BUSITEMA UNIVERSITY
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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

www.busitema.ac.ug

COMPARATIVE ANALYSIS OF NUTRITIONAL QUALITY OF CULTURED AND WILD NILE TILAPIA (Oreochromis niloticus) MEAT IN SOROTI DISTRICT

BY

NATUKUNDA EDSON

BU/UG/2015/2109

natukundaedson71@gmail.com

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

JULY 2018

DECLARATION

I NATUKUNDA EDSON declare that this research dissertation has not been submitted to any University or any other higher institution of learning for any degree or related qualification.

Signature.....Edson.....

Date.....28th/ July /2018.....

This dissertation has been submitted with supervision and approval of

Mr. MUYINDA ROBERT

UNIVERSITY –SUPERVISOR

BUSITEMA UNIVERSITY ARAPAI CAMPUS

P.O BOX 203 SOROTI.

Signature.....

Date.....

DEDICATION

I am exceedingly humbled and profoundly honored to dedicate this piece of work to my family members especially my farther Mr. Turyagyenda Charles, my mother Ms. Kabatoro Jane plus my brothers and sisters without forgetting all agriculturalist especially those in the Animal Industry Section.

ACKNOWLEDGEMENT

Great thanks goes to the Government of Uganda through the ministry of Higher Education that provided me with tuition and allowances which made my stay at campus possible may the lord God reword you.

The same thanks goes to the Administration of Busitema University for supporting me in every academic questions, fellow students for co-operating with me in one way or the other without forgetting my research supervisor Mr. Muyinda Robert and other technicians who helped me in data collection and analysis.

Finally, great thanks goes to my family members who endlessly supported me both financially and materially may the almighty God reword them abundantly.

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LIST OF ABBREVIATIONS

FAO	Food and Agriculture Organization
ON	Oreochromis Niloticus
CM	Centimeters
Kg	Kilogram
Mg/l	milligram per liter
dw	dry weight
FEB	February
MAR	March
APRI	April
Ug	Uganda
Shs	Shillings
g	grams
ml	milliliters
ANOVA	Analysis of variance
AOAC	Association of Official Analytical Chemists
USDA	United States Department of Agriculture
ORP	Oxidation-Reduction Potential
NNED	N-1- naphthylenediamine-dihydrochloride.

ABSTRACT

The study was conducted on the proximate composition of wild and cultured Nile tilapia (Oreochromis niloticus) as well as water quality from Arapai pond and Lalle landing site in Soroti district. The internationally accepted methods of AOAC and APHA were used for the analysis of the data. A total of twelve Oreochromis Niloticus fish were collected. Six cultured fish were collected from Arapai pond at Arapai Busitema University and other six from Lalle landing site both found in Soroti district. The study also looked at the water quality from both the wild and culture environments. Proximate composition analysis was conducted on the two group to determine the dry matter content, protein, fat, fiber and ash as well as water quality by determining the levels of pH, temperature, conductivity, phosphate, Nitrate, Nitrite, Redox potential and Ammonia. The data was analyzed by one –way analysis of variance. Results obtained were as follows: Dry matter (wild Nile tilapia: 90.3%, cultured: 92.4%), crude protein (wild Nile tilapia: 78.2%, cultured: 62.3%), crude fat (wild Nile tilapia: 2.0%, cultured: 13.0%), ash (wild Nile tilapia: 0.75%, cultured: 3.93%),fiber content(wild Nile tilapia:0.51%, cultured: 4.49% pH (wild environment: 7.55, culture environment: 7.37); Conductivity(wild Nile environment: 367.88 mg/l, culture: 142.39mg/l), Dissolved oxygen (wild: 3.68mg/l culture: 4.98mg/l), Temperature (wild : 27.27°c, culture: 24.81°c), Redox potential (wild: -5.22mv, culture: -3.56mv), Phosphate (wild environment: 14.52mg/l, culture environment: 85.23 mg/l), Nitrate(wild environment: 22.71 mg/l, culture environment: 63.81mg/l), Ammonia(wild environment: 0.47 mg/l, culture environment: 12.46mg/l and Nitrite (wild environment: 6.16mg/l, culture environment: 31.37mg/l). The results showed no significant difference between the two groups in proximate composition and some water quality parameters. However, the results showed a significant difference between the two groups for dissolved oxygen and redox potential.

Key wards: Proximate composition, water quality parameters, wild and cultured tilapia, Oreochromis niloticus, Arapai pond, Lalle landing site

CHAPTER ONE: INTRODUCTION

1.1 Background

Oreochromis niloticus has significantly increased the global tilapia production of freshwater aquaculture. It accounts for 83% of global Nile tilapia production. This has been shown by the Worldwide harvest of farmed tilapia which has now surpassed 800,000 metric tons(Popma & Masser, 1999).It's production was promoted as an aid to the poor in rural families of developing countries(Rica, 2005). However, it has attracted the attention of many consumers including Japan, USA, European Union and others creating a global market(Fish & Fish, 2004; Gupta & Acosta, 2004).

From a nutritional point of view, Nile tilapia is of high nutritional quality. It is rich in most of the vitamins, fats, protein, minerals and fibers (Sulieman & James, 2011). Fats are important because they serve as stored energy reserves and as carriers of essential fatty acids and fat-soluble vitamins(Abou, Aina, Fiogbé, & Micha, 2013). Proteins are important in the formation of regulatory compounds, defend the body against disease and act as a component of some hormones and all enzymes in the body(Sources, 2001). Mineral elements are essential components of enzyme systems meaning simple or conditioned deficiencies of mineral elements can have profound effects on metabolism and tissue structure of both animals and humans(Soetan, Olaiya, & Oyewole, 2010). Fibers are important for proper bowel function and can reduce symptoms of chronic constipation, diverticulosis, and hemorrhoids(Bersamin et al., 2004).vitamins are essential for health, growth, and reproduction(FAO & World Health Organization, 1998). They are also essential for normal metabolism and lack of which in the diet causes deficiency diseases. These properties have placed Nile tilapia in an important category of human diet food(Job, Antai, Inyang-Etoh, Otogo, & Ezekiel, 2015).

However the nutritional quality and chemical composition of Nile tilapia varies greatly from individual to another depending on nutritional requirements, fish size, age, sex, environment, diet, season and culture system(Sulieman & James, 2011). Water quality including temperature, pH, dissolved oxygen, nitrite, nitrate, phosphates, redox potential, ammonia and heavy metal accumulation are the factors affecting the growth and health of Nile tilapia. Temperature and salinity affects the growth, physiology, reproduction and metabolism hence compromising the nutritional quality(Gustavsson, 2016). In addition, heavy feeding of Nile tilapia on high protein

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