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FACULTY OF AGRICULTURE AND ANIMAL SCIENCES

DEPARTMENT OF ANIMAL PRODUCTION AND MANAGEMENT

FINAL YEAR RESEARCH REPORT

AN ASSESSEMENT OF HEAVY METAL RESIDUES IN BROILER CHICKEN FROM DIFFERENT FARMS IN MBIKKO, NJERU MUNICIPALITY.

By

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A RESEARCH DISSERTATION SUBMITTED TO THE FACULTY OF AGRICULTURE AND ANIMAL SCIENCES IN PARTIAL FULFILMENT OF REQUIREMENTS FOR THE AWARD OF A DEGREE OF ANIMAL PRODUCTION AND MANAGEMENT OF BUSITEMA UNIVERSITY

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ABSTRACT

Heavy metals are elements having relatively high density and are toxic at low concentration; they are divided into essential and non-essential heavy metals. They exist naturally within the atmosphere resulting from human and anthropogenic activities. Environmental pollution has increased recently. The pollutants come from different sources and they contain a variety of heavy metals like Iron (Fe), Copper (Cu), Lead (Pb), Zinc (Zn) and Cadmium (Cd). These heavy metals are bio-accumulated in chicken which is later consumed by humans and cause health problems.

In this research, ten broiler birds at finishing stage were sampled from different farmers in Mbikko parish and analyzed to determine the presence and levels of Cu, Pb, and Cd in thigh muscle tissues and liver tissues. The samples were analyzed using an atomic absorption spectrometer at Uganda Industrial Research Institute (UIRI).

Findings showed heavy metal concentrations of copper and lead. Results revealed that 100% of all thigh muscle and liver tissue samples screened were contaminated with traces of copper with 1.819±0.257 and 0.705±0.454 mean ± SD concentrations (mg/Kg), ranging from 1.556 to 2.310 and 0.281 to 1.618 respectively. While only 20% of the screened samples had residues of lead, with 0.092±0.206 mean ± SD and 0.610 mg/Kg maximum concentration in both thigh muscles and liver tissues. No residues of Cadmium were found at detectable levels (were less than 0.02, the LOD).

Moreover, all thigh muscle samples and only 20% liver tissues samples were contaminated with unacceptable levels of copper as the concentrations were more than the permissible maximum residue levels (1.00 mg/Kg). Similarly, 20% of both liver and thigh muscle samples (all positive samples) had beyond permissible levels of lead (0.1 mg/Kg) set by FAO/WHO.

DECLARATION

I hereby declare that, this research report is my original work and has never been presented anywhere for any award in any other University or institution of higher learning.

Student

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Signature……..…

Date…….

APPROVED BY

This dissertation report has been submitted with approval of my Academic supervisor;

Supervisor

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Signature……

Date …….

LIST OF ABBREVIATIONS

CU.	Copper.
Pb.	Lead.
Hg.	Mercury.
Zn	Zinc.
As	Arsenic
Ni	Nickel.
Dr.	Doctor.
Cd.	Cadmium.
RDA.	Recommended daily allowance.
REG.NO.	Registration number.
AAS.	Atomic absorption spectrometer.
&	And.
FAO	Food and agriculture organization.
WHO	World health organization.

DEDICATION

I dedicate this piece of work to my father Mr.Tibyasa David, mother Mrs. Mukodha Ruth, my friend Nanteza Rehema and madam Nalugya Hanah for their unceasing love, encouragement, and financial support during the research process.

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1.0 CHAPTER ONE: INTRODUCTION.

1.1 Background

Worldwide poultry products such as liver, meat & eggs are considered immediate sources of minerals, energy, proteins & vitamins as they are delicious, affordable, and supply most of the RDA of proteins, trace minerals, and energy (Attia *et al., 2014*; Bamuwamye *et al., 2015;* Attia *et al., 2016*). Copper, Fe, etc. are commonly added to chickens diet to promote good health and growth of birds (Attia *et al.*, 2016). For proper maintenance of bodily function, immunity &metabolic activity organisms' minerals play a big role(Eton *et al.*, 2008).

However, as a result of contamination of poultry products with metals through the food chain, they pose risks to the consumer (Abduljaleel *et al*., 2012; Rehman *et al.,* 2012). These minerals have a negative environmental impact that can go beyond animal requirements and be excreted in the wastes (Eton *et al.*,2008). Besides, some metals, such as lead & Cd, are not required for body function and integrity of body (Ayar *et al.*, 2008; Qin *et al.*, 2009). Therefore, health risks increase with increased ingestion of these toxic elements over time. For proper embryonic development in humans, the mineral content of animal products is important (Sparks 2006; Attia *et al.*, 2016). and has been suggested as a bio-indicator of environmental pollution by heavy elements (Pappas *et al.*, 2006). However, the animal might bio-accumulate these toxic elements to high levels from the feed, water, litter, and environment (Ayar *et al.*, 2008; Eton *et al.*, 2008). Cadmium & lead are toxic they spread through the food chain causing various health problems to both animals and humans. Pd is neurotoxic and can result in health complications such as metabolic & nervous problems. Cd is transmitted through the food chain to animals which includes diet and environment and eventually to humans, inducing hypertension and kidney dysfunction (Mohamed and Youssef 2020).

The analysis of toxic element levels in poultry products is a useful indicator of environmental sustainability and nutritional safety. Thus, the present study aimed at assessing the concentrations of Cu, Pb, Cd, in the tissues of chicken, which is essential to determine the possible risks resulting from the consumption of chicken contaminated with heavy elements.

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