Safety, Preparation and Handling Practices of Street-Vended Foods in Selected Districts of Uganda.

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A Dissertation submitted to the School of Graduate Studies in partial fulfillment of the requirements for the award of the Degree of Master of Science in Food Science and Technology of Makerere University

DECEMBER 2009

ABSTRACT

This study aimed at investigating the safety, preparation and handling practices of street- vended foods in three districts in Uganda namely Kampala, Jinja and Masaka using a cross-sectional study. Structured questionnaires were used to determine the nature, types, preparation methods, personal hygiene and hygiene of premises. Samples of randomly selected street-vended food were obtained to analyse for microbes and heavy metals. The data from the survey was described and analysed using SPSS statistical package version 16.0. Relationships among study variables were established using chi-square test ($p \leq 0.05$).

Characteristics and preparation methods of street-vended food were studied in the three districts. The response rate was Kampala (83), Jinja (72) and Masaka (70). The majority (>85 %) of the vendors were female irrespective of district. Majority (>50%) of the vendors in Kampala and Jinja were trained in sanitary practices and concepts, conversely, in Masaka the highest number 24 (34.3%). trained vendors had been taught how to run a business All vendors in the study districts used tap water, with the exception of a few vendors in Masaka that used rain water (1.4%) and spring water (1.4%). The vendors' main criterion for choice of food ingredients was customer preference. Use of head load was the popular means of transporting raw food for preparing at vending sites in the districts. Masaka had the highest proportion of vendors 16 (22.9%) who lacked knowledge about diarrhoea. The common street-vended foods encountered were plantain and starchy roots, tubers, cereals, legumes, meat/animal products, beverages, and vegetables. Results showed that 21/40 (52.5%) of the types of street-vended foods studied were not significantly different ($p > 0.05$) among the study districts. Methods of cooking 37/61 (60.7%) street-vended foods were not significantly different ($p > 0.05$) among the study districts.

Microbial analysis for Total Plate Count, and counts for *Staphylococcus aureus*, Faecal coliforms, *E.coli, B.cereus, Campylobacter spp* and *Psuedomonas spp* was done. Classification of food as unsafe i.e risk of transmitting pathogenic bacteria was based on established Uganda Standards/limits. Relationships between microbial counts across selected districts were established using one sample t-test. ($p \leq 0.05$). Microbial results clearly showed that Jinja district had street-vended foods with the highest concentration of microbial contaminants. Overall, the cooked street vended foods from Jinja were potentially capable of causing staphylococcal food poisoning except rice (2.59 ± 0.63 $\log_{10}$ cfu/g), *matooke* (2.88 ± 1.67 $\log_{10}$ cfu/g) and boiled drinking water (1.91 ± 2.70 $\log_{10}$ cfu/ml). *B.cereus, Campylobacter sp* and *Pseudomonas sp* in the street-vended food were less than 1 $\log_{10}$ cfu/g (ml) thus food borne illness from these microbes is minimal. Microbial quality of 13/18 (72.2%) street vended food did not vary significantly ($p>0.05$) among the selected districts.

Use water had the least number of viable microbes, Kampala (1.22 ± 3.15 $\log_{10}$ cfu/ml), Jinja (1.60 ± 0.42 $\log_{10}$ cfu/ml), and Masaka (<1 $\log_{10}$ cfu/ml). *S.aureus* was more commonly isolated on serving surfaces, (with concentrations above 3 $\log_{10}$ cfu/cm^2 in all the three districts and Masaka (3.32 ± 1.01 $\log_{10}$ cfu/cm^2)). Faecal coliform counts were highest on swabs from hands of vendor in both Jinja (2.90 ± 0.29 $\log_{10}$ cfu/cm^2) and Masaka (3.42 ± 0.60 $\log_{10}$ cfu/ cm^2). *Escherichia coli* counts were prevalent in final rinse dish water from Kampala (2.25 ± 0 $\log_{10}$ cfu/ml) and Jinja (1.42 ± 0.2 $\log_{10}$ cfu/ml). Occurrence of *B.cereus, Campylobacter sp* and *Pseudomonas sp* on hands, utensils, surfaces and in water was not common i.e less than 1 $\log_{10}$ cfu/g (ml).

Heavy metal analysis for Pb, Cd, Zn, Cu, and Ni was done. Classification of food as having a risk of heavy metals was based on established standards/limits. Relationships between heavy metal concentrations across selected districts were established using one sample t-test (p≤ 0.0.05). Concentrations of Cd, Zn, and Cu in bean sauce were significantly different (p<0.05) among the districts. Results revealed levels of cadmium and lead to be above the recommended maximum limits in foods that get in direct contact with the cooking pans/utensils. For example bean sauce had high levels of lead for Kampala (9.4ppm) and Masaka (9.7ppm). The cooking pans/utensils were obtained from doubtable sources hence the likely source of heavy metals. Nickel was not detected in any samples.

Less than 50% (16/36) of the correlations between faults in food handling that reduce microbial safety of food and faults that reduce personal hygiene of vendor were significant positive correlations. However, this does not mean that there is no relationship between food handling practices that reduce microbial safety of food and personal hygiene of vendor.

Street-vended foods are here to stay, not only in Kampala, Jinja and Masaka districts of Uganda but in Uganda as a whole and internationally, but majority i.e. over 50% are unsafe. Stakeholders in the street food vending business who include governments, street-food vendors and consumers should immediately take the necessary procedures to improve the safety of street-vended foods.

Key words: *street food vendors, street-vended foods, microbiological safety, heavy metal safety*