

**MICROBIAL PROFILING AND NUTRITIONAL CONTENTS OF *Parkia biglobosa* and *Pentaclethra macrophylla* IN OTA, OGUN STATE, NIGERIA**

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**JULY, 2022**

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**BY**

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**A DISSERTATION SUBMITTED TO THE SCHOOL OF POSTGRADUATE STUDIES IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF MASTER OF SCIENCE (M.Sc) DEGREE IN MICROBIOLOGY IN THE DEPARTMENT OF BIOLOGICAL SCIENCES, COLLEGE OF SCIENCE AND TECHNOLOGY, COVENANT UNIVERSITY.**

**JULY, 2022**

## **ACCEPTANCE**

This is to attest that this dissertation is accepted in partial fulfilment of the requirements for the award of the degree of Master of Sciences in Microbiology in the Department of Biological Science, College of Science and Technology, Covenant University, Ota, Nigeria

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**Prof. Akan B. Williams**  
(Dean, School of Postgraduate Studies)

**Signature and Date**

## **DECLARATION**

**I, ADELODUN, COMFORT ADEBUKOLA (20PCQ02197)** declare that this research was carried out by me under the supervision of Prof. Solomon, U. Oranusi of the Department of Biological Science, College of Science and Technology, Covenant University, Ota, Nigeria. I attest that the dissertation has not been presented either wholly or partially for the award of any degree elsewhere. All sources of data and scholarly information used in this dissertation are duly acknowledged.

**ADELODUN, COMFORT ADEBUKOLA**

**Signature and Date**

## **CERTIFICATION**

We certify that this dissertation titled “**MICROBIAL PROFILING AND NUTRITIONAL CONTENTS OF *Parkia biglobosa* and *Pentaclethra macrophylla* IN OTA, OGUN STATE, NIGERIA**” is an original research work carried out by, **ADELODUN COMFORT ADEBUKOLA** with matriculation number **20PCQ02197** in the Department of Biological Sciences, College of Science and Technology, Covenant University under the supervision of Prof. Solomon, U. Oranusi. We have examined and found the work acceptable for the award of a degree of M. Sc in Microbiology.

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**Signature and Date**

## **DEDICATION**

I dedicate this work to Almighty God for giving me the strength, wisdom, knowledge, and understanding to write this thesis successfully.

## ACKNOWLEDGMENTS

I acknowledge Almighty God, my Alpha and Omega, for this grace throughout this project.

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## TABLE OF CONTENTS

CONTENT	PAGE
COVER PAGE	i
TITTLE PAGE	ii
ACCEPTANCE	iii
DECLARATION	iv
CERTIFICATION	v
DEDICATION	vi
ACKNOWLEDGMENT	vii
TABLE OF CONTENTS	viii
LIST OF TABLES	xi
LIST OF FIGURES	xii
ABSTRACT	xiv
<b>CHAPTER ONE: INTRODUCTION</b>	<b>1</b>
1.1 Background	1
1.2 Statement of the research problem <b>Bookmark not defined.</b>	<b>Error!</b>
1.3 Research Questions <b>Bookmark not defined.</b>	<b>Error!</b>
1.4 Aim and objectives of the study <b>Bookmark not defined.</b>	<b>Error!</b>
1.5 Justification of Study <b>Bookmark not defined.</b>	<b>Error!</b>
1.6 Scope of the study <b>Bookmark not defined.</b>	<b>Error!</b>
<b>CHAPTER TWO: LITERATURE REVIEW</b>	<b>1</b>
2.1 Traditionally fermented condiments	5
2.2 Microorganisms involved in the production of fermented condiments	9
2.3 Biochemical changes during production of fermented condiments	9
2.4 Nutritional value of fermented condiments	10

2.5	Use of starter culture for the controlled fermentation of fermented condiments	11
2.6	African locust beans ( <i>Parkia biglobosa</i> )	11
2.6.1	Production process of Iru from <i>P. biglobosa</i>	12
2.7	<i>Pentaclethra macrophylla</i> (African oil bean seed)	15
2.7.1	Production process of <i>Pentaclethra macrophylla</i>	15
2.8	<i>Bacillus</i> species	18
2.9	Functional roles of <i>Bacillus</i> species in fermented condiments	19
2.9.1	Flavour and aroma development	19
2.9.2	Degradation of proteins and amino acid synthesis	20
2.9.3	Degradation of non-digestible carbohydrates	20
2.9.4	Lipopeptide antimicrobial production	20
<b>CHAPTER THREE: MATERIALS AND METHODS</b>		<b>23</b>
3.0	Materials	23
3.0.1	Equipment Used	<b>Error!</b>
	<b>Bookmark not defined.</b>	
3.0.2	Media Used	<b>Error!</b>
	<b>Bookmark not defined.</b>	
3.0.3	Reagents	<b>Error!</b>
	<b>Bookmark not defined.</b>	
3.1	Methodology	<b>Error!</b>
	<b>Bookmark not defined.</b>	
3.1.1	Sample collection	<b>Error!</b>
	<b>Bookmark not defined.</b>	
3.1.2	Preparation of Fermented <i>P. biglobosa</i> and <i>P. microphylla</i> samples for analysis	<b>Error!</b>
	<b>Bookmark not defined.</b>	
3.2	Microbial community profiling of Iru and Ugba samples	<b>Error!</b>
	<b>Bookmark not defined.</b>	
3.2.1	Isolation of Microorganisms	<b>Error!</b>
	<b>Bookmark not defined.</b>	
3.2.2	Identification of Bacterial Isolates	<b>Error!</b>
	<b>Bookmark not defined.</b>	
3.2.2.1	Gram staining	<b>Error! Bookmark not defined.</b>
3.2.2.3	Oxidase Test	<b>Error! Bookmark not defined.</b>
3.2.2.4	Triple Sugar Iron (TSI) Test	<b>Error! Bookmark not defined.</b>
3.2.2.5	Citrate Utilization	<b>Error! Bookmark not defined.</b>

3.2.2.6	Urease Test	<b>Error! Bookmark not defined.</b>
3.2.2.7	Methyl Red – Voges Proskauer (MR-VP) Test	<b>Error! Bookmark not defined.</b>
3.2.2.8	Indole Production Test	<b>Error! Bookmark not defined.</b>
3.2.2.9	Endospore stain	<b>Error! Bookmark not defined.</b>
3.2.3	Identification of Fungal Isolates	<b>Error! Bookmark not defined.</b>
3.3	Characterization of beneficial <i>Bacillus</i> species in retailed fermented condiments	<b>Error! Bookmark not defined.</b>
3.3.1	Safety Assessment	<b>Error!</b>
	<b>Bookmark not defined.</b>	
3.3.1.1	Hemolysis Test	<b>Error! Bookmark not defined.</b>
3.3.1.2	Antibiotic susceptibility Test	<b>Error! Bookmark not defined.</b>
3.3.2	Probiotic examinations of <i>Bacillus</i> strains	<b>Error!</b>
	<b>Bookmark not defined.</b>	
3.3.2.1	Resistance of <i>Bacillus</i> strains to acidic pH	<b>Error! Bookmark not defined.</b>
3.3.2.2	Bile salt tolerance	<b>Error! Bookmark not defined.</b>
3.3.2.3	Phenol tolerance	<b>Error! Bookmark not defined.</b>
3.4	Molecular identification of <i>Bacillus</i> species used as a starter culture	<b>Error!</b>
	<b>Bookmark not defined.</b>	
3.4.1	DNA Extraction procedure	<b>Error!</b>
	<b>Bookmark not defined.</b>	
3.4.2	PCR amplification	<b>Error!</b>
	<b>Bookmark not defined.</b>	
3.5	Laboratory Fermentation of <i>Parkia biglobosa</i> (African locust bean) 'Iru' and <i>Pentaclethra macrophylla</i> (African oil bean seed) 'ugba' using <i>Bacillus</i> species as stater culture	<b>Error!</b>
	<b>Bookmark not defined.</b>	
3.6	Proximate analysis of Traditionally Fermented Seeds and Laboratory fermented seeds	<b>Error! Bookmark not defined.</b>
	<b>Error! Bookmark not defined.</b>	
3.6.1	Ash content	<b>Error!</b>
	<b>Bookmark not defined.</b>	
3.6.2	Moisture content	<b>Error!</b>
	<b>Bookmark not defined.</b>	
3.6.3	Crude protein determination	<b>Error!</b>
	<b>Bookmark not defined.</b>	
3.6.4	Crude Fibre Content Determination	<b>Error!</b>
	<b>Bookmark not defined.</b>	
3.6.5	Determination of crude fat	<b>Error!</b>
	<b>Bookmark not defined.</b>	

3.6.6 Determination of Carbohydrate Content	<b>Error!</b>
<b>Bookmark not defined.</b>	
3.7 Statistical Analysis	<b>Error!</b>
<b>Bookmark not defined.</b>	
<b>CHAPTER FOUR: RESULTS</b>	33
4.1 Enumeration of bacterial and fungal count in <i>P. biglobosa</i> and <i>P. macrophylla</i> samples	33
4.2 Identification of bacterial isolates in <i>P. biglobosa</i> and <i>P. macrophylla</i> samples	
<b>Error! Bookmark not defined.</b>	
4.3 Identification of fungal isolates in <i>P. biglobosa</i> and <i>P. macrophylla</i> samples	
<b>Error! Bookmark not defined.</b>	
4.4 Occurrence of <i>Bacillus</i> species in the selected traditionally fermented <i>P. biglobosa</i> and <i>P. macrophylla</i>	38
4.5 Hemolysis test	<b>Error!</b>
<b>Bookmark not defined.</b>	
4.6 Antibiotics susceptibility test	<b>Error!</b>
<b>Bookmark not defined.</b>	
4.7 In Vitro Screening of Probiotic Potential of <i>Bacillus</i> Isolates	<b>Error!</b>
<b>Bookmark not defined.</b>	
4.7.1 pH tolerance	<b>Error!</b>
<b>Bookmark not defined.</b>	
4.7.2 Bile Salt Tolerance	<b>Error!</b>
<b>Bookmark not defined.</b>	
4.7.3 Phenol Tolerance	<b>Error!</b>
<b>Bookmark not defined.</b>	
4.8 Laboratory Controlled Fermentation of <i>Parkia biglobosa</i> and <i>Pentaclethra macrophylla</i> using <i>Bacillus</i> species as starter culture	<b>Error!</b>
<b>Bookmark not defined.</b>	
4.8.1 pH variation of laboratory controlled fermentation of <i>P. biglobosa</i> and <i>P. macrophylla</i>	
<b>Error! Bookmark not defined.</b>	
4.8.2.1 <i>P. biglobosa</i>	<b>Error!</b>
<b>Bookmark not defined.</b>	
4.8.2.2 <i>P. macrophylla</i>	<b>Error! Bookmark not defined.</b>
4.9 Molecular characterisation of <i>Bacillus</i> species used as the starter culture for the laboratory-controlled fermentation	<b>Error!</b>
<b>Bookmark not defined.</b>	

**CHAPTER FIVE: DISCUSSION**  
**Error! Bookmark not defined.**

5.1 Identification of microbial profile of traditionally selected fermented condiments  
**Error! Bookmark not defined.**

5.2 Safety and probiotic test for isolated *Bacillus* species to be used as a starter culture  
**Error! Bookmark not defined.**

5.2.1 Hemolysis test for *Bacillus* species isolated from traditionally fermented samples  
**Error! Bookmark not defined.**

5.2.2 Antibiotics susceptibility testing for *Bacillus* species isolated from traditionally fermented samples  
**Error! Bookmark not defined.**

5.2.3 Acid and bile salt tolerance of *Bacillus* species isolated from traditionally fermented samples  
**Error! Bookmark not defined.**

5.2.4 Phenol tolerance of *Bacillus* species isolated from traditionally fermented samples  
**Error! Bookmark not defined.**

5.3 Fermentation of selected condiments seeds using *Bacillus* species as a starter culture  
**Error! Bookmark not defined.**

5.3.1 pH  
**Error! Bookmark not defined.**

5.4 Comparative analysis of the nutritional content of retailed and controlled fermented condiments  
**Error! Bookmark not defined.**

**CHAPTER SIX : CONCLUSION AND RECOMMENDATION**  
**Error! Bookmark not defined.**

6.1 Summary of the study  
**Error! Bookmark not defined.**

6.2 Conclusion  
**Error! Bookmark not defined.**

6.3 Contributions of knowledge  
**Error! Bookmark not defined.**

6.4 Recommendations  
**Error! Bookmark not defined.**

**REFERENCES 68**

**APPENDIX 80**

## LIST OF TABLES

<b>TABLES</b>	<b>LIST OF TABLES</b>	<b>PAGE</b>
2.1:	Common traditionally fermented food condiments of African origin	7
2.2:	Gaps in literature	23
4.1:	Mean Total Bacterial and Fungal count in sampled condiments	38
4. 2:	Morphological and Biochemical Characteristics of Bacterial isolates from Fermented Sampled Condiments	40
4.3:	Cultural identification of fungal isolates from <i>P. biglobosa</i> and <i>P. macrophylla</i> sample	41
4. 4:	Hemolysis activities of <i>Bacillus</i> species isolated from fermented condiments	46
4.5:	Antibiotics susceptibility pattern of the <i>Bacillus</i> species isolated from fermented condiments	48
4.6:	Description the <i>Bacillus</i> isolate on the basis of BLAST analysis	60

## LIST OF FIGURES

FIGURES	TITLE OF FIGURES	PAGE
2.1:	Common fermented foods in Africa	8
2.2:	Preparation of Iru	14
2.3:	A: Unfermented seed of <i>P. biglobosa</i> B: Fermented <i>P. biglobosa</i>	15
2.4:	Preparation of Ugba	17
2.5:	Unfermented seeds <i>P. macrophylla</i> (a) and fermented <i>P. macrophylla</i> (b)	18
4.1:	Occurrence of <i>Bacillus</i> sp. in the selected traditionally fermented <i>P. biglobosa</i>	43
4.2:	Occurrence of <i>Bacillus</i> sp. in the selected traditionally fermented <i>P. macrophylla</i>	44
4.3:	pH tolerance of <i>Bacillus</i> species used as starter culture	50
4.4:	Bile salt tolerance of <i>Bacillus</i> species used as starter culture	52
4.5:	Phenol tolerance of <i>Bacillus</i> species used as starter culture	54
4.6:	pH variation of laboratory-controlled fermented <i>Parkai biglobosa</i>	56
4.7:	pH variation of laboratory-controlled fermented <i>P. macrophylla</i>	56
4.8:	Proximate analysis of traditionally and laboratory fermented <i>P. biglobosa</i>	58
4.8:	Proximate analysis of traditionally and laboratory fermented <i>P. macrophylla</i>	59
4. 10:	Unrooted tree of isolate <i>Bacillus</i> strain BD_1492R	61

## APPENDIX

APPENDIX	LIST OF APPENDICES	PAGE
PLATE 1:	<i>Aspergillus niger</i> on SDA agar	84
PLATE 2	<i>Saccharomyces cerevisiae</i>	84
PLATE 3:	Mixed colonies of <i>Aspergillus fumigatus</i> , <i>Aspergillus niger</i> and <i>Saccharomyces cerevisiae</i> on SDA aga	85
PLATE 5&6:	Isolates showing $\Upsilon$ -hemolysis on blood agar	85
PLATE 7&8:	Isolates showing $\beta$ -hemolysis on blood agar	86

## ABSTRACT

*Pentaclethra macrophylla* and *Parkia biglobosa* are Nigerian food condiments produced by natural inoculation, enhanced by environmental microflora, thus resulting in competitive adaptation and activities of autochthonous, spoilage, and pathogenic microorganisms. Consequently, the condiments produced lack consistency in terms of quality attributes, safety, and organoleptic properties. Efforts at large-scale production and commercialization of these condiments necessitate the development of a controlled fermentation system, using appropriate starter cultures that can initiate fermentation, dominate the process, and rapidly ferment the substrate. The aim of this study was to determine the microbial diversity and nutritional contents of these selected fermented condiments in Ota, Ogun State, Nigeria. The microbial diversity and nutritional profile of the fermented *P. biglobosa* and *P. macrophylla* were determined using standard procedures. The morphological and biochemical characterization of isolates showed members of the genera of *Bacillus* sp., *Staphylococcus* sp., *Micrococcus* sp., *Proteus* sp., *Aspergillus* sp. and *Saccharomyces cerevisiae*. Molecular characterization of the probiotics bacillus isolates confirmed *Bacillus subtilis* BD\_1492R, *Bacillus pumilus* strain CBs9, *Bacillus subtilis* strain B5, *Bacillus subtilis* strain AN5 16S. The proximate composition of the controlled fermented *P. macrophylla* seeds using safe, and probiotic *Bacillus* strains as a starter culture, was protein (25.4 %±0.01), ash (4.03 %±0.02), crude fibre (15.15 %±0.02) and carbohydrate (8.06 %±0.01), which was higher than the values from the naturally fermented condiment which are; 35.85 %±0.01, 0.56 %±0.01, 20.05 %±0.01, and 15.04 %±0.03 respectively. While *P. biglobosa* had higher moisture (41.4 %±0.15), ash (2.04 %±0.01), protein (21.04 %±0.02) and fat (17.54 %±0.01), but with lower crude fibre (4.08%±0.01) and carbohydrate (13.9 %±0.06) content when compared to the value of the traditionally fermented samples which is; 4.08 %±0.01 and 13.9 %±0.06 respectively. The laboratory-controlled fermented samples had better nutritional content when compared to the traditional samples; therefore, the probiotic *Bacillus* strains isolated from the selected condiment samples can be used as a starter culture for the controlled fermentation of *P. Biglobosa* and *P. macrophylla*.

**Keywords:** *fermentation, local condiments, nutritional, microbial diversity, controlled fermentation.*