Proximate and Phytochemical Content of African Locust Bean: A Systematic Review.

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Abstract- Background

Proximate & Phytochemicals Content helps to reveal the nutritional composition and quality of a substance aimed at helping consumer make healthier dietary choice and African locust bean is one of those highly nutritional and medicinal legume that has been extensively studied which has been reviewed in this work so as to further reveal its importance globally.

Methods The review was guided by preferred reporting items for systematic review and meta-analysis guidelines using four data bases Pub Med, Web of Science, Google Scholars and Scopus.

Result: A proximate content range of 3.19-7.96% crude protein, 1.98-3.55% crude fat, 3.82-7.69% crude fibre, 1.06-3.55% Ash, 4.55-8.02% moisture and 56.22-75.65% carbohydrate was gotten while phytochemicals content range of 3.25-6.22mg/g tannins, 3.23-5.67mg/g flavonoids, 12.21-18.37mg/g steroids, 8.04-11.98mg/g terpenoids, 29.98-56.34mg/g alkaloids and 4.69-8.22mg/g cardiac glucosides which account for the several nutritional and medicinal effect accrued to african locust bean.

Indexed Terms- Proximate, Phytochemical, Composition, African locust bean.

I. INTRODUCTION

Proximate & Phytochemicals Content helps to reveal the nutritional composition and quality of a substance aimed at helping consumer make healthier dietary choice and African locust bean is one of those highly nutritional and medicinal legume that has been extensively studied which has been reviewed in this work so as to further reveal it's importance globally.

In Nigeria and west coast of Africa, African locust bean is traditionally use as seasoning, medicinal agent, wound healing agent, treatment of malaria, bronchitis, pneumonia, ulcers, skin Infection, diarrhea and hypertension (Augustine.I. Airaodion, Edith. O. Airaodion, Emmanuel.O. Ogbuagu, Uloaku Ogbuagu & Etinosa U. Osamwoma, 2019).

II. SYSTEMATIC REVIEW QUESTIONS

(i) What are the phytochemicals content of African locust bean?

(ii) What are the proximate content of African locust bean?

III. SEARCH STRATEGY

Four (4) data bases were used - Pub Med, Web of Science, Google Scholars and Scopus. MeSH (Medical Subject Heading) was also adopted eg. Proximate content, Phytochemical content, nutritional evaluation, Physicochemical properties etc.

IV. STUDY SELECTION

Search records were transferred to Mendeley software and duplicate were removed. Title and abstract were screened for relevance, full published articles from aforementioned data bases were equally screened for relevance.

V. ELIGIBILITY CRITERIA - INCLUSION /EXCLUSION

Included eligibility criteria are

(i). Articles that dealt directly on the description, phytochemicals content and proximate content of African locust bean. Also, article that dealt on description of proximate and Phytochemical as a concept

(ii). Papers conducted using well elucidated study designs. (iii). Grey literature

(iv) Papers published in English.

## VI. ELIGIBILITY CRITERIA - INCLUSION /EXCLUSION

Excluded eligibility criteria are
(i). Articles not connected with African locust bean, proximate or phytochemicals content.
(ii). Articles not written in English as well as conference paper, manuscript and abstract

VII. SEARCH RESULT

The four data bases yielded 5510 records to which Mendeley removed 1400 duplicate and 4050 records after abstract and title screening leaving 60 full length paper for further screening. Upon consideration of eligibility criteria (inclusion &: exclusion), only 34 full length paper were considered for this qualitative synthesis.

VIII. PRISMA FLOW CHART
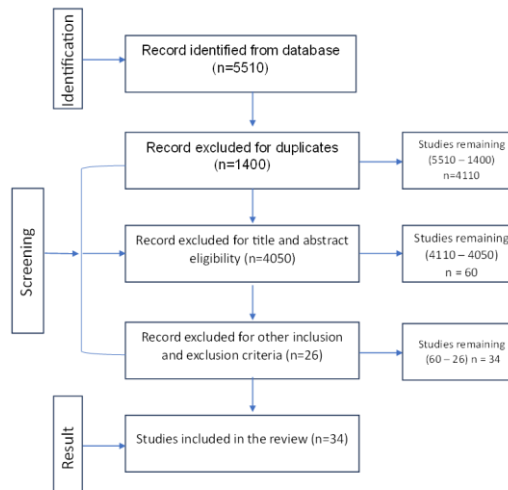
IX. DATA EXTRACTION

Data were extracted base on authors, year of publication, purpose of the study, study design, methodology and statistical analysis.

Data Synthesis
(i)   Compiled record were well studied for proper understanding of content.
(ii) key concept of articles were noted and systematic labelling carried out using descriptive code.
(iii) Extraction of relevant information from supportive article
(iv) Extracted data serves as a concrete evidence to answer the research questions

X. RESULT/ KEY FINDINGS

A proximate content range of 3.19-7.96% crude protein, 1.98-3.55% crude fat, 3.82-7.69% crude fibre, 1.06-3.55% Ash, 4.55-8.02% moisture and 56.22-75.65% carbohydrate was gotten while phytochemicals content range of 3.25-6.22mg/g tannins, 3.23-5.67mg/g flavonoids, 12.21-18.37mg/g steroids, 8.04-11.98mg/g terpenoids, 29.98-56.34mg/g alkaloids and 4.69-8.22mg/g cardiac glucosides which account for the several nutritional and medicinal effect accrued to African locust bean.

Proximate content of African Locust Bean
(Peak Values)
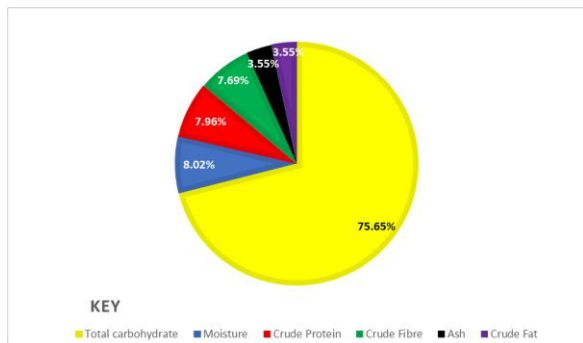
Phytochemical Content of African Locust Bean (Peak Values)
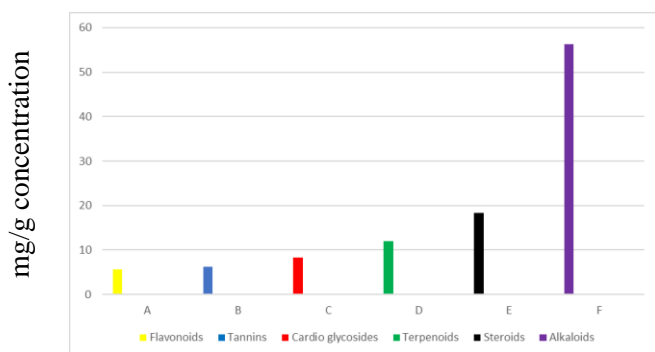
XI. DISCUSSION OF FINDINGS

The result synthesized from this review is in line with WHO/UNICEF standard for legumes which stated the maximum proximate content as 42% crude fibre, 22.9% crude fat, 40% crude fibre, 5% ash, 10% moisture and 80% carbohydrate & maximum phytochemicals not greater than 50mg/g which is equally in line with the articles considered in this systematic review.

XII. IMPLICATIONS/CONCLUSION/RECOMMENDATIONS

The phytochemicals and proximate content result from the review shows that African locust bean is highly nutritional and medicinal and should be embrace both as food, additives, raw materials for pharmaceutical/food industry etc.

It's therefore recommended that specific study be done in respect to its acclaim therapeutic effect such as hypoglycemic effect since diabetes amongst other's being threat to human existence.

REFERENCES

[1] Adeleye, J.O (2021). The hazardous terrain of Diabetes mellitus in Nigeria. The time for action is now. *Research Journal of Health Sciences* 9(1), 69-76.

[2] Afolayan, M. Afolayan, S. B and Muhammad M.A (2017) Determination of proximate and phytochemical composition of African locust bean forage. *Nigeria Journal of Animal Production* 44(51): 65-69.

[3] Arinola S.O, Oje O.J and Omowaye-Taiwo, O.A. (2019). Evaluation of physicochemical properties and phytochemical tropical Agriculture 24(1): 64-69

[4] Augustine I. Airadoin, Edith O. Airadoin, Emmanuel O. Ogbugua, Uloka Ogbugua and Etinosa II. Osemwowa (2019). Effect of Oral intake of African locust bean on Fasting blood sugar and lipid profile of Albino Rats: *Asian Journal of Research in Biochemistry.* 4(4):1-9.

[5] Bresciani, L., Scazzina, F., Leonardi, R., Dall'Aglio, E., Newell, M., Dall'Asta, M., Melegari, C., Ray, S., Brightenti, F. and Del Rio, D. (2016) Bioavailability and metabolism of compounds from wholegrain wheat and aleurone-rich wheat bread. *Molecular nutrition and food research.* 60(11).. 2343-2354.

[6] Chukwuma S. Ezeonu and Chigozie M. Ejikeme (2016). Qualitative and Quantitative Determination of Phytochemical Contents of Indigenous Nigerian Softwoods. *New Journal of Science.*

[7] Doha A. Mohamed, Kareem Fouda, Hoda B. Mabrok, Marawa, E.El-Shamarka and Ibrahim, M. Hamed (2024). Sourdough bread as nutritional intervention tool for improvement of cognitive dysfunction in diabetic rats *BMC Nutrition* 10:53.

[8] Federal Ministry of Finance, Budget and National Planning and UNICEF, Monetary child poverty in Nigeria, 2021.

[9] Federal Republic of Nigeria, Multi-Dimensional Child Poverty in Nigeria. (2021). Multiple Overlapping Deprivation Analysis (MODA).

[10] Obasi B.C, Abur, E.V. and Zakka. R (2023). Evaluation of proximate composition, physical and sensory properties of soyabean supplemented wheat bread. *World Journal of Advanced Research and Reviews.* 18(01): 907-914.

[11] Paul Chukwuka EZE (2020) Determination of the Proximate Composition and Amylose Content of New Rice for Africa (NERICA) Flour. *Turkish Journal of Agricultural Engineering Research.* 1 (1): 131-140

[12] Richard A. Ajani, Stephen A. Adefegha, Ganiyu Oboh (2022). Hypolipidemic effect and antioxidant properties of Cassava flour composite bread in rat *Journal of Measurement and Characterization.*

[13] Sara Masood, Attiq Ur Rehman, Shasid Bashir, Mohamed El Shazly, Muhammed Imran, Palwasha Khalil, Faiza Iftikhar, Hafiza Madiha Jaffar, Tara Khursheed (2021). Investigation of the anti-hyperglycemic and antioxidant effects of wheat bread supplemented with onion peel extract and onion powder in diabetic rats.

[14] Tharise N. Julianti E, and Nurminah-M. (2014). Evaluation of Physiochemical and functional properties of composite flour from cassava, rice, potato, soyabean and xanthan gum as alternative to wheat flour. *International Food Research Journal* 40:1641-1649.

[15] Uloko A.E, Musa B.M, Ramalan M.A, Gezawa I.D, Puepet F.H, Uloko A.T, Borodo M.M, Sada K.B (2018) Prevalence and Risk factors for Diabetes Mellitus in Nigeria: A systematic Review and Meta Analysis. *Diabetes.Their doi.org 110.1007/s/3300-018-0441-1.*

[16] UNICEF Nigeria Highlights 2018 – 2022, Key results for children