FOOD SAFETY ANALYSIS OF HEAVY METALS IN BEEF SOLD IN SOROTI DISTRICT EASTERN UGANDA.

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DECLARATION

This dissertation contains my own work and has never been submitted to any institution for any assistance or award of academic credit or qualification.

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DEDICATION

I dedicate this thesis to my parents HIGENYI AHAMED and RAFA ADIRU and my supervisors DR. KENETH ICELAND KASOZI and Dr. GERALD ZIRINTUNDA for their tireless support to me during the research process. There is nothing worthy I can pay you with but only pray that the almighty Allah can rewards you abundantly Amen.

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LIST OF ABBREVIATIONS   (ACRONYMS)

AAS	ATOMIC ABSORPTION SPECTROMETER
AU	AFRICAN UNION
Cd	CADMIUM
Cu	COPPER
DR	DOCTOR
EPA	ENVIRONMENTAL PROTECTION AGENCY
FAO	FOOD AND AGRICULTURE ORGANISATION
HM	HEAVY METAL
Pb	LEAD
UBOS	UGANDA BUREAU OF STATISTICS
WHO	WORLD HEALTH ORGANIZATION
Zn	ZINC

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ABSTRACT

Human consumption of the inorganic compounds beyond the international reference levels results into observable pathological effects in the body. Numerous studies have linked the excessive accumulation of heavy metals to development of health abnormalities which include: cardiovascular, kidney, nervous and bone diseases, and language delay. This study was conducted in Soroti district of Eastern Uganda during the period of COVID19 Outbreak in East Africa. The main objective of this study was to determine the concentration of the major inorganic compounds in beef and determine their safety for the general public.

A total of 40 samples each 200g of beef were purposively collected from beef butcher points of sales and georeferenced coordinates (with accuracy less than 3m) were taken for each villege during morning slaughters, placed in sterile plastic bottles and transported under 4° C in the field. The heavy metals were then determined using AAS, Perkin Elmer to generate absorbance at the corresponding wavelength for each sample. Using the standard equations for each analyte ($y = mx + c$), the concentration for each sample was determined. Data was cleaned in MS Excel version 201 0 and exported to Graph Pad prism Version 6 and tested for normality by conducting the D'Agostino & Pearson omnibus normality test and when $P > 0.05$, data was qualified for parametric tests. Information was presented as mean ± 95% CI and a one sample t-test was conducted by making comparisons using the theoretical mean acquired from the WHO/FAO reference values and significance was reported when $P < 0.05$ to define safety. The mean concentrations heavy metals in the samples, from the highest to the lowest, were found to follow this order: $Zn > Pb > Cu > Cd$. The study showed that poisonous heavy metals are present in beef from Soroti (Uganda) at concentrations far higher than those recommended by WHO and that essential elements are present at concentrations much lower than th ose recommended by WHO. Therefore collaborative efforts has to be made by Uganda Ministries of Agriculture Animal Industry & Fisheries and of Health with the sole purpose of devising practical strategies to improve beef quality and designing nutritional guidelines to help communities struggle ng with malnutrition challenge