Opinion/Perspective
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Unlocking the Therapeutic Potential of *Garcinia cowa* Rox. in Diabetes Management

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Abstract: *Garcinia cowa* Rox. is a tropical fruit traditionally used in various parts of Asia for medicinal purposes. Recent research has indicated that it may have potential as an antidiabetic drug. Studies have shown that the extract from the fruit of *G. cowa* can lower blood glucose levels in diabetic rats. This effect is believed to be due to various bioactive compounds, including flavonoids and xanthones, which have demonstrated antidiabetic properties. In addition, fruit extract has also been found to improve lipid metabolism, often disrupted in individuals with diabetes. The extract has been shown to reduce levels of triglycerides, total cholesterol, and low-density lipoprotein cholesterol while increasing high-density lipoprotein cholesterol levels. Further studies are needed to explore the full potential of *G. cowa* as an antidiabetic drug, including clinical trials in humans. However, these initial findings suggest that this tropical fruit is a promising natural and effective treatment option for individuals with diabetes.

Introduction

Garcinia cowa Rox. is an evergreen plant with edible fruit native to Asia, India, Bangladesh, Myanmar, Malaysia, Vietnam, Laos, Cambodia, and Southwest China. In Assam, the plant is known as Kujithekera. Wild-grown variants of fruits and leaves are gathered for consumption in the region. It is a tropical fruit that has been used in traditional medicine for its various health benefits (1). The fruit of *G. cowa* has been shown to exhibit anti-inflammatory properties. It contains compounds like xanthones and flavonoids which can reduce inflammation. This highlights its applicability in the treatment of arthritis and other inflammatory diseases (1). The fruit of *G. cowa* also has anti-microbial properties. It contains compounds like garcinol and isogarcinol which can effectively inhibit bacteria and viruses. This property makes it helpful in the treatment of microbial infections. Furthermore, the fruit of *G. cowa* is an abundant source of antioxidants. These compounds can help neutralize free radicals in the body, which can cause damage to cells and tissues. This makes it helpful in protecting against diseases like cancer, heart disease, and other chronic conditions. Traditionally, the fruit of *G. cowa* has been considered to improve digestive health. It can help control bowel motions and alleviate symptoms such as diarrhoea and constipation (2, 3). The fruit of *G. cowa* contains compounds such as hydroxy citric acid (HCA) that can help suppress appetite and reduce fat absorption in the body, resulting in weight loss. This makes it useful for weight loss and management (3).

Garcinia cowa in Diabetes Management

Recent studies have indicated that fruit extract of *G. cowa* may hold promise as a natural and effective treatment option for individuals with diabetes (1, 2). Diabetes is a chronic metabolic disease that affects millions of individuals globally. Diabetes is characterized by elevated blood glucose levels, which can result in various problems, including cardiovascular disease, neuropathy, and renal damage. Current treatments for diabetes include oral medications, insulin injections, and lifestyle modifications, but these interventions can have side effects and are not always effective in controlling blood glucose levels (3).

G. cowa, on the other hand, is a safe and natural supplement that has demonstrated antidiabetic effects in animal research. Research studies reported

significantly reduce blood glucose levels in diabetic rats by the extract. The authors attributed this effect to the presence of various bioactive compounds, including flavonoids and xanthones, which have been shown to have antidiabetic properties (4).

Flavonoids, such as quercetin and kaempferol, are natural plant compounds that have been shown to improve insulin sensitivity and glucose uptake in cells. Studies also reported that quercetin improved glucose metabolism in diabetic rats by increasing the expression of glucose transporters in muscle cells. Similarly, another study found that kaempferol improved insulin sensitivity and reduced blood glucose levels in diabetic mice (5, 6).

On the other hand, xanthones are a class of natural plant compounds that have been shown to have antioxidant and anti-inflammatory properties. A study reported that the xanthone compound mangostin, present in *G. cowa* improved insulin sensitivity and reduced blood glucose levels in diabetic rats. In *G. cowa*, the main xanthones are mangostin, garcinone E, and gamma-mangostin (7, 8). The mechanism of action of these compounds in improving lipid metabolism is not completely understood. However, studies have shown that they can improve lipid profiles by reducing the levels of total cholesterol, low-density lipoprotein (LDL) cholesterol, and triglycerides while increasing the levels of high-density lipoprotein (HDL) cholesterol. One possible mechanism is activating the peroxisome proliferator-activated receptor (PPAR) alpha, a transcription factor that plays a key role in lipid metabolism. Flavonoids and xanthones can activate PPAR alpha, leading to increased expression of genes involved in lipid metabolism and reduced circulating lipid levels (6, 7).

Another possible mechanism is the inhibition of lipid absorption in the gut. Flavonoids and xanthones can inhibit the activity of pancreatic lipase, an enzyme that is responsible for the breakdown of dietary fats. This leads to a reduction in the absorption of fats from the diet, which can lower circulating lipid levels (7, 8). While more research is needed to determine the specific mechanism of action of xanthones in diabetes, these studies suggest that the compound may have therapeutic potential for treating the disease (7).

In addition to its antidiabetic properties, *G. cowa* fruit extract has also been found to improve lipid metabolism, which is often disrupted in individuals with diabetes. Research studies reported that the fruit extract reduced triglycerides, total cholesterol, and LDL cholesterol levels while increasing HDL cholesterol levels in diabetic rats. This effect is believed to be due to various bioactive compounds, such as flavonoids and xanthones, which have been shown to have lipid-lowering properties (8, 9). Flavonoids such as amentoflavone, morelloflavone, volkensiflavone, kaempferol, and quercetin were isolated from *G. cowa*, and garccowasides A, B, and C were reported for the first time in *G. cowa*. Only morelloflavone and morelloflavone-7-O-glucoside exhibited high antioxidant activity, which may contribute to their antidiabetic effects (8).

Conclusion

In conclusion, the available evidence suggests that *G. cowa* may be a promising natural and effective treatment option for individuals with diabetes. The fruit extract has been shown to have antidiabetic and lipid-lowering properties, which are mediated by various bioactive compounds, such as flavonoids and xanthones. While more research is needed to determine the safety and efficacy of the extract in humans, these initial findings suggest that *G. cowa* may be a valuable addition to the current armamentarium of antidiabetic drugs. Owing to the increasing prevalence of diabetes and the limits of existing treatments, it is crucial to evaluate the therapeutic potential of natural substances, such as *G. cowa*, in the management of the ailment.

Declarations

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Conflict of Interest

The authors declare no conflicting interest.

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