EXPLORING THE ANTI-CANCER POTENTIAL OF *CURCUMA RAKTAKANDA* SPECIES

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INTRODUCTION

A distinctive and intriguing plant species known as *Curcuma raktakanda* is a member of the Zingiberaceae family, also known as the ginger family. The *Curcuma* genus, which includes a number of flowering plants used in both cooking and medicine, includes this specific species.
The red turmeric plant, *Curcuma raktakanda* is well recognised for its vivid red rhizomes. *Curcuma raktakanda* which has its roots in parts of South Asia including India and Sri Lanka, has a long history of usage in ayurvedic and conventional medical practises. Because of its antioxidant, anti-inflammatory, and antibacterial qualities, its rhizomes are prized for their potential health benefits.
In addition to its use in medicine, *Curcuma raktakanda* finds its application in culinary industry. Particularly in traditional South Asian cuisine, the rhizomes are frequently employed as a flavouring and colouring element. Dishes are aesthetically appealing because to the distinctive red tint, which gives them a vivid touch. Overall, *Curcuma raktakanda* stands out as an attractive plant species thanks to its attractive red rhizomes, cultural importance, and potential medical benefits.

The following are some possible health benefits of *Curcuma raktakanda:*

- **Anti-cancer:** Manifests broad spectrum anti-cancer activities, inhibiting the viability of glioblastoma, breast and cervical cancer cells.
- **Anti-diabetic:** It has been demonstrated that *C. raktakanda* improves insulin sensitivity and lowers blood sugar levels in patients with diabetes.
- **Antimicrobial:** Studies have indicated that *C. raktakanda* is effective against a range of bacteria, fungi, and viruses.
- **Anti-inflammatory:** It has been demonstrated that *C. raktakanda* helps to lessen inflammation in the body.
- **Antioxidant:** *C. raktakanda* is a high source of antioxidants, which can shield the body from harm caused by free radicals.

THE ANTI-CARCINOGENIC PROPERTIES OF *CURCUMA RAKTAKANDA*

The antioxidant capabilities, apoptosis-inducing characteristics, and angiogenesis-inhibiting properties of *C. raktakanda* altogether suggested to contribute to the plant's anti-carcinogenic benefits.

- **Antioxidant qualities:** Curcumin is an active component accumulated a lot in C. raktakanda known for its anti-oxidant property. Cancer is brought on by free radicals, unstable chemicals that may harm DNA and other biological components. Free radicals can be neutralised by curcumin, preventing cellular damage.

- **Apoptosis induction:** By activating a number of pathways, such as the mitochondrial pathway and the caspase pathway, curcumin can also cause cancer cells to undergo apoptosis. A kind of planned cell death called apoptosis is crucial for maintaining tissue homeostasis. Apoptosis is frequently avoided by cancer cells, allowing them to proliferate and spread uncontrolled. Cancer cells may undergo apoptosis, which results in their death, with the assistance of curcumin.

- **Inhibition of angiogenesis:** The process by which new blood vessels are produced is called angiogenesis. Inhibiting angiogenesis can aid in slowing the growth of tumours since cancer cells require a blood supply to multiply and spread. By stymieing the activities of VEGF and bFGF, among other proteins, curcumin can reduce angiogenesis.

Curcuma raktakanda: Inducing Apoptosis and Suppressing Migration in Cancer Cells

Since ancient times, the medicinal herb *Curcuma raktakanda* has been utilised in traditional Indian medicine to cure a wide range of illnesses, including cancer. Recent research haves demonstrated that *C. raktakanda* extract can cause cancer cells to commit suicide and reduce their migration.

- For maintaining tissue homeostasis, a sort of programmed cell death known as apoptosis is required. In order to develop and spread uncontrolled, cancer cells frequently manage to avoid apoptosis. By triggering a number of pathways, including the mitochondrial route and the caspase pathway, *C. raktakanda* extract has demonstrated to cause apoptosis in cancer cells.
- To expand to other areas of the body, cancer cells must be able to move. *C. raktakanda* extract inhibits the function of many proteins, including (matrix metalloproteinase) MMP-2 and MMP-9, which stops the migration of cancer cells.
- The *C. raktakanda* extract has the ability tostop the formation of cancer cells by impeding the function of proteins like vascular endothelial growth factor (VEGF) and basic fibroblast growth factor (bFGF) that can reduce angiogenesis.
- The use of *C. raktakanda* extract is a viable option for cancer treatment because of its combined ability to inhibit apoptosis, migration, and angiogenesis. To validate the effectiveness and safety of *C. raktakanda* extract in people, additional study is necessary.

It has been demonstrated that the Indian turmeric plant, *Curcuma raktakanda*, possesses anti-carcinogenic properties both in vitro and in vivo. The in vivo investigations in mice as confirmed the ability of *C. raktakanda* extract in averting tumour growth. Various cancer cells, including breast cancer, colon cancer, and leukaemia, can undergo apoptosis when exposed to *C. raktakanda* extract, according to in vitro research. The effectiveness and safety of *C. raktakanda* extract in people still need to be confirmed by lot more studies. However, *C. raktakanda* may be a potential option for cancer therapy, according to the evidences previously in view.