

Curcuma longa

Curcuma longa commonly known as **Turmeric**, is a flowering plant in the ginger family Zingiberaceae. It is a perennial, rhizomatous, herbaceous plant **native to the Indian subcontinent and Southeast Asia.**

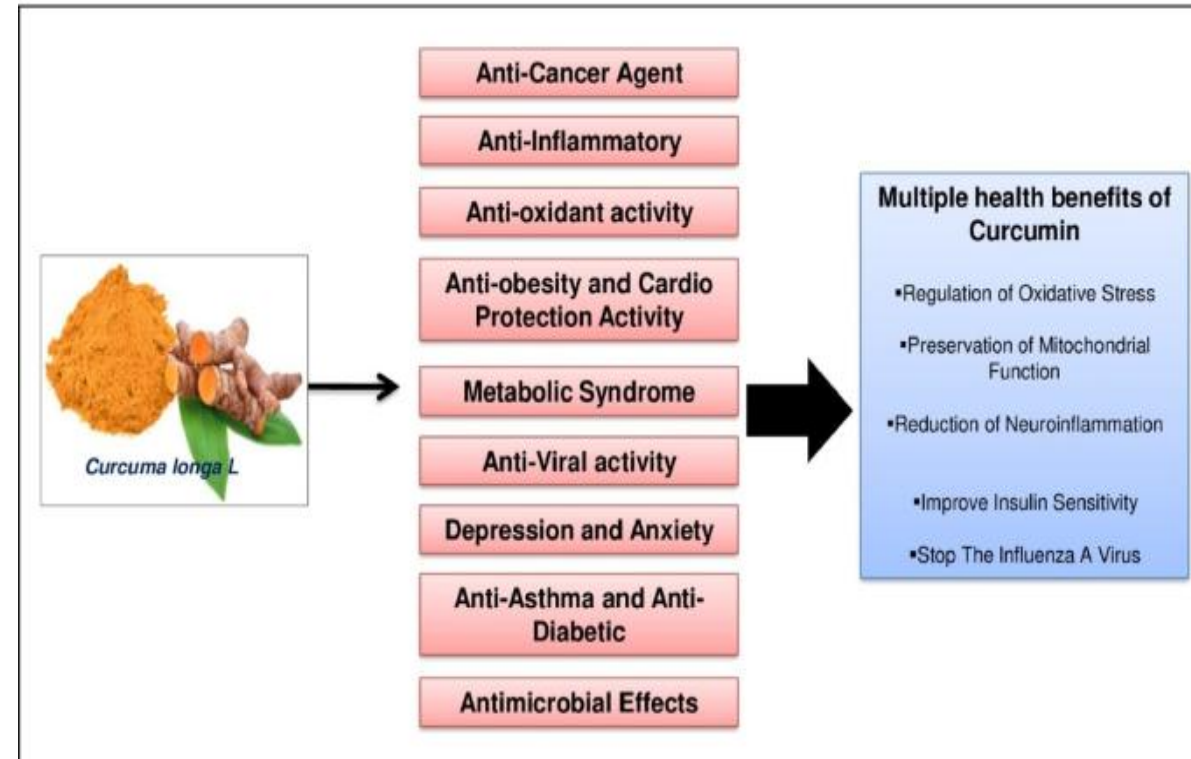
Potential health benefits : anti-inflammatory, antioxidant, and even anticancer properties.

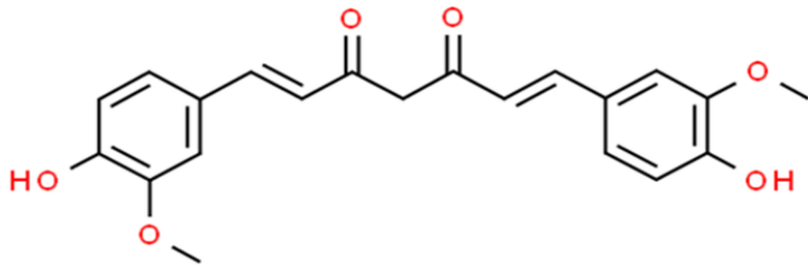
Because **curcumin has low bioavailability on its own**, curcumin extract is often **paired with** other ingredients like **black pepper (which contains piperine) to enhance absorption.**

Uses of curcumin extract : Reducing inflammation, Supporting brain health, Antioxidant support, Supporting joint health



Botanical Name : Curcuma Longa
 Scientific Name: Curcumin, Turmeric
 Product Code:AMBCT01





Curcumin

❖ Chemical Structure and Properties

- **Chemical Name:** Curcumin (diferuloylmethane)
- **Molecular Formula:** C₂₁H₂₀O₆
- **Appearance:** Bright yellow powder
- **Solubility:** Curcumin is poorly soluble in water, which limits its bioavailability. However, it is soluble in organic solvents like ethanol and acetone.
- **Stability:** Curcumin is sensitive to light, heat, and pH, making it unstable under certain conditions. This instability can be addressed in formulations designed for better stability and bioavailability.

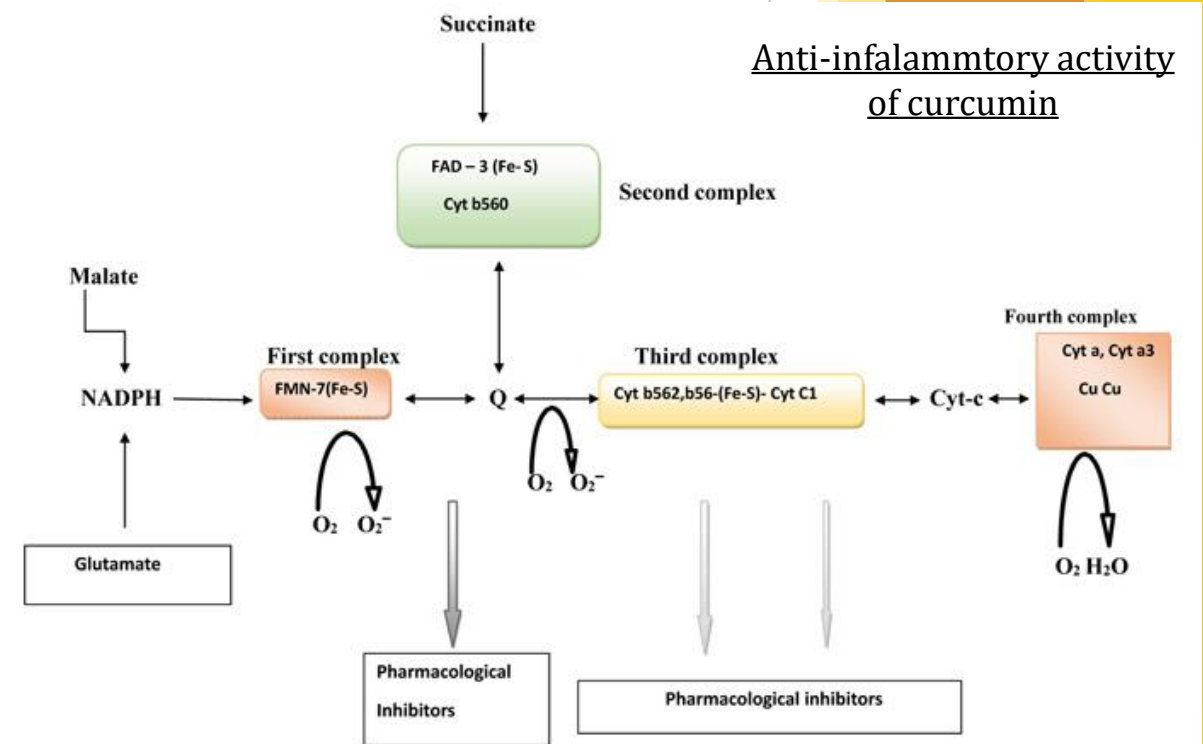
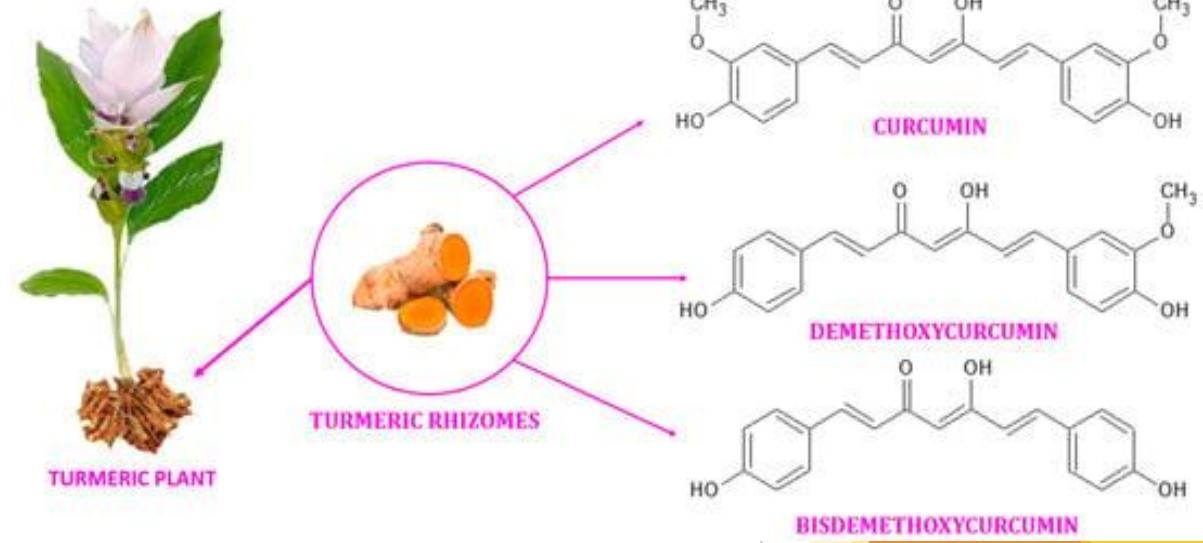
• **Absorption:** Curcumin has low oral bioavailability, meaning that only a small amount of it is absorbed by the body when taken orally. This is due to its poor solubility in water and rapid metabolism in the liver.

• **Metabolism:** After absorption, curcumin undergoes extensive metabolism in the liver, primarily through conjugation with glucuronic acid and sulfate, which significantly reduces its bioavailability.

• **Bioavailability Enhancement:** To improve absorption, curcumin is often combined with other substances, such as **piperine** (from black pepper), which has been shown to enhance curcumin's bioavailability by up to 2000%. Other advanced formulations like curcumin nanoparticles, liposomal curcumin, and curcumin combined with fats (like in turmeric oil) also help increase absorption.

❖ Mechanism of Action

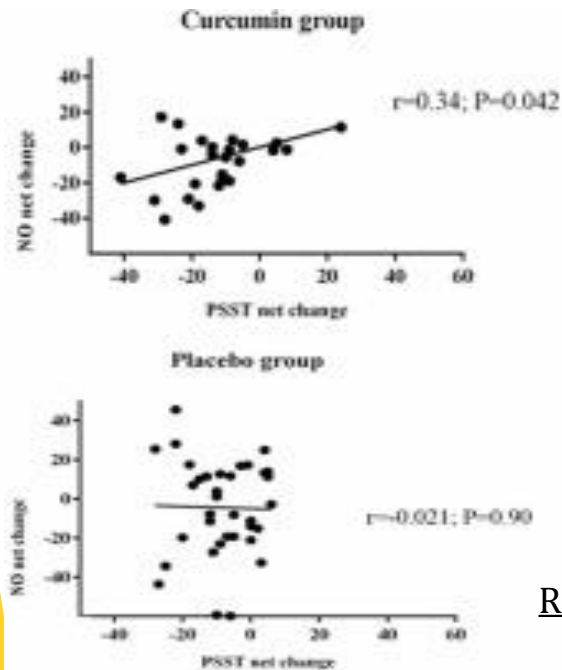
- **Anti-inflammatory Activity:** Curcumin's anti-inflammatory effects are primarily mediated through the inhibition of inflammatory enzymes (like COX-2), cytokines (TNF- α , IL-6), and transcription factors (NF- κ B), which play a role in inflammatory pathways.
- **Antioxidant Effects:** Curcumin scavenges free radicals and boosts the body's antioxidant defenses. It increases levels of antioxidant enzymes such as **superoxide dismutase (SOD)**, **catalase**, and **glutathione peroxidase**, which help protect cells from oxidative damage.
- **Gene Expression Modulation:** Curcumin can influence various signaling pathways, including those involving **Nrf2** (nuclear factor erythroid 2-related factor 2), which regulates the body's antioxidant response, and **MAPK** (mitogen-activated protein kinase), which is involved in cell stress responses.



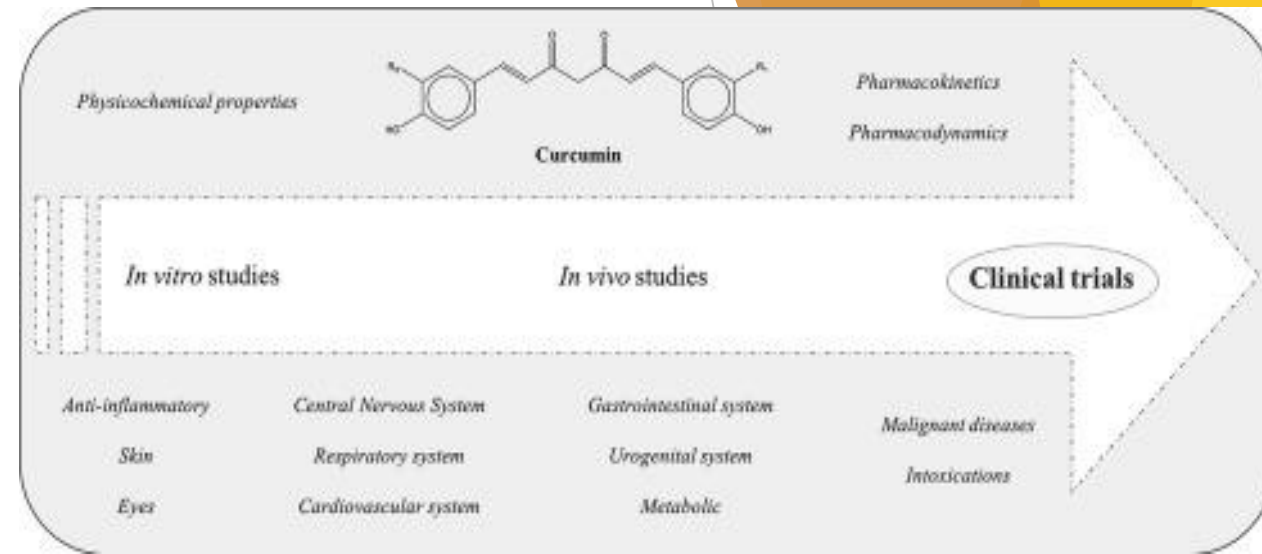
❖ Clinical Studies and Research

Cancer: A study published in the *Journal of Clinical Oncology* in 2008 found that curcumin can inhibit tumor growth in colorectal cancer by modulating various molecular pathways. Research is ongoing to evaluate its role as an adjunct in cancer treatment.

Arthritis: Clinical trials have shown that curcumin supplementation can significantly reduce pain and improve joint function in patients with osteoarthritis and rheumatoid arthritis, with fewer side effects compared to conventional NSAIDs (nonsteroidal anti-inflammatory drugs).



Randomized controlled trial



Alzheimer's Disease: Research suggests curcumin's ability to cross the **blood-brain barrier** and reduce amyloid plaques, showing its potential as a neuroprotective agent. A study in the *American Journal of Geriatric Psychiatry* (2018) found that curcumin supplementation improved memory and cognitive function in people with mild cognitive impairment.

Diabetes: A clinical trial in the *Journal of Clinical Endocrinology and Metabolism* (2012) found that curcumin supplementation improved insulin sensitivity and blood glucose regulation in type 2 diabetes patients.

Certifications

