Call: National Agency for Science and Engineering Infrastructure (NASENI)

Proposal Title: Improving on the Quality and commercialization of Kolanut value-added products, enhancing the livelihoods of farmers and SMEs in the Kolanut industry

Lead/Principal Investigator: Dr. Omotayo O. Adenuga
Other Investigators: Dr. (Mrs.) B. O. Olorundare, Dr. Ogunsowo A. O., Mrs. E. F. Odeyemi and Mr. C. Agbebaku
Email:
Phone: +2348054120997
Affiliation: Cocoa Research Institute of Nigeria (CRIN), Ibadan, Oyo State, Nigeria
Funder: National Agency for Science and Engineering Infrastructure (NASENI)
Date: September, 2025.

Executive Summary

Kolanut (Cola nitida and Cola acuminata) is a West African economically and culturally important crop, which is widely used for its stimulating effects and traditional importance. Its industrial potential as a raw material for beverage cannot as yet be fully harnessed. Kolanut is currently sold mostly in raw form with little processing and value addition. Informally processed kolanut drinks are available but are plagued with issues of poor and variable quality, non-standardization, and non-certification, which make them uncompetitive both in the local and international markets.

The project seeks to improve on the quality and the commercial processing of kolanut beverages as a source of economic growth, job creation, and income generation. Intervention will be in terms of capacity building for youths and women, pilot production of standardized kolanut-based beverages such as juices, herbal teas, and functional energy drinks, and developing quality and safety procedures based on HACCP and NAFDAC standards.

The project will also enable certification, branding, packaging, and market linkages so that kolanut beverages can meet consumer expectations and regulatory standards. By exploiting the growing demand for natural and functional beverages, the project will enhance market opportunities while reducing unemployment and underemployment among kolanut-producing communities.

The expected outcomes are standardized and certified kolanut beverages, enhanced technical skills of women and youth entrepreneurs, improved market access, and the creation of sustainable employment and incomes. In the long term, the project will contribute significantly to rural development and major SDGs, particularly SDG 1 (No Poverty), SDG 2 (Zero Hunger), SDG 5 (Gender Equality), and SDG 8 (Decent Work and Economic Growth).

Introduction

Kolanut (*Cola nitida and Cola acuminata*) is a indigenous tropical crop of great cultural, economic, and medicinal significance in West Africa and, more specifically, Nigeria. It has long been utilized as a stimulant on account of its naturally occurring caffeine content and in cultural ceremonies as a sign of peace and hospitality (Akinmoladun & Komolafe, 2019). Despite its omnipresence and cultural tolerance, kolanut has not been widely exploited as a raw material for agro-processing. In contrast to cocoa or coffee, whose equally efficient global value chains exist, kolanut is mostly consumed raw with little value addition. It has been an important object of trade for a long time due to its wide economic values. In Nigeria, it has different levels of significance to the three major existing ethnic groups, the Hausa, Igbo and Yoruba among which source of livelihood plays the most vital role (Azeez, 2015).

Kola nut is also a cultural staple that has been listed by the U.S. Food and Drug Administration (FDA) as generally safe for human consumption (Burdock *et al*., 2009). It is freshly chewed in both private and social settings for its caffeine-rich effects as a central nervous system stimulant (Paul, 2021). In this regard, it is known to mitigate hunger and fatigue. Moreover, its consumption has been implicated in folk medicine as remedy for cough, diarrhea, weight loss, headaches, and many other health conditions (Odebunmi *et al*., 2009).

Transforming Kolanuts, Pathway to Achieving the Renewed Hope Agenda Mantra

Research has revealed that kolanut is of potential interest for the production of functional beverages, soft drinks, and nutraceuticals (Jayeola, 2001, Odebunmi *et al.,* 2020). Pilot-scale processing and improved quality of kolanut drinks can lead to new markets, employment, and Nigerian expansion into the global beverage market, thereby achieving Sustainable Development Goals (SDGs) 1 (No Poverty), 8 (Decent Work and Economic Growth), and 9 (Industry, Innovation, and Infrastructure).

The Usefulness of kolaNut in driving Sustainable Development Goals (SDGs)

The health benefits of kolanut are significantly related to their bioactive compositions. Kolanut being a significant source of caffeine (2 – 3.5%), also contains modest amounts of methylxanthine and theobromine. Plant phenolic compounds such as flavonoids, anthocyanins, and tannins are reportedly present in significant amounts and all these are responsible for their observed health bioactivities.

Research gap

The formulation of beverages kola fruits have been from time immemorial. In the Cocoa Research Institute of Nigeria, several beverages including wines, drinks,

instant powder and infusion have been made from kolanuts. Jayeola (2001; Jayeola and Akinwale, 2002) produced kola soft drinks using varying ratio of *Cola nitida*followed by their physicochemical and organoleptic characterization. Moreover, a document published by Ibrahim, (2022) discusses CRIN utilizing kolanut in the production of various beverages including kola wine. However, there are several limitations backing the commercial scale production of these beverages. Hence, it is pertinent to scale up, fortify, improve and modernize the various technologies involved in production of these beverages. This will enable maximizing the nutritive and economic values in kola fruits for improved health benefits and economic profitability.

Background and Problem Statement

Nigerian kolanut production is vast, with estimated annual output of over 100,000 metric tons (FAO, 2021). Below 5% of the same production, however, is manufactured into value-added forms. Younger generations are registering decreasing consumption of kolanut due to lifestyle changes and lack of innovation in product development (Olayemi et al., 2018).

Aside the usage of kola fruits in medicine, it is used in food industry as a natural flavoring ingredient, and also, in the manufacturing of beverages. Beverages are both alcoholic and non-alcoholic drinkable liquids taken to provide nourishment, quench thirst and for enjoyment cum social purposes. Alcoholic beverages include wines, vinegar, spirits while non-alcoholic beverages are kola instant powder, drinks, kola infusion, kola mix e.t.c. (Ndagi *et al.,* 2012).

Justification

There are limited kolanut-based beverages available that are largely non-formal, of variable quality, and shoddily packaged and hence not competitive in the formal and international markets. Furthermore, a lack of standard processing techniques, poor quality control, and little investment in research and development stifle commercialization. Consequently, the full economic potential of kolanut as revenue generation, employment creation, and industrial raw material is not harnessed.

Therefore, this research proposal seeks the support of the National Agency for Science and Engineering Infrastructure (NASENI) to scale up, fortify and improve on technologies involved in the formulation and production of Kolanut alcoholic and non-alcoholic beverages.

Main Objective:

To improve quality and commercialize Kolanut value- added products, enhancing the livelihoods of farmers and SMEs in the Kolanut industry

Objectives of the Proposal

1. To improve on the quality and safety of kolanut beverages by embracing better processing and packaging practices through **quality and safety standards (HACCP, NAFDAC certification) for kolanut beverages.**
2. To establish a processing facility for kolanut-based beverages.

3. To raise competitiveness in the market through the development of new, functional, and appealing kolanut value added products with **branding, packaging, and marketing options for kolanut-based beverages.**

4. To provide employment opportunities to young people and women along the kolanut value chain.

5. To spur national economic growth and income generation through commercialization and export**.**

Materials

kolanuts, sugar, laboratory consumables,

Equipment

Processing equations, spray dryer, high-power grinder, dehydrator, wine vats, packaging machines and materials, branding among others.

Methodology

The project will adopt a phased approach:

Raw Material Sourcing and Quality Control– Training in postharvest handling and standardization of supply chains will be given to farmers in the key kolanut-producing states (e.g., Ogun, Oyo, Kwara, Kogi). The focus will be on freshness, caffeine content, and microbial safety during quality checks (Odebunmi et al., 2020).

Pilot Processing Development– A compact processing plant will be established to host equipment for washing, extraction, filtration, pasteurization, packaging and bottling. Food-grade stainless steel will ensure safety and shelf stability.

Product Formulation – Different kolanut-flavored products will be formulated, such as wines, drinks, instant powder, kola infusion and kola mix supplemented with natural sweeteners, vitamins, or herbal extracts for market value.following standard procedures

Quality and Safety Assurance – Hazard Analysis and Critical Control Points (HACCP) procedures shall be followed to ensure safety, standardization, and compliance with national and international food standards (Codex Alimentarius, 2019).

5. **Market Development and Commercialization** – Branding, attractive packaging, and consumer awareness campaigns shall be launched. Tie-ups with supermarkets and distributors

Expected Outcomes

1. Improved technical skills of women and youth in standardized Kolanut beverage processing.
2. Access to different quality Kolanut value-added products meeting local and global standards.
3. Better market access for women and youth entrepreneurs.
4. Reduction in Kolanut export
5. Improved income generation, employment, and improved livelihoods.
6. Improved contribution of Kolanut to food security, nutrition, and export diversification.

Potential Impact

- Empowerment of women and youth as key promoters of agro-processing enterprises.
- Strengthened rural economies through job creation.
- Improvement in food safety and competitiveness of products in global markets.
- Contribution to Sustainable Development Goals (SDGs), with particular focus on SDG 1 (No Poverty), SDG 2 (Zero Hunger), SDG 5 (Gender Equality), and SDG 8 (Decent Work and Economic Growth).

Project timeline

Phase/Activity	Description	Timeline (Months)
Phase 1: processing assurance	Improving quality of value added products from Kolanut (HACCP, SOPs,GMP)	Month 1
Phase 2: capacity building	Engage women and youth on the value addition techniques through demonstrations and engagement in Kolanut beverage processing	Months 2 – 3
Phase 3: Processing and Product Development	Establish processing units, develop standardized recipes for Kolanut value Addition beverages), conduct sensory evaluation and shelf-life testing.	Months 3 – 5
Phase 4: Quality Improvement and Certification	Introduce quality control measures, carry out microbial/nutritional analyses, and facilitate certification (NAFDAC, SONCAP).	Months 5 – 6
Phase 5: Market Linkages and Branding	Develop branding and packaging strategies, organize product launches/exhibitions, and connect entrepreneurs with distributors and supermarkets.	Months 6 – 8
Phase 6: Monitoring and Evaluation	Track progress indicators (trained entrepreneurs, product quality improvements, job creation, sales volume), document lessons and success stories.	Months 6 – 8
Data Analysis	Analyze survey, training, and pilot data to evaluate project impact and sustainability.	Months 7 – 8
Report Writing	Prepare comprehensive report covering findings, outcomes, and recommendations for scaling up.	Months 8 – 9

Budget (Indicative)

1. **Processing assurance process** **3.5M**
2. **Capacity building.** **10.8M**
3. **Processing and product development** **6.3M**
4. **Quality improvement and certification** **12.2M**
5. **Market linkages and branding.** **80.1M**
6. **Monitoring and evaluation** **5.6M**

Total = 118,500,000

Publications on Kolanut beverages

Jayeola (2001) : Preliminary studies on the use of Kolanuts (*cola nitida*) for soft drink production, Nutritional Journal of food Technology in Africa Vol. 6 No. 1 Pg. 25-26.

Jayeola C. O, and Akinwale T. O. (2002): Utilization of Kolanut and cocoa in beverage production. Nutrition and Food Science Vol. 32 NO. 1, pg. 21-

JAYEOLA C. O. and YAHAYA L.E. (2004): Physico-chemical changes in Kola drink during storage. 28th Annual Conference proceedings of Nigeria Institute of Food Science and Technology, pg. 106-107

Olorundare BO, Ogunsowo AO, Akinola CO, Odeyemi EF and Jayeola C.O. (2023) Effects of Drying Procedures on the Nutritional, Biochemical and Phytochemical Compositions of Cola nitida Seeds. Journal of Agriculture and Ecology Research International Volume 24, Issue 5, Page 162-169, 2023; Article no.JAERI.104404 ISSN: 2394-1073

Ogunsowo A. O.; Odeyemi E. F., Akinola C. O.,Olorundare B. O. and Jayeola C. O. (2023): Comparison of Some In-vitro Antioxidant Properties of Cola acuminata and Cola nitida Fruit Testas. Asian Research Journal of Agriculture

References

Adelusi, A.A., Ogunwolu, Q.A., Ugwu, C.A., Alli, M.A.,Adesanya, K.A., Agboola -Adedoja, M.O. and Akinpelu, A.O. (2020). Kolanut consumption, its benefits and side effects. World Journal of Advanced Research and Reviews, 08(03):356–362.

Akinmoladun, A. C., Salawu, S. O., Akindahunsi, A. A., & Osemwegie, O. O. (2023). Assessment of the Anxiolytic, Antidepressant, and Antioxidant Potential of Parquetina Nigrescens (Afzel.) Bullock in Wistar Rats.*

Azeez, S.O., Lasekan, O., Jinap, S. and Sulaiman, R. (2015). Physico-chemical properties, amino acid profile and antinutritional factors in seeds of three Malaysian grown jackfruit cultivars. J. Food Agric. Environ., 13 (2): 58-62.

Burdock, G.A., Carabin, I.G. and Crincoli, C.M. (2009). Safety assessment of kola nut extract as a food ingredient. Food and Chemical Toxicology. 47 (8):1725-1732.

FAO (2021): Food and Agriculture Organization of the United Nations

Ibrahim, S.J. (2022). A report on the utilization of Cocoa, Coffee, Cashew, Kola and Tea. DOI:10.13140/RG221995202567.

Jayeola (2001) : Preliminary studies on the use of Kolanuts (*cola nitida*) for soft drink production, Nutritional Journal of food Technology in Africa Vol. 6 No. 1 Pg. 25-26.

Jayeola, C.O. and Akinwale, T.O. (2002). Utilization of kolanutand cocoa in beverage production. Nutrition and Food Science; 32(1):21-23. DOI:10.1108/00346650110396655.

Ndagi, I., Babalola, F.D., Mokwunye, I.U., Anagbogu, C.F., Aderolu, I.A., Ugioro, O., Asogwa, E.U., Idrisu, M. and Mokwunye, F.C. (2012). Potentials and Challenges of Kolanut Production in Niger State, Nigeria.

Odebunmi, E.O., Oluwaniyi, O.O., Awolola, G.V. and Adediji, O. D. (2009). Proximate and nutritional composition of kola nut (*Cola nitida*), bitter cola (*Garcinia cola*) and alligator pepper (*Afromomum melegueta*). African Journal of Biotechnology Vol. 8 (2), pp. 308- 310.

Annex 1: CRIN VALUE ADDED PPRODUCTS


COCOA RESEARCH INSTITUTE OF NIGERIA
CRIN
Crin
COCO-COLA
BEVERAGE
250g
Net Weight


CRIN
COLA
Wine
Made and bottled by:
COCOA RESEARCH INSTITUTE OF NIGERIA (CRIN)
P. M. B. 5244, Idi-Ayunre, Ibadan, Oyo State