ALPHA (1970). The analyses were done in triplicate on 60g raw periwinkle samples which were blended with 460ml of sterile peptone water 0.1% as described in the Bacteriological Analytical Manuel plates were prepared from 10 fold dilutions in nutrient agar (micro master) for total bacteria counts. MacConkey agar (micro-master) for total Coliform count and Salmonella/Shigella agar (Micro-master) for Salmonella – Shigella counts were made after incubation at 37°c for 24 hours. Colonies were characterized and identified using various morphological and biochemical tests such as mortality, catalase, urease, citrate, indole, oxidase $M_{R-V}P$ and sugar fermentation tests. The isolates were identified according to Cowan and steel's manual for Medical Bacteria Identification (Cowan, 1985).

RESULTS AND DISCUSSION

Table 1 shows the total microbial counts of periwinkle samples from two different swamps of Oron and Yenogoa. The total microbial load for Oron was 1.14×10^8 and 1.24×10^8 respectively from *T. fuscatus* represented as Y and Z while Yenogoa swamp total microbial load was 1.36×10^8 and 1.44×10^8 represented by W and X for *P.aurita.* The salmonella count recorded from Oron swamp 6×10^6 represented the highest microbial load compared to that from Yenogoa swamp which was 2.0×10^6. This means that the swamp from Oron was more contaminated than that from Yenogoa and hence will support the growth of more microorganisms, this is in agreement with Nester et al. (1983). The Coliform count was higher in Yanogoa creek as represented 2.6×10^5 than 1.8×10^5 from Oron creek. There are high levels of pollution such as defecation, bathing, sewage discharge of effluent and washing in the fresh water environment than in brackish water where *P.aurita* is often found (Jay, 1986). The incidence of microorganism and other shell fish depends on the quality of water from which animals are obtained. This was supported by (Ekanem and Adegoke, 1995). The organisms isolated from these periwinkles: salmonella, proteus, enterobacter, Escherichia and Pseudomonas are very important bacteria that are of public health implications. Organisms like *Escherichia coli* have been associated with infantile diarrhea while enterobacter causes septicemia. Salmonella causes paratyphoid in humans and is in agreement (Nester, 1995).
Through periwinkles are cheap source of protein, it has the tendency of harboring pathogenic microorganisms especially those relevant to human health due to the poor sanitary condition of the water bodies where these animals are cultivated and this is in agreement of the findings Adebayo-tayo et al. (2006).

Bacterial contamination in the periwinkle species from the two swamps exceeded the acceptable limits for shellfish. The International Commission on Microbiological Specifications for Foods ICMSF (1982) and the US Food and Drug Administration FDA (1991) have suggested a maximum microbial count of not greater than $1\times10^5 cfug^{-1}$ and Coliform level of not greater than $1\times10^2 cfug^{-1}$ of shellfishes for consumer safety. The result obtain here is in agreement with that reported by Ekanem et al. (1994).

Table 1 - Total microbial counts of periwinkle samples in Oron and Yenogoa

Location	Sample	Salmonella count ($cfug^{-1}$)	Coliform count ($cfug^{-1}$)	Total Bacterial count ($cfug^{-1}$)
Oron	Y	6×10^6	1.6×10^5	1.46×10^8
	Z	1.2×10^6	1.8×10^5	1.24×10^8
Yenogoa	W	1.5×10^6	2.4×10^5	1.36×10^8
	X	2.0×10^6	2.6×10^5	1.44×10^8

Key Y and Z; *Tympanotonous fuscatus* , W and X; *Pachymelania aurita*

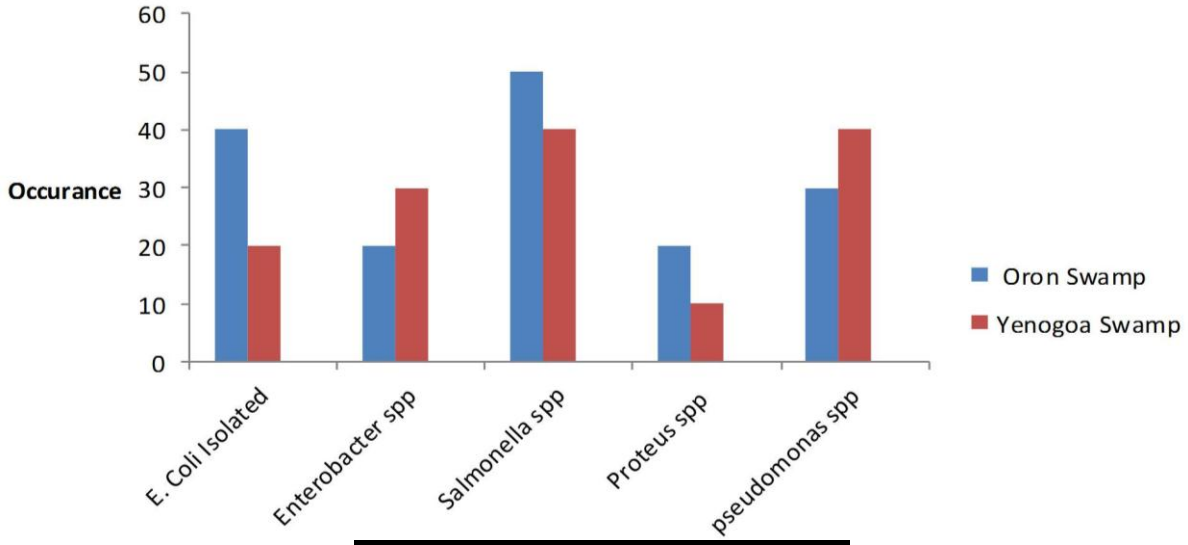

Figure 1 – Bactrial isolated from Periwinkle

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CONCLUSION

The study evaluated the Oron and Yenogoa swamps (Creeks) for periwinkles produced there and the proximate bacteriological analysis represented. The samples from both Creeks presented an unacceptable volume of microbial organisms which is negative to human populace that consumes them. Hence, proper attention should be paid towards proper processing, handling and storage in order to minimize the risk to human infection on consumption.

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