

**CHEMICAL COMPOSITION AND SOME MINERAL PROPERTIES OF MAIZE
COBS ENSILED WITH WOOD ASH EXTRACT FORTIFIED WITH
MOLASSES**

BY

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DEPARTMENT OF ANIMAL SCIENCE

FACULTY OF AGRICULTURE

UNIVERSITY OF BENIN

BENIN CITY

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**A PROJECT WORK SUBMITTED TO THE DEPARTMENT OF ANIMAL
SCIENCE, FACULTY OF AGRICULTURE, UNIVERSITY OF BENIN, IN
PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE AWARD OF
BACHELOR OF AGRICULTURE**

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CERTIFICATION

This is to certify that the project work was carried out by Gift Kelechi KISSIWE, Department of Animal Science, Faculty of Agriculture, University of Benin, Benin City, Nigeria, under the supervision of Prof F.U. Igene.

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Project Supervisor

Signature & Date

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Signature & Date

DEDICATION

This research work is dedicated to God Almighty and my Family, KISSIWE Family.

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Firstly, Praises and thanks to God Almighty for divine blessings and provision throughout my research work. I would like to express my deep and upmost gratitude to my Project supervisor, Prof. F. U. Igene for his patience, understanding and guidance throughout this research, and also I would love to express my deep and upmost gratitude to my Co- Project supervisor, Mrs. O.B. Abiloro for her continuous support, guidance and motherly love towards my project colleagues and I throughout this research. I also appreciate the Dean of Faculty of Agriculture Prof. C.O. Emokaro, Head of Department, Dr. N.C. Akaeze and to my lovely lecturers; Prof. J.M. Omoyhaki, Prof. M.A. Bamikole, Prof. S.O. Nwokoro, Prof. J.O. Oyedeji, Dr. G.I.O. Odafe, Dr. (Mrs). G.O. Egigba, Mr Paul Aduba, Dr. B.G. Onagluse, Mrs. B.O. Issac, Dr. W.O. Agbonghae, Dr. E.S. Abel, Dr Ekom Udofia, and Mrs. V.E. Ekhurutomwen, for their relentless efforts towards impacting knowledge, advice and good morals to me.

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ABSTRACT

This study investigated the chemical composition and some mineral properties of maize cobs ensiled with wood ash extract fortified with molasses. The study aimed to determine the effect of soaking durations and additive combination on the proximate and mineral composition of maize cob silage. Six treatments were used, comprising ordinary dried ground maize cobs (control), maize soaked in only water, maize soaked in 500 ml of wood ash for three days, maize soaked in 500 ml of wood ash for seven days, maize soaked in 500 ml of wood ash and molasses for three days, and maize soaked in 500 ml of wood ash and molasses for seven days. Samples of these differently treated maize cobs were analyzed for moisture content, dry matter content, crude protein, crude fat, ash, crude fiber, carbohydrate, and selected minerals such as nitrogen, phosphorus, potassium, calcium, zinc, and sodium. The results showed that the inclusion of wood ash extract and molasses, as well as prolonged soaking duration, had significant effects ($p < 0.05$) on the chemical and mineral composition of the maize cob silage. Moisture, ash, and mineral contents increased with the addition of wood ash extract and molasses, while crude protein, fat, and carbohydrate showed slight decreases as fermentation progressed. The highest ash (6.53%), calcium (188.30 mg/100g), potassium (578.10 mg/100g), and sodium (99.91 mg/100g) contents were recorded in maize soaked in 500 ml wood ash and molasses for seven days, while the control recorded the least mineral enrichment.

The increase in mineral content indicates that wood ash extract served as a good mineral fortifier, while molasses enhanced fermentation and nutrient stability. Prolonged soaking improved nutrient diffusion and fermentation efficiency, resulting in better silage quality. The combination of wood ash extract and molasses for seven days proved to be the most effective treatment, producing silage with improved nutritional and mineral composition suitable for livestock feed. This study concludes that maize cobs can be effectively converted into nutritionally valuable and mineral-rich silage through ensiling with wood ash extract fortified with molasses, thereby providing a cost-effective and sustainable feed resource for livestock production.

