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**EFFECTS OF DIFFERENT CONCENTRATIONS (10% and 20%) OF CITRUS LIMON AND  
0.05% SODIUM BENZOATE AS PRESERVATIVES IN THE EXTENTION OF SHELF LIFE  
OF FRESH FISH**

**BY**

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SCIENCES IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF  
A BACHELOR IN ANIMAL PRODUCTION AND MANAGEMENT**



**DECLARATION**

I Kalagala Pamela, declare that this work in the dissertation is mine and has never been submitted to any university or institution for an award of any degree

Sign.....

Date.....

**APPROVAL**

This dissertation has been prepared under the guidance of my supervisor and approved for submission to the department of animal production and management

Supervisor's name

Signature

.....

.....



## **DEDICATION**

I dedicate this dissertation to my supervisor as I appreciate him for the support and guidance he granted to me. Thanks for the good work may God richly bless you.

## **AKNOWLEDGEMENT**

I appreciate the Almighty for his protection and guidance during the writing of this dissertation

I also express my thanks and gratitude to my supervisor Dr. Ziritunda Gerard for his guidance during the writing of this dissertation.

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## **ABSTRACT**

Effects of different concentration of *citrus Limon* 10% and 20% and 0.05% sodium benzoate. This research was done in Soroti district. It involved buying fish from soroti market and transported to Arapai campus laboratory. 40 fish samples were used in the research. The gills and the stomach contents of the fish were used as the samples as they were measured and crushed then serial dilution was done. The solution was put in the petri dishes which had the culture media then culturing was done. After culturing total plate count was done to know the bacterial load of the fish samples. Staining of the bacteria was done to identify the different species of bacteria in the fish samples. Preparation of nutrient broth was done and this was used during the process of clearance and sensitivity where the three extracts 10% and 20% sodium benzoate were used to test their effectiveness in clearing bacteria. In this research, there was a significant difference between the microbial load of the gills and the stomach content as the stomach content had more microorganisms than the gills. There was a significant difference in the species load of gills and the gastrointestinal tract as the gills had more of streptococci than staphylococci while the gastrointestinal tract had more of staphylococci than clostridium. There was no significant difference between the three preservatives 10% *citrus Limon*, 20% *citrus Limon* and 0.05% sodium benzoate as all the solutions had almost the same area of clearance. Therefore I recommend the fish traders to remove the gills and the stomach content of the fish as they contain a high number of bacteria which cause fish spoilage. The traders and consumers of fish should use 10% concentration of lemon as a preservative as it is readily available and has the same effect on microorganisms like 0.05% sodium benzoate which is scarce to find. Other researchers to get information on the effects of excessive use of *citrus Limon* as a preservative for fresh fish.

## **CHAPTER ONE**

### **INTRODUCTION**

#### **1.1 Background**

Fish is a good nutrient source with a high protein content but it gets spoilt easily due to the short shelf life of about 6-8 hours(Masniyom, 2011). Spoilage is caused by the biochemical and microbial toxin that alter the appearance, odour and texture of the muscles thus affecting the colour, taste, smell and go soft. These include the volatile nitrogen hypoxanthine and biogenic amines(Masniyom, 2011). This is due to accumulation of bacteria inside their stomach, gills plus flesh and enzymatic reactions which act like acids.

These enzymes are very important when the fish is alive because they digest food in the stomach but harm full when the fish is dead as they continue digesting on fish leading to fish spoilage(Ward, 2014). Common micro-organisms that affect fish include psychrotrophic strains of pseudo spp, monoxella spp, clostridium, Carnobacterium, staphylococcus, streptococcus, Vagococcus, Lactobacillus, Enterococcus, Lactococcus( Ababouch., et al 2014). Bacteria breakdown amino acids in the tissue of dead fish into substances such as putrescine and cadaverine a process known as putrefaction leading to undesirable smells and flavours associated with rotten fish. The organoleptic test of fish include looking mainly at its appearance, odour, and texture, eyes, gills, surface lime and the firmness of the scale, the presence and absence of rigor mortis.(Massaquoi., et al 2011).

Fish toxins like histamine, cadaverine, putrescine, tyramine when eaten by humans through spoilt fish will cause scombrotxin fish poisoning (SFP) majorly in the gastrointestinal tract leading to contraction of intestinal smooth muscles hence abdominal pains cramps, diarrhea, vomiting plus others like headaches increased heartbeat, blood pressure, increased stimulation of the sensory neurons which produces pain, itching and urticarial lesions ("Fisheries aquaculture & Paper", 2014). Under poor conditions of post capture handling, shelf life of fish

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