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Turmeric: Pharmacological Effects

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Turmeric (*Curcuma longa L.*) is a spice utilized widely in India, China, and Southeast Asia as an aromatic stimulant, a food preservative, and coloring material. The commonly used names of turmeric are castor saffron, turmeric, and saffron root. Turmericis a yellow–orange polyphenolic natural substance derived from C. longa rhizomes. It has been used to treat common inflammatory diseases, tumors, biliary diseases, anorexia, cough, topical wounds, diabetic injuries, liver disorders, rheumatism, and sinusitis. Extensive studies on the biological properties and pharmacological consequences of turmeric extracts have been conducted in recent years. Curcumin, the primary yellow biocomponent of turmeric, has anti-inflammatory, antioxidant, aanticarcinogenic, antidiabetic, antibacterial, antiprotozoal, antiviral, antifibrotic, immunomodulatory, and antifungal properties.It has very low toxicity, too. As the global use, development of modern drugs from turmeric should be emphasized for the control of various Diseases. Further evaluation needs to be carried out on turmeric in order to explore the concealed Areas and their practical clinical applications, which can be used for the welfare of mankind.

Key words: Antioxidant properties, curcumin, biocomponent, preservative, inflammatory diseases

Introduction

Turmeric, derived from the Curcuma longa plant, has been a staple in traditional medicine and culinary practices for centuries. Its primary bioactive compound, curcumin, is responsible for many of its pharmacological effects, which include anti-inflammatory, antioxidant, and antimicrobial properties. Research has increasingly highlighted turmeric's potential in managing a variety of health conditions, from chronic inflammation and arthritis to metabolic disorders and even cancer. This introduction explores the pharmacological effects of turmeric, its mechanisms of action, and its diverse applications in both traditional and modern medicine.

History of Turmeric

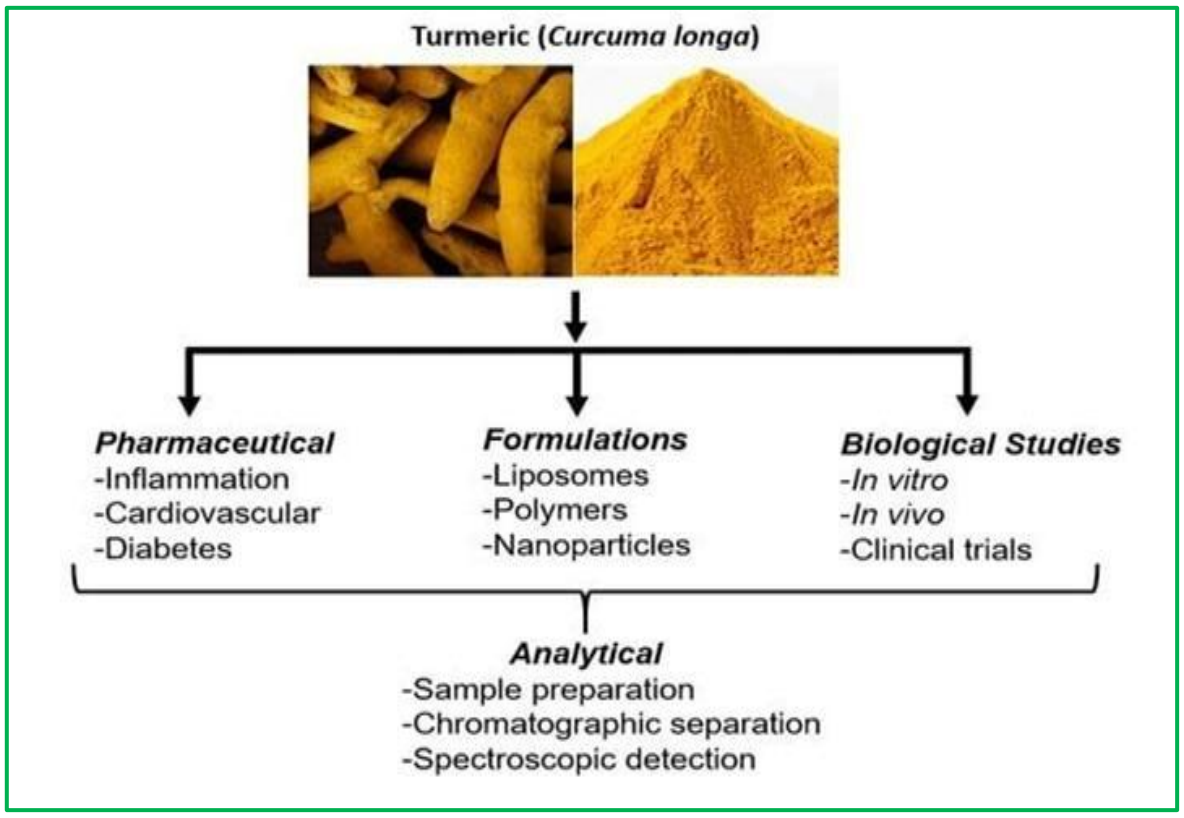
Turmeric has been used in Asia for centuries and is a major part of Ayurveda, Siddha medicine, traditional Chinese medicine, Unani, and the animistic rituals of Austronesian peoples. It was first used as a dye, and then later for its supposed properties in folk medicine.Turmeric was found in Farmana, dating to between 2600 and 2200 BCE, and in a merchant's tomb in Megiddo, Israel, dating from the second millennium BCE. It was noted as a dye plant in the Assyrians' Cuneiform medical texts from Ashurbanipal's library at Nineveh from 7th century BCE. In Medieval Europe, turmeric was called "Indian saffron.

Medicinal Uses

Rhizome: Purifies blood, used as tonic to brain And heart, used to treat leucoderma, piles, Bronchitis, asthma, tumours, tuberculous glands on the neck, enlargement of spleen, to Check leucorrhal and gonorrhoeal discharge.

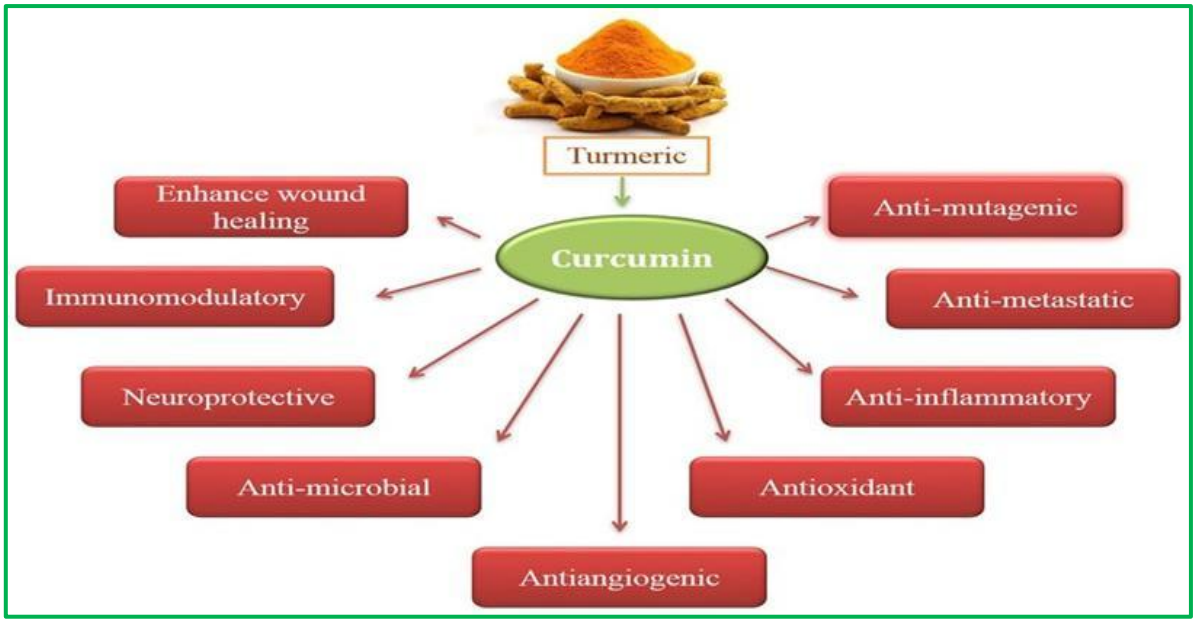
Phytoconstituents

- 1,8-cineole, 2-bornanol, 2-hydroxy-Methyl-anthraquinone, 4-hydroxybisabola-2.
- 10-diene-9-one; 4-methoxy-5-Hydroxybiosabola; 4-hydroxy-cinnamoyl-(Feruloyl)-methane, Alpha-atlantone, Alpha-Pinene, Alphaterpineol, Ar-turmerone, Arabinose.
- Ascorbic-acid, Ash, Azulene, Beta-Carotene, Beta-pinene, Beta-Sesquiphellandrene, Bis-(Para-hydroxy-Cinnamoyl)-methane.
- Bis-desmethoxycurcumin, Bisabolene, Bixin, Borneol, Boron, Caffeic-acid, Calcium, Caprylic-acid, Caryophyllene, Chromium, Cineole, Cinnamic-acid, Cuminyl-alcohol,Curcumene, Curcumenol, Curcumin, Curdione, Cobalt, Copper.
- Eugenol, Epiprocurcumenol; Eucalyptol; Eugenol; Feruloyl-p-coumaroyl-methane, Gamma-atlantone, Germ crone, Germacrone-13-al;Guaiacol, Isoborneol, L-alpha-Curcumene.



Curcumin

Curcumin is the primary bioactive compound found in turmeric, renowned for its potent anti-inflammatory, antioxidant, and antimicrobial properties. It has been studied for its potential health benefits, including anti-cancer effects, cardiovascular protection, and neuroprotective qualities. Curcumin works by modulating various signaling pathways, reducing oxidative stress, and influencing gene expression. However, its low bioavailability limits its effectiveness in clinical settings. To enhance absorption, formulations often combine curcumin with piperine (black pepper extract) or use specialized delivery methods. Ongoing research continues to explore its therapeutic potential across a range of health conditions.



Antioxidant Activity: Turmeric, primarily due to its active compound curcumin, exhibits significant antioxidant activity. Curcumin scavenges free radicals, thereby neutralizing oxidative stress and reducing cellular damage. Studies suggest that turmeric can enhance the body's own antioxidant enzymes, further contributing to its protective effects against oxidative damage linked to various diseases, including cancer and cardiovascular conditions. Its anti-inflammatory properties also complement its antioxidant capabilities, making it a valuable addition to health regimens.

Antimicrobial activity: Antimicrobial activity against a range of bacteria, viruses, and fungi. Research shows that curcumin can inhibit the growth of pathogens such as E. coli, Staphylococcus aureus, and Candida species. Its mechanisms include disrupting microbial cell membranes, inhibiting biofilm formation, and interfering with the expression of virulence factors. These properties make turmeric a promising candidate for natural antimicrobial agents in food preservation and therapeutic applications.

Anti-cancer effects: Turmeric, particularly its active compound curcumin, has garnered attention for its potential anti-cancer effects. Research indicates that curcumin can inhibit cancer cell proliferation, induce apoptosis (programmed cell death), and disrupt the cancer cell cycle. It exerts these effects through various mechanisms, including the modulation of signaling pathways associated with inflammation and cell growth, such as NF-kB and STAT3. Additionally, curcumin has been shown to enhance the effectiveness of conventional cancer treatments while reducing side effects. Its antioxidant properties further contribute to its protective role against cancer by neutralizing free radicals that can cause DNA damage. Overall, while more clinical studies are needed, the evidence suggests that turmeric could be a valuable adjunct in cancer prevention and treatment strategies.

Gastrointestinal effects: Turmeric, particularly through its active compound curcumin, has several beneficial gastrointestinal effects. It is known to support digestive health by stimulating bile production, which aids in fat digestion. Curcumin's anti-inflammatory properties can help reduce symptoms of gastrointestinal disorders such as irritable bowel syndrome (IBS) and inflammatory bowel disease (IBD). Additionally, turmeric may promote a healthy gut microbiome by inhibiting the growth of harmful bacteria while supporting beneficial strains. Its antioxidant effects also help protect the gastrointestinal tract from oxidative stress. However, high doses can sometimes cause gastrointestinal discomfort, so moderation is key.

Alzheimer and turmeric: Epidemiological studies have suggested reduced risk of in Alzheimer's disease (AD) in patients with long-term use Of nonsteroidal anti-inflammatory drugs (NSAIDs) which May show the role of brain inflammation in Alzheimer's Disease. It also has been shown with increased cytokines And activated microglia. It has been shown that curcumin Has NSAID like activity and reduces oxidative damage., The effect of 160 ppm and 5000 ppm doses of dietary Curcumin on inflammation, oxidative damage, and plaque Pathology were tested. Both doses significantly lowered Oxidized proteins and IL-1, a proinflammatory cytokine Usually elevated in the brains of these mice. In view of its Efficacy and apparent low toxicity, this spice has promise For the prevention of Alzheimer's disease .

Conclusion

(Turmeric) rhizome, has been used for centuries for culinary and food coloring purposes, and as an ingredient for various medicinal preparations, widely used in Ayurveda and Chinese medicine. In recent decades, their biological activities have been extensively studied.

References

1. Nasri. H , et al. "Turmeric: A spice with multifunctional medicinal properties". *Journal of herbmed pharmacology*, 2014; 3(1): 5-8.
2. Mohammad. E Abd El-Hack *et al*."Curcumin, the active substance of turmeric: its Effects on health and ways to improve its Bioavailability". *J Sci Food Agric* 2021; 101: 5747–5762
3. Wiggers HJ, Zaioncz S, Cheleski J, Mainardes RM and Khalil NM, CurcuMin, a multitarget phytochemical: challenges and perspectives, inStudies in Natural Products Chemistry. Elsevier, Amsterdam, pp.243–276 (2017).