# Innovative Research on Garcinia Kola Heckel Seed Extracts Phytochemicals and Related Enzymes Ability to Prevent Important Blood Glucose Levels

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**Abstract**— a member of the Guttiferae family of Angiosperms, garcinia kola is the term "bitter kola" is used in trade. Its relevance in folkloric medicine as a purgative, mastcatory, aphrodisiac, etc. is significant. The seed seeds are used in the therapy of a variety of illnesses, including diabetes. Diabetes mellitus is a metabolic illness with several underlying causes characterised by chronic hyperglycemia that can cause serious side effects such neuropathy, nephropathy, retinopathy, and foot ulcers. A screening for qualitative phytochemicals was done. The structure of the isolated chemical was clarified using Gas Chromatography-Mass Spectrophotometry and Fourier Transformed-Infra Red spectroscopy after column chromatographic analysis of the ethyl acetate extract. Under predetermined circumstances, pig pancrease and seed small intestine were used to extract pancreatic -amylase and intestinal glucosidase. The following substances were found: phenolics, flavonoids, cardiac glycosides, alkaloids, coumarins, and phlobatannins. The IC50 values for methanol, ethyl acetate, and n-Hexane preparations were used to block –amylase 0.78 mg/ml, 3.44 mg/ml, 4.89 In contrast, the concentrations of glucosidase were 2.67 mg/ml, 1.68 mg/ml, and 10.29 mg/ml, respectively. from an ethyl solution acetate, the substance ZAAK was obtained. Fourier ZAAK contains an ester and a carboxylic acid, according to transformed-infrared spectra. The ZAAK total ion chromatogram showed three main peaks that correspond to Zaak numbers 1, 2, and 3 are. ZAAK1, ZAAK2, and

ZAAK3are, in accordance with their mass profiles, 1 pentadecanecarboxylic acid, (Z)-11-octadecenoic acid, and octadecanoic acid, 2-(2hydroxyethoxy) ethyl ester, respectively.

***Keywords—Garcinia Kola, Heckel Seed Extracts', Phytochemicals, Important Blood Glucose Level - Related Enzymes.***

## INTRODUCTION

The vast majority of people in poor nations think that these seed-based goods are safer and more economical. In industrialized, emerging, and impoverished nations, the use of these seed products has expanded due to new illnesses developing as well as microbial resistance. the subject of healthcare delivery, ethnopharmacology and pharmaceutical therapy using seed-based products are still crucial. Every part of the garcinia kola seed has a medical purpose, earning it the nickname "miracle seed." The objective of the ensuing assessments was to provide an update and thorough analysis of G. kola's biological potential. garcinia kola Heckel (family, Guttiferae), a plant that can reach a height of 12 metres and is found in moist forests, is frequently due to its bitter taste and alleged aphrodisiac properties, is referred to as "bitter kola" or "male kola." At social gatherings, it is usually regarded as a very valuable item and offered to guests as a sign of respect. Every component of the plant, including the bark, leaves, roots, and wood, has been found to have medicinal value, earning it the moniker "wonder plant." It has been demonstrated that taking G. kola an hour before or after meals increases the absorption of the necessary nutrients. Use with or without additional foods is harmless. It has been established that bitter kola's phytochemicals play a major role in its therapeutic value. The phytochemical and biochemical analyses of G. kola seeds, Kolaviron, revealed a complicated mixture of sterols, terpenoids, flavonoids, glycosides, saponin, tannins, reducing sugar, triterpenoids, and phenolic chemicals, including biflavonoids, xanthones, benzophenones, cycloartenol, and triterpenes. The nutritional value of G. kola nuts is high in moisture, dry matter, crude fat, crude protein, ash, crude fiber, and total carbohydrates as a percentage, according to study. In addition to being a recognised herbal remedy, G. kola is also known to contain the minerals K, Ca, Mg, Fe, Zn, and P. It has been established that bitter kola's phytochemicals play a major role in its therapeutic value. A complex mixture of sterols, terpenoids, flavonoids, glycosides, saponin, tannins, reducing sugar, triterpenoids, and phenolic chemicals, including biflavonoids, xanthones, benzophenones, cycloartenol, and triterpenes, were found in the phytochemical and biochemical analyses of G. kola seeds, Kolaviron. According to a research, G. kola nuts have a high nutritional value in terms of moisture, dry matter, crude fat, crude protein, ash, crude fiber, and total carbohydrates as a percentage. It is well known that G. kola contains the minerals K, Ca, Mg, Fe, Zn, and P in addition to being an abundant source of vitamins. Numerous studies have demonstrated the antioxidative properties of polyphenolic compounds derived from plants, which can lessen the negative effects of ROS and thereby promote human health. Consuming foods rich in polyphenols with potential as antioxidants, such as fruits, vegetables, and medicinal plants, has been linked to a lower risk of oxidative stress-related illnesses, according to a number of evidence-based research. Reactive oxygen species are known to interfere with cellular homeostasis even though they are thought to be inevitable byproducts of regular aerobic metabolism.

## METHODOLOGY

**(i) Taxonomy, Distribution, and Morphology of Garcinia kola-** The Malpighiales order and the Clusiaceae family are the home genera of garcinia kola. It has about 180 participants from various countries. Synonyms for indica mango Garcinia giadidii De Wild and Garcinia bergheana are two varieties of Spirlet. Because almost all of the parts of the G. kola woodland tree in Sub-Saharan Africa have been shown to have medicinal benefit, it is known as a "wonder plant." It is native to Sierra Leone, Southern Nigeria, Zaire, and Angola but has spread widely as a result of human activity and is commonly observed thriving nearby settlements. It is a tree that grows in the coastal rain forests of Central and West Africa. It can be in equatorial African nations as well as all of Asia. It is approximately 30 feet tall. (Each fruit, which is the size of an orange, is smooth and reddish yellow in colour. It has yellow meat and peach-like skin, as well as three to Four seeds with a seed covering made of brown. The term "e seed" refers to an edible kernel. (e seed coat is dark with branching lines, while the kernels are pale with resin pockets.) (Figure 1). Fruits have a yellow-orange interior and an orange, rosy, or golden exterior to reddish pulp. (The blooms have a crimson indumentum and are greenish-white in colour.

**Figure 1- Leaf and fruits (a) and seeds (b) of Garcinia kola**

**(ii) Biological Assessment**- Due to the fact that alternative medicine is founded on medicinal plants, many novel medications have been developed. In the eighteenth century, more than 80% of medicines were made from plant materials. The pharmaceutical business expanded as a result of the scientific revolution, and the importance of manufactured medications increased. (Medicinal plants are being used more frequently to cure diseases because they are recognised as safe and efficient medications with fewer side effects and lower costs than other treatments.

**(iii) Antioxidant**- Oxidative stress, which normally occurs during physiological activity in humans but can be harmful if left unchecked, is indicated by free radicals and reactive oxygen species. In the current study, kolaviron appears to be just as effective as BHA as an in vivo natural antioxidant and hepatoprotective agent. These findings suggested that G. kola seeds might help reduce the oxidative damage brought on by extended ethanol exposure in Wistar livers. The antioxidant's phenolic content was discovered to be between 10 and 21 mgg1, and the quantity of free radicals it scavenges was shown to be between 26% and 55%, indicating that it will act as a natural reserve of antioxidants and be used as dietary supplements. We discovered that Ci 50 (65.86-1.17 g/mL) and the reducing power of the Ferric ion (125.4-4.91 mg/mL) are statistically significant using the radical trapping test and the ion conversion method.

**(iv) Antibacterial-** Antibiotics are the main cause of bacterial resistance, which can be linked to biological occurrences including the target microbes' changes in physiochemistry, efflux kinetics, and membrane permeability. Bacterial strains have a higher genetic capacity to quickly acquire and propagate antibiotic resistance than other kinds of microorganisms. Researches are looking for novel compounds with antibacterial properties and the potential to be used as raw materials in creating new treatments because antibacterial drug resistance is a major global issue. The fraction of ethyl acetate hexane showed the highest inhibitory efficacy against Streptococcus viridans and Streptococcus mutans at 0.33 and 0.33 mgmL1, respectively, because some bacterial strains had been found in dental cavities. The fact that it is frequently used to treat toothaches and prevent caries lends credence to the traditional herbalist's claim.

**(v) Antifungal-** Plant extracts have long been used as sources for the creation of new antifungal medications. Human health and wellbeing have been greatly improved by plant-based therapies. (e extracts were also effective at inhibiting the growth of Aspergillus niger. The data demonstseede that the chemical has significant antifungal activities in comparison to the conventional medicines that were used in the research. The root extract has a strong antifungistatic effect when applied to Aspergillus flavus and Candida albicans. The MICs of ketoconazole [common medicines] for the fungus were 275-691/mL and 346-318/mL, respectively. These findings imply that the extract might contain substances that can guard against infectious disease.

**(vi) Antiviral-** The extract's apparent and encouraging capacity to promptly treat a patient's eye symptoms and signs has been identified by investigation. This could revolutionise the way these viral infections are treated because there is now no specific antiadenoviral drug available. This study found that G kola works well in resource-constrained settings and against viral illnesses.

**(vii) Antihypertension-** High blood pressure, or hypertension, is the term used to describe consistently high the vessels' blood pressure. Blood vessels that feed the kidneys, heart, brain, and eyes with oxygen can become damaged by high blood pressure. By the third week, at p 0.05, the blood pressure in the seeds who were given diets rich in G kola had significantly dropped. A vasoactive substance found in G. kola can lower blood pressure, too. These exact process is still a riddle, though. The use of G. kola components to treat hypertension has traditionally been endorsed by practitioners of traditional medicine. The findings of the subsequent studies offer fresh avenues for investigation into herbal or manufactured antihypertensive drugs. Plant-based medicines are considered to be effective.

**(viii) Anti-Inflammatory-** the body's normal reaction to harm or discomfort from an outside source is inflammation. Since the beginning of time, people have been aware of inflammation and its associated pain. Humans have been searching for methods to lessen and regulate inflammation since the beginning of time, including employing plants. Cell growth was reduced by Treatments with 25, 50, and 100 g/ mL in a dosage- and time-dependent manner. Incorporseeding substances with anti-inflammatory properties helped the study's conclusions. In situations where there is cellular growth and inflammation, it might be advantageous.

**(ix) Antianalgesic-** In particular for the elderly, managing critical concerns. Pain is a generalised sign of many illnesses that cause unpleasant sensory and emotional sensations. The chemical has anti-nociceptive characteristics against acetic acid-induced abdominal constriction in mice, according to the results of the study. At $p<0.05$, there was a decrease in the quantity of writhes at all doses when compared to control animals. The seeds of (e have anti-analgesic qualities. The extract from bitter kola was found to have potent antianalgesic effects in the research reviewed in the subsequent investigation.

## RESULTS

findings of the aqueous extract of Garcinia kola kernel underwent phytochemical screening tests, and the results revealed that it contained the following compounds: starch, protein, glycosides, flavonoids, tannin, saponins, sterols, and triterpenoids. The diethyl ether extract of Garcinia kola seed was found to be significantly active against Pseudomonas aeruginosa at concentrations of 100 mg and 50 mg, respectively. Zones of suppression for Krebsiella pneumonia and Bacillus subtilis were measured at 12.66 mm, 12.66 mm, and 8.33 mm, 8.66 mm, respectively, for the 100 mg concentration and the 50 mg concentration of the extract. (figure 2). The 100mg concentration of the extract displayed significant activity [zone of inhibition of 8. 33mm], whereas the 50mg dose only showed action against Staphylococcus aureus.

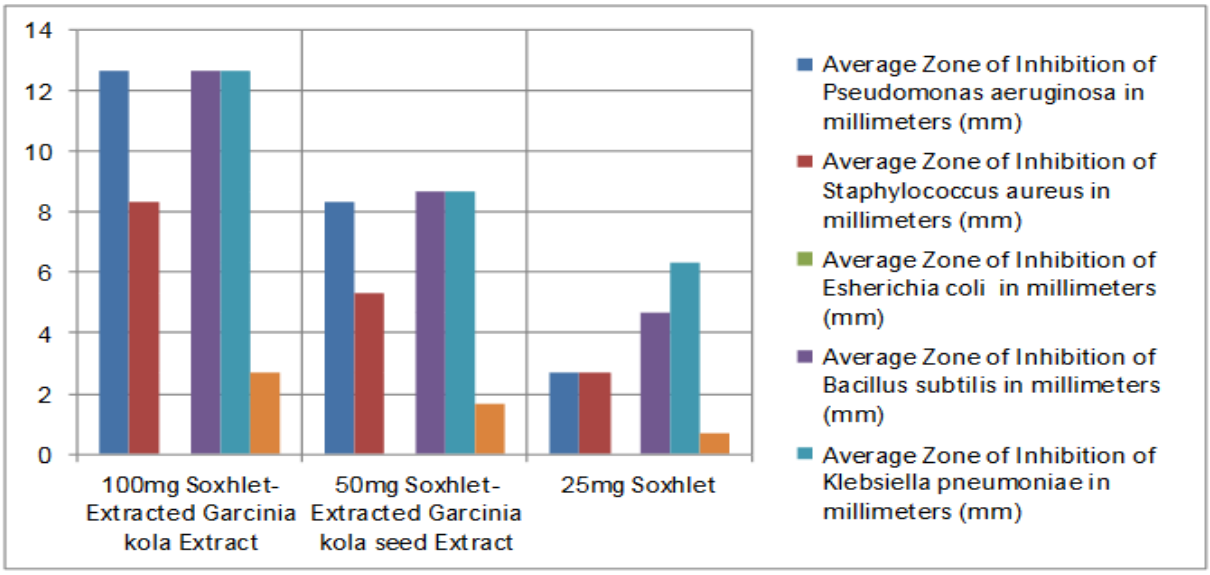


**Figure 2- Average Zones of inhibition of diethyl ether extract of Garcinia kola seed**

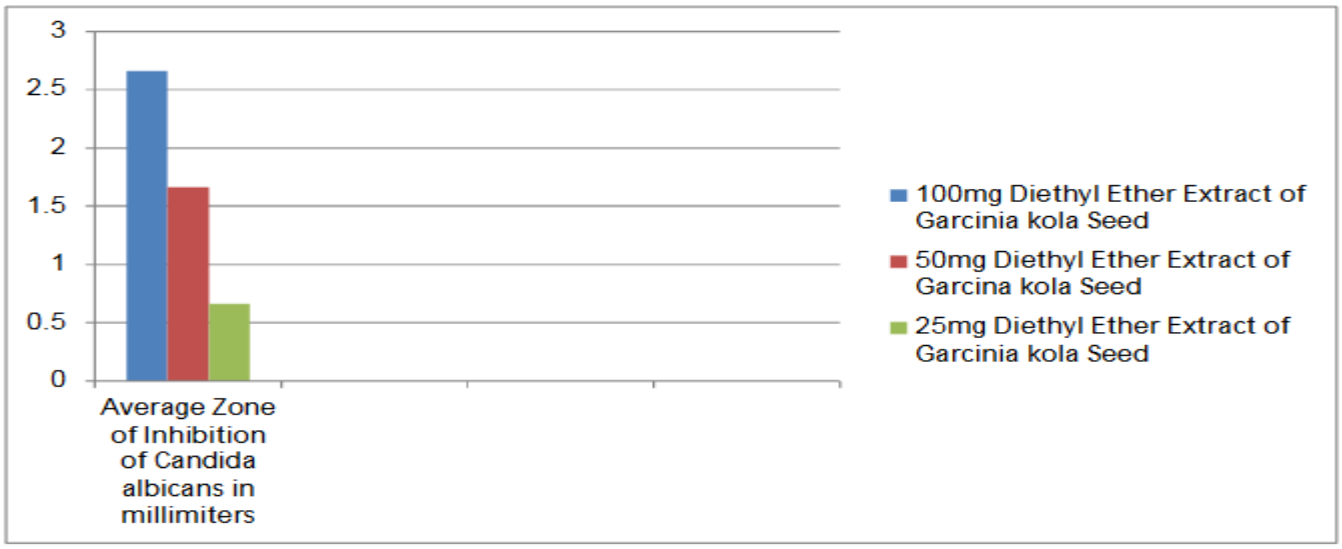


**Figure 3- The Low anti-fungal Activity of 100mg, 50mg and 25mg Concentseedions of Diethyl Ether Extract of Garcinia kola seed**

With zones of inhibition of 6.33 mm and 4.66 mm for Klebsiella pneumonia and Bacillus subtilis, respectively, and 2.66 mm and 2.66 mm for Pseudomonas aeruginosa and Staphyloccocu aureus, respectively, the 25mg concentseedion of the extract demonstseeded only modeseede activity against these pathogens. The diethyl ether extract of Garcina kola at all three dosages had weak inhibitory activity against Candida albicans in the following order: 100 mg>50 mg>25 mg [with inhibition zones of 2.66 mm; 1.66 mm; and 0.66 mm, respectively]. There was no inhibitory action of the extract against Escherichia coli at any of the three concentseedions. (figure 3).

## CONCLUSION

We can better plan current and forthcoming studies to address a variety of human disorders because of research into the pharmacological advantages of medicinal plants. There are numerous traditional applications for the extraordinary medicinal herb G. kola that date back in time. On a number of biological activities, preclinical research has already been done. Due to the G. kola's presence of nutrient- and pharmacologically-important chemicals, it was discovered that the seeds had significant biological activity. It is necessary to do research into the biologically active chemical components' underlying mechanisms. Therefore, to gather more concrete proof of the efficacy of G. kola seeds, carefully planned clinical trials are recommended. Plants are known to utilise a wide range of anti-oxidative enzymes and low molecular weight antioxidants to scavenge various kinds of reactive oxygen intermediates and protect cells from harm and potential damage. The phytochemical and antioxidant properties of G. kola may therefore be responsible for the affects it has on the testis and adrenal gland. Okoko has already stated that G. kola is a powerful antioxidant, which supports this assertion. Furthermore, the cytoprotective effects of flavonoids, a phytochemical found in G. kola, have been linked to a direct antioxidant impact. In fact, it has been shown that flavonoids work indirectly as antioxidants by increasing glutathione, -glutamylcystein ligase, glutathione s-transferase, and NAD (P) H: quinine oxidoreductase in a variety of cell systems and by inhibiting cell death by lowering oxidative stress. As a result, the weakening of oxidative indicators and observed improvement in the antioxidant status of the testicular and adrenal tissues are consistent with and ascribed to G. kola's antioxidants and phytochemical properties.

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