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A BRIEF REVIEW ON - BIOLOGICAL ACTIVITY AND CLINICAL EFFICACY OF CURCUMIN

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Abstract -

Curcumin, an active compound obtained from the turmeric plant (Curcuma longa), has attracted great attention due to its potential biological and therapeutic effects. It provides many health benefits with its anti-inflammatory, antioxidant, anticancer and neuroprotective properties. Preclinical studies have shown that curcumin can regulate key signaling pathways involved in inflammation, apoptosis and cell proliferation, making it a promising treatment for various diseases including cancer, arthritis and neurodegenerative diseases. Despite promising results, its clinical use in humans has been limited due to issues such as low bioavailability and low dosage. Recent efforts to increase the bioavailability of curcumin through formulations such as nanoparticles, liposomes and conjugates have been successful in increasing its therapeutic potential. However, larger, well-designed clinical studies are needed to determines its therapeutic efficacy and optimize its application in clinical practice.

Introduction -

Curcumin, the active polyphenolic compound found in turmeric rhizome, has been widely studied for its multiple activities and therapeutic potential. Curcumin has been traditionally used for preventive and therapeutic purposes in Ayurvedic and Chinese medicine and has attracted attention in the scientific community due to its many medicinal properties. These include potent antioxidant, anti-inflammatory, anti-inflammatory, and neuroprotective effects attributed to its ability to modulate various molecular targets involved in cell signaling, gene expression, and enzyme activity. Despite positive results from preclinical studies, the clinical efficacy of curcumin is limited due to its low bioavailability, necessitating the development of various drugs to improve its absorption and treat its effects. This review explores the biological mechanisms behind the effects of curcumin and explores its clinical benefits in the treatment of diseases such as osteoarthritis, cancer, heart disease, and neurodegenerative diabetes.

- Advantages and Disadvantages

•Advantages -

Curcumin, the active compound in turmeric, has many potential health benefits:

•Anti-inflammatory: Curcumin has powerful anti-inflammatory properties that can help reduce physical pain and lower the risk of chronic diseases like arthritis. It may increase brain-derived neurotrophic factor (BDNF), a protein that promotes the growth and maintenance of neurons, which may reduce neurodegenerative diseases like Alzheimer's disease. Curcumin may improve endothelial cells (cells that line the inside of blood vessels), reduce inflammation, and lower cholesterol.

•Cancer prevention: Some studies have shown that curcumin contains anti-cancer properties that can slow the growth of cancer cells. It naturally blocks the growth and spread of cancer cells in diseases like cancer.

•Disadvantages - 1] Curcumin, the active compound in turmeric, has anti-inflammatory and antioxidant properties, but can also cause adverse effects or side effects when used in large amounts or under certain conditions

2]Low Bioavailability:

Curcumin has low bioavailability, It is difficult to absorb by the human body when taken orally.

• Its benefits may be limited if it is not combined with other ingredients such as black pepper (piperine) to increase absorption. , nausea or diarrhea, especially in large doses.

This may affect its results or lead to negative results. Second price. It stimulates bile flow, which can be problematic for people with problems such as gallstones or bile duct obstruction. because it contains oxalate, which binds to calcium in the body

Chemical Constituent -

Common Name – curcumin

Scientific Name- curcuma longa

Family- zingiberaceae

- Chemical Composition -

•Curcumin (dibenzofuranmethane) is a polyphenolic compound belonging to the group of curcuminoids, which constitutes approximately 2-8% of the weight of turmeric. Various derivatives with similar structures and biological properties are known, such as demethoxycurcumin and bisdemethoxycurcumin.

•Curcumin is yellow in color and is soluble in alcohol but slightly soluble in water, which limits its bioavailability. Help us understand its medicinal properties.

•Some of the main functions are:

•Anti-inflammatory: Curcumin inhibits various pro-inflammatory cytokines, enzymes (such as COX-2) and transcription factors (such as NF-kB), leading to strong immune system. system. .

•Anti-cancer: Curcumin has the ability to prevent cancer cells by regulating signaling pathways such as PI3K/Akt, MAPK and NF-kB, initiating cell apoptosis and preventing metastasis. Its ability to create stress and pain makes it a potential cause of neurodegenerative diseases such as Alzheimer's disease. Studies show that curcumin facilitates the destruction of amyloid plaques, one of the symptoms of Alzheimer's disease. It fights against many diseases. Although curcumin has good biological activity, its therapeutic effects are unclear. To overcome this challenge, various strategies have been investigated, such as combining it with piperine (an extract of black pepper) to increase absorption or developing curcumin formulations such as nanoparticles or liposomes. Clinical studies have shown that curcumin can reduce tumor size, increase the effectiveness of chemotherapy, and reduce the side effects of cancer treatment. However, the results are mixed and more research is needed to draw conclusions. Its role in medicine is still being investigated, although it has been shown to be effective in diseases such as Parkinson's disease, reducing pain and inflammation, but larger clinical trials are needed to confirm its therapeutic benefits.

• Metabolic and cardiovascular diseases: Preliminary data suggest that curcumin may be effective in metabolic syndrome, diabetes, and heart disease.

- Medicinal Properties of curcumin -

1] Kurkuma (Curcuma longa -rhizome), which is usually used as a spice, is well documented about the medical characteristics of the Indian and Chinese health systems.

2] It was often used to treat several illnesses. Epidemiological observations are not conclusive, but show that turmeric consumption reduces the risk of cancer and can have other protective biological effects on humans.

3] These biological effects of turmeric were attributed to his constituent curcumin.

4] It has been widely investigated for its anti-inflammatory, anti-angiogenic, antioxidant, wound healing and anti-cancer effects. As a result of extensive epidemiological, clinical and animal studies, several molecular mechanisms have been created that explain some biological effects of curcumin.

5]. This summary summarizes the most interesting vitro and in vivo studies of the biological effects of curcumin.

- Medicinal Uses -

1] Turmeric (Rhizomes of Curcuma longa) is widely used as a spice and its medicinal benefits are well documented in Indian and Chinese medicine.

2] It is widely used in the treatment of many diseases. Epidemiological studies, although not conclusive, suggest that turmeric consumption may reduce the risk of developing certain types of cancer and may have other protective effects in humans.

3] The biological effects of turmeric have been attributed to its component curcumin, which has been extensively studied for its anti-inflammatory, anti-angiogenic, antioxidant, wound healing and anti-cancer properties. Extensive epidemiological, clinical and animal studies have discovered several molecular mechanisms that mediate the various biological effects of curcumin.

4] This review presents the most comprehensive in vitro and in vivo studies on the biological properties of curcumin. Its treatment has been investigated.

• Some of its uses include: •Anti-inflammatory: Curcumin has powerful anti-inflammatory properties that may help reduce symptoms of chronic conditions such as arthritis and inflammatory bowel disease (IBD). > Antioxidant Properties: It neutralizes free radicals and helps protect cells from oxidative damage by stimulating the body's own antioxidant enzymes. The product has been shown to help slow the growth of cancer cells and prevent metastasis, but more research is needed. Osteoarthritis and rheumatoid arthritis. disease. It helps control blood sugar and improve insulin sensitivity, which may help control type 2 diabetes. It treats conditions such as irritable bowel syndrome (IBS).

Conclusion -

- Curcumin has been shown to have many health benefits, primarily due to its antioxidant and anti-inflammatory properties. These benefits are best achieved when combined with carbohydrates such as piperine, which increase the bioavailability of curcumin. Studies have shown that curcumin helps control oxidative and inflammatory diseases, metabolic syndrome, anti-inflammatory, stress control, and prevent diabetes, hyperlipidemia. It can also help control the use of various drugs in health and improve people's health, thus improving recovery and post-exercise recovery in active people. In addition, in sufficient doses, it can provide health benefits to people who do not yet have health problems. The main component of turmeric is curcumin. Although preliminary studies have shown that curcumin is beneficial in patients with rheumatoid arthritis, inflammatory bowel disease, pancreatitis, psoriasis, hyperlipidemia, post-surgical pain, and inflammatory cancer, good clinical studies are still needed. In addition, clinical studies have been conducted to confirm its effectiveness in many settings, considering biosafety, efficacy, effectiveness, and ease of use.

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