

ABSTRACT

Investigation of the Microbiological Quality of Locally Processed Meats from
Two Plants in Trinidad

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Contamination of processed meats by bacterial pathogens is responsible for a large number of cases of food borne illnesses around the world each year. Although some preliminary research in Trinidad have shown the presence of bacterial pathogens in processed meats, the extent of their presence in these products and the exposure risks to local consumers are largely unknown. This study investigated the prevalence of bacterial pathogens and factors influencing their presence in processed meats in Trinidad. Information on popularity and storage conditions of locally processed meats was obtained from a survey of 60 groceries throughout the island. Microbiological evaluations were then completed on 480 samples of chicken franks, bologna and bacon from the two most popular brands (A and B) collected from eight groceries over a one year period. A detailed investigation followed on one of the plants (B) to determine factors that may impact on their quality. The results showed that storage and handling conditions in groceries did not contribute to the contamination of these products. Products which showed high microbiological risks for human health were bacon (41.5%), franks (35.4%) and bologna (23.1%) with bacon having the highest tendency to exceed international standards. Products originating from Brand A were also of poorer microbiological quality than

Brand B. The overall prevalence of *Listeria* in retail products was 19.4% (93 of 480) and from these, 38.7% (36 of 93) harboured *Listeria monocytogenes*. In Plant B, the overall prevalence of *E. coli*, *Salmonella* and *Listeria* was 2.9%, 2.9% and 14.1% respectively and was mostly found in raw ingredients. Using molecular methods 96.5% (110 of 114) *Listeria* isolates obtained were confirmed as belonging to the genus and 33 (28.9%) were confirmed as *L. monocytogenes*, which mostly originated from Brand A bacon. The DNA Fingerprinting analysis showed that, with some exceptions, *Listeria* isolates separated based on brand. The plant and groceries isolates of *Listeria* from Brand B also generally clustered together, which suggested a link between the processing environment and contamination of the products. Cross-contamination, improper plant design and insufficient emphasis on sanitation, may have been the cause of contamination in Plant B; whereas the lack of protective gear and non-compliance to Good Manufacturing Practices were the downfalls in Plant A. Both meat processors and grocers need to fully understand various concepts in food safety to improve the quality of food sold to consumers.

Keywords: food microbiology, food safety, *Listeria*, processed meat, manufacturing plant