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P.O. Box 236, Tororo, Uganda  
Gen: +256 - 45 444 8838  
Fax: +256 - 45 4436517  
Email: [info@adm.busitema.ac.ug](mailto:info@adm.busitema.ac.ug)

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**EFFECT OF *TEPHROSIA VOGELII* AND *ALBIZIA CORIARIA* ON THE FLESH  
QUALITY OF CULTURED NILE TILAPIA (*OREOCHROMIS NILOTICUS*)**

BY

IRAGENA CHARLES ATEGEKA

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[iragenacharles6@gmail.com](mailto:iragenacharles6@gmail.com)



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## DECLARATION

I, Iragena Charles Ategeka, declare to the best of my knowledge that this dissertation is my original work and has never been submitted to any university or institution for the award of any degree. All information within was based on my own findings unless otherwise stated.

Name

Iragena Charles Ategeka

Sign



Date

30<sup>th</sup> / 07 / 2018

This research has been supervised and submitted with the approval of;

**Mr. Muyinda Robert**

Lecturer

Department of Animal Production and Management

Busitema University - Arapai

Signature 

Date 31/7/2018



## **DEDICATION**

I dedicate this dissertation to my parents: Mr. Augustine Byibesho and My Mother Buhengeniya Nyeramugisha, my brothers, sisters, and friends for their continuous love, moral support, perseverance and sacrifice.

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## TABLE OF CONTENTS

DECLARATION.....	i
DEDICATION.....	ii
ACKNOWLEDGEMENT.....	iii
LIST OF TABLES .....	vii
LIST OF FIGURES .....	viii
LIST OF ABBREVIATIONS .....	ix
ABSTRACT.....	x
<b>CHAPTER ONE .....</b>	<b>1</b>
1.0 Background .....	1
1.1 Problem statement.....	2
1.2 General objective.....	2
1.3 Specific objectives.....	2
1.4 Research hypotheses .....	2
1.5 Significance of the research .....	2
1.6 Justification .....	2
1.7 Scope of the study .....	3
<b>CHAPTER TWO .....</b>	<b>4</b>
2.0 LITERATURE REVIEW .....	4
2.1 Global Aquaculture .....	4
2.2 Aquaculture in Africa.....	4
2.3 Fisheries and Aquaculture in Uganda.....	5
2.4 Culturing of tilapia .....	5
2.5 Fish sedatives .....	6
2.6 Bio ecology of <i>Tephrosia vogelii</i> .....	7

2.7	Bio ecology of <i>Albizia coriaria</i> .....	7
2.8	Fish quality.....	8
2.9	Rigor mortis and pH.....	8
<b>CHAPTER THREE.....</b>		<b>10</b>
3.0	<b>MATERIALS AND METHODS.....</b>	<b>10</b>
3.1	Materials used .....	10
3.2	Description of the study area.....	10
3.3	Research approach.....	10
3.4	Collection of plant samples.....	11
3.5	Plant extraction.....	11
3.6	Animals and sampling.....	11
3.7	Evaluation of the sedative potential of <i>T. vogelii</i> and <i>A. coriaria</i> .....	11
3.8	Determining muscle pH, and time of onset of rigor mortis using the three killing methods .....	12
3.9	pH Measurement .....	12
3.10	Rigor index measurement.....	12
3.11	Statistical analysis .....	13
3.12	Data presentation.....	13
3.13	Environmental consideration .....	13
3.14	Ethical consideration.....	13
<b>CHAPTER FOUR.....</b>		<b>14</b>
<b>RESULTS.....</b>		<b>14</b>
4.0	Evaluation of the sedative potential of <i>T. vogelii</i> and <i>A. coriaria</i> .....	14
4.1	Determining the muscle pH, and the time of onset of rigor mortis using the three killing methods .....	15
4.2	Rigor mortis index.....	15

4.3	pH.....	16
<b>CHAPTER FIVE .....</b>		<b>17</b>
DISCUSSION .....		17
5.0	Evaluation of the sedative potential of <i>T. vogelii</i> and <i>A. coriaria</i> .....	17
5.1	Determining the muscle pH, and the time of onset of rigor mortis using the three killing methods .....	17
5.2	Rigor mortis.....	17
5.3	pH.....	18
<b>CHAPTER SIX.....</b>		<b>19</b>
6.0	Conclusion.....	19
6.1	Recommendation.....	19
<b>REFERENCES.....</b>		<b>20</b>
<b>APPENDICES.....</b>		<b>24</b>
Appendices I data collection sheet for experiment 1 .....		24
Appendices II: data collection sheet for experiment 2.....		25

## LIST OF TABLES

<b>Table 1</b> Instruments used during the study.....	10
<b>Table 2</b> Stages of sedation and their characters .....	12
<b>Table 3</b> Characterization of rigor mortis index.....	13
<b>Table 4</b> Period of sedation and recovery as affected by the study plant extracts.....	14
<b>Table 5</b> Rigor index for Whole Fish Stored at room temperature, killed/stunned by two plant extracts over a time period of 12 hours.....	16
<b>Table 6</b> Muscle pH of Nile tilapia killed by the two plant extracts over a time period of 12 hours .....	16
<b>Table 7</b> Period of sedation and recovery as affected by the study plant extracts.....	24
<b>Table 8</b> Quality characteristics of raw Nile tilapia muscle as affected by stunning/killing procedures over a period of time .....	25



## LIST OF FIGURES

<b>Figure 1</b> A graph showing the time to reach different sedation stages using <i>T. vogelii</i> and <i>Albizia coriaria</i> at different concentrations .....	15
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## LIST OF ABBREVIATIONS

RM	Rigor mortis
FAO	Food and Agricultural Organization
MAAIF	Ministry of Agriculture, Animal Industry and Fisheries
CNS	Central Nervous System
RM	Rigor mortis
ATP	Adenosine Triphosphate

## ABSTRACT

The study was carried out with the objective to study the effect of two local plant extracts on fresh quality of Nile tilapia (*O. niloticus*) for 12 hours period at room temperature. Nile tilapia were exposed to various concentrations of two plant extracts (*T. vogelii* and *A. coriaria*) to determine the potential crude concentration for sedation. Extractions were made by grinding 50 g of plant material with 500 ml of water followed by crushing and filtering. Induction times of anesthesia to three pre-determined stages (I-III) were recorded for different concentrations of plants extracts. When fish lost the total equilibrium (III), it was placed in a fresh water tank and the recovery time was recorded. Each concentration of the plant extract was tested in two replicate fish. Tephrosia was more effective and statistically the potential to induce sedation stage III was different ( $p < 0.05$ ) for both plants. Tephrosia gave the best induction time, at 9ml plant extract/L, fish attained III within 7.27 minutes with recovery time 27 minutes. *A. coriaria* showed some sedative properties but was less effective due to longer induction time, at 25ml/l plant extract fish attained stage III within 19.9 minutes with recovery time 47.86 minutes. In experiment 2, the established concentration of each plant extract were used as killing methods to evaluate their effect on the fresh quality of Nile tilapia (*O. niloticus*). Whole fish were used eviscerated and these were divided into two groups, whereby each group was killed using a different method: Tephrosia, and Albizia. Rigor mortis and muscle pH were assessed besides the sedative potential of plant extracts. Rigor mortis did not differ among treatments during 12 hour period ( $p > 0.05$ ), however fish killed by Albizia had faster onset of rigor compared to that of Tephrosia, and after six hours all animals were in rigor stage. Analysis showed that rigor mortis was affected by time ( $p < 0.05$ ). pH values obtained from the study had no significant difference for all the three slaughtering methods ( $p > 0.05$ ), but there was subsequent low muscle pH. This research is evidence of how plant extracts have a significant effect on fresh quality of Nile tilapia fish and thus a basis for demoting the use of these plant extracts in the culture of Nile tilapia

## CHAPTER ONE

### 1.0 Background

Sedation is a biological reversible state, induced by an agent which results in the partial or complete loss of voluntary neuromotor control through chemical or non-chemical means (Anju, Solomon, & Cheikyula, 2013). In fish farming, various management practices such as weighing, tagging, stripping and transportation are required to handle fish. Handling of fish out of water is very stressful and even lethal to fish depending on the severity of the stress (Ramanayaka & Atapattu, 2006).

The use of chemical anesthetics in fisheries and aquaculture to immobilize fish started 60 years ago and the inadequacy of chemical anesthetics has resulted in a renewed interest to develop green (plant-derived) chemical anesthetics with low environmental impact and health risk (Ramanayaka & Atapattu, 2006). Natural plant extracts have been used for thousands of years to kill and demobilize fish (Anju, *et al.*, 2013; Ramanayaka & Atapattu, 2006). *Tephrosia vogelii* Locally known as "Muluku/Nanyeni" (in Bugisu) has long been used by the Badadiri people of Bugisu in Eastern part of Uganda to kill fish in water bodies (Barbara, 2014). *Albizia coriaria* known locally as Musita (Lusoga), Mugavu (Luganda) and Musiisa (Rukiga) "Ober" (Alur) its bark is harvested locally for poisoning fish by the Alur people of Nebbi of Northern part of Uganda (Barrau, 2007).

It has been predicted that aquaculture will be supplying increased products in the future due to the decline in wild captures and growing demand. (Ray, 2003). Freshness is one of the most significant aspects for evaluation of fish quality, as freshness is directly linked to appearance, texture, and taste of the perception of consumers (Cheng, Sun, Han, & Zeng, 2014). There are many external and internal influencing factors that affect the flesh quality of fish, including postmortem transformation such as the early stage of rigor, autolysis process, and muscle pH these accelerate the loss of freshness, destroy the structure of muscle, and degrade the quality of fish (Cheng *et al.*, 2014).

Fish exposed to stress respond with a fight or flight reaction that usually involves rapid muscle contraction leading to anaerobic energy transformation (Stien *et al.*, 2005). And subsequent development of rigor mortis which is characterized by muscle rigidity as a result of irreversible consumption of ATP. This study was inspired by the use of these plant extracts to catch fish by some local fishermen in parts of Northern and Eastern Uganda with the main objective to study the effects of the plant extracts on fresh quality of fish (*O. niloticus*)

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