BACTERIOLOGICAL SAFETY OF FRUITS AND VEGETABLES SOLD AT THE ELDORET MUNICIPAL MARKET

BY

DAVID W. BARNEY

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ABSTRACT

Background: There have been notable outbreaks of illness in recent years that demonstrate the increasingly important role of fresh fruits and vegetables in foodborne disease. Many microbiological pathogens are ubiquitous in the environment and their presence on fresh fruit and vegetables are unavoidable. There is increased evidence that microbiological hazards have been implicated in foodborne outbreaks in the recent past.

Problem statement: There have long been doubts about total effectiveness of washing of fruits. Microbes such as *Salmonella* and *E.coli* may elude water and chemicals by burrowing into leaves. Recovery of *E. coli* from food is indicative of possible presence of enteropathogenic and toxigenic microorganism, which could constitute a public health hazard.

Justification: Documented outbreaks of human infections associated with the consumption of fruits and vegetables have increased in recent years. This study sought to outline a bacteriological quantitative and qualitative risk assessment approach for the hazards and risks associated with fruit and vegetables within Eldoret municipality.

Objectives: To determine: the presence and average bacterial load on selected fruits and vegetables sold at the Eldoret Municipal Market, the presence of *E.coli* bacteria and any other enteric bacteria, the effectiveness of washing the fruits and vegetables when using municipal treated tap water. And to carry out a safety assessment on fruit and vegetable storage and handling at the Eldoret Municipal Market

Study design: Cross-sectional study

Sample size: A total of 88 fruit and vegetable samples were analyzed and 217 sellers interviewed.

Data analysis: Frequencies and averages were used. Chi square test was used to determine for any relationships between variables from data from questionnaires. Mann-Whitney Test and Wilcoxon Signed rank test were used to determine strength of associations between independent and dependent variables of the laboratory experiments respectively.

Data presentation: Data was presented on tables, bar graphs and pie charts.

Results and discussion: Aerobic plate counts ranged from < 10 to $> 10^9$ colony-forming units ml^{-1}, with the highest counts recorded for mangoes. A significant difference in the load of bacteria between the produces sold from the stalls and those sold from sacks spread on the ground was observed, with the following p-values; tomatoes=0.043, mangoes=0.042 carrots=0.042, and bananas=0.043. A significant difference in the bacterial levels after washing using chlorinated tap water was observed, p-values; tomatoes=0.04, carrots=0.04, mangoes=0.04 and bananas=0.04. All samples tested positive for *E.coli*. no other enteric bacteria was found. Poor hygienic conditions were observed at the market place thus high risk of contamination.

Conclusion and recommendations: Fruits and vegetables cold at the Eldoret Municipal Market were contaminated with bacteria. *E.coli* bacteria were present on all the tested samples. Washing fruits and vegetables in tap water removed a portion of bacterial cells. The vegetables and fruits sold at the market were at high risk of contamination due unhygienic handling by the sellers and poor market sanitation. Proper hygiene measures should be put in place to avoid outbreaks of food borne diseases.