

ABSTRACT

The Bacteriological Quality of Fresh Oysters from the Estuarine Habitat of the Caroni Swamp Oyster Reserve in Trinidad

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The consumption of raw oysters in Trinidad and Tobago, for perceived aphrodisiac benefits, is a long established practice. In Trinidad, most of the oysters are harvested from the Caroni Swamp, Oropouche Lagoon and Nariva Swamp. Oysters and the swamps from which they are harvested, have been regarded by local Health Authorities to be contaminated for some time. With the advent of the Cholera pandemic in neighbouring Latin and Central America, and the current threat to Trinidad and Tobago, a ban was imposed on the sale of oysters, clams, mussels and scallops. Additionally, several inshore and inland aquatic habitats have been found to be heavily polluted with sewage effluent. In this context therefore, the bacteriological quality of the Mangrove Oyster, Crassostrea rhizophorae, and the swamp water from the Caroni Swamp in Trinidad were investigated.

The study was conducted over a four-month period during the wet season. A total of 400 oysters (16 sample sets) and 16 swamp water samples from 5 sampling areas (drains) were examined for physico-chemical properties and bacteriological quality. The Caroni Swamp possesses an estuarine environment. The swamp water physico-chemical profile was (arithmetic means):- pH 7.3; eH -23; salinity 1.4 per cent and surface water temperature 28°C. The values for the oysters were:- pH 6.7 and eH 8.8. The bacterial flora of the oysters and that of the swamp water were found to be similar in composition, consisting primarily of Gram-negative rods.

Standard plate counts (arithmetic means of all samples) of oysters and swamp water were 2.71×10^5 cfu/g and 6.42×10^3 cfu/ml respectively. Total coliform counts were 8.63×10^4 cfu/g for oysters and 1.77×10^3 cfu/ml for swamp water. Means for faecal coliforms (MPN) were 613/g for oysters and 71/ml for swamp water. Statistical analysis of the physico-chemical parameters and bacteriological counts indicated that there was no significant differences between sampling areas or samples. Therefore, samples collected were representative of the oyster population and the surrounding water from which they were harvested.

The bacteria isolated and confirmed to species, from all oyster and swamp water samples, included:- Enteropathogenic Escherichia coli (Ø126ab), Klebsiella oxytoca, Citrobacter freundii, Pseudomonas aeruginosa, Staphylococcus aureus, Clostridium perfringens and Vibrio mimicus. Presumptive positive results were obtained for the Genera:- Proteus, Micrococcus, Arizona and Enterobacter. Vibrio cholerae, Vibrio parahaemolyticus, Salmonella and Shigella were not isolated. The occurrence of plaques on aerobic plates suggested the presence of bacteriophage. However, the determination of host specificity and significance of its presence, was beyond the scope of this investigation.

The results indicate that the Standard plate counts are within the International Microbiological limits, being less than 5.0×10^5 cfu/g or ml. However, the Coliform counts and Faecal Coliform MPN exceed the limits of MPN stipulated of less than 70 MPN/100 ml for water and not in excess of 230 MPN/100 g for oysters. The levels found in the oysters and swamp water of 613 MPN/g and 71 MPN/ml respectively, indicate sewage pollution of the habitat. The indicator levels and the presence of the organisms isolated (although MPN counts were not conducted) are of public health significance.

WHO (1989) emphasized that microbiological criteria for live and fresh-shucked oysters cannot provide assurance of safety to consumers of the raw or lightly cooked molluscs. Harvesting these molluscs from waters that meet strict microbiological standards for faecal pollution will reduce, but cannot eliminate with certainty, contamination with human enteric bacteria and viruses. The problem is further compounded in that no recovery, isolation or enumeration techniques are available for several important pathogens harboured by molluscan shellfish. A higher level of safety is provided, especially if the microbiological status of growing waters is suspect, by depuration, in which molluscs cleanse themselves in a flow of water that has been disinfected by chlorination, ozonization or ultra-violet light (WHO, 1989).