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

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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

Mr. Taiwo B. Erewunmi
(Secretary, School of Postgraduate Studies) **Signature and Date**

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.

Prof Solomon U. Oranusi
(Supervisor) **Signature and Date**

Prof Solomon U. Oranusi
(Head of Department) **Signature and Date**

Prof. Afolabi O. Rebecca
(External Examiner) **Signature and Date**

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

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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.