Review Article

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A Review on Pharmacological Activity of Curcumin

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Abstract

Turmeric (Curcuma longa Linn) is extensively used as a spice and grownup wide throughout Indian landmass. Turmeric plant has been utilized in ancient drugs as a remedy for varied diseases together with cough, polygenic disorder and internal organ disorders. For the previous couple of decades, in depth works are done to ascertain the medicine actions of Turmeric and its extracts. Curcumin is that the main substance of Turmeric and evidenced for its anti-inflammatory drug, inhibitor, antimutagenic, antidiabetic drug, bactericide, hepatoprotective, medication and anticancerous medicine activities. This review provides update in the main on the medicine activities of the Turmeric, its extracts and plausible medicative applications of Turmeric beside their safety analysis.

Keywords: Curcumin; Medicinal uses.

Introduction

Turmeric is Associate in Nursing Indian stalk flavourer plant (Curcuma longa) of the monocot family (Zingiberaceae) of well known medical edges. Fig. one shows herbaceous plant. The medicative edges of turmeric may be attributed to the presence of active principles referred to as curcumin oids. one in all the foremost attention grabbing elements of curcumin oid is curcumin, that could be a tiny mass polyphenolic compound and lipophillic in nature, therefore insoluble in water and additionally in ether however soluble in plant product, dimethylsulfoxide, and different organic solvents. Curcumin is stable at the acidic pH scale of the abdomen. The opposite constituents gift area unit volatile oils together with tumerone, atlantone and zingiberone and sugars, proteins and resins.[1] The active constituent of turmeric- curcumin is isolated from herbaceous plant and it provides color to turmeric. Such bioactive element has been totally investigated five. Curcumin (1, 7-bis (4 hydroxy 3 methoxyphenyl)-1, 6-heptadiene 3, 5 dione) is additionally referred to as diferuloylmethane vi. It's a tautomeric compound existing in organic compound type in organic solvents and as a keto type in water

Curcumin is obtainable in many forms together with capsules, tablets and ointments.[2] Curcumin oids are approved by the US Food and Drug Administra-

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tion (FDA) as "Generally Recognized as Safe" (GRAS) it's the aim of this review to supply a short summary of the potential health edges of curcumin

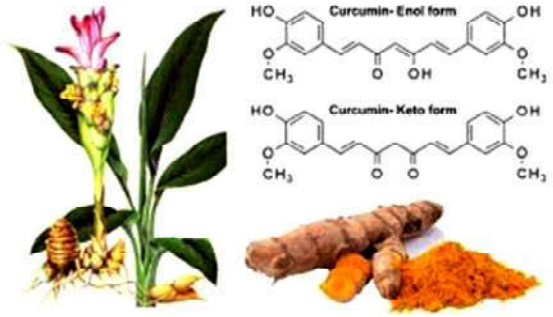

Fig 1: Structure of Curcumin.

Medicinal uses of Curcumin

Anti arthritis Activity: atrophic arthritis (RA) could be a chronic disease that's characterised by dysplasia of the secretion fibroblasts. Curcumin is understood to possess potent anti inflammatory drug and anti-arthritic properties. Curcumin treatment was allotted on patients with active atrophic arthritis and compared with nonsteroidal anti-inflammatory drug reference cluster. Curiously, the curcumin cluster showed the very best proportion of improvement in overall unhealthy arithritis[3] scores and these scores were considerably higher than the patients within the nonsteroidal anti-inflammatory drug cluster. Additional significantly, curcumin cluster was found to be safe and failed to relate with any adverse events compared to nonsteroidal anti-inflammatory drug cluster.

Anti-Alzheimer Activity: Alzheimer unwellness (AD) is out and away the foremost common explanation for insanity globally. This neurodegenerative disorder of the brain is chronic and progressive, characterised clinically by the deterioration within the key symptoms of activity and psychological feature skills. Researchers reportable the benefits of curcumin oids as antialzheimer agents.

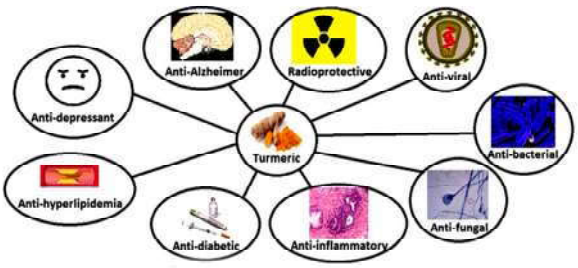

Fig 2: Medicinal Uses of Curcumin.

Anti-Angiogenesis Activity: Curcumin was tested for its ability to inhibit the proliferation of primary endothelial cells in the presence and absence of basic fibroblast growth factor (bFGF), as well as its ability to inhibit proliferation of an immortalized endothelial cell line. Curcumin was tested for its ability to inhibit phorbol ester-stimulated vascular endothelial growth factor (VEGF) mRNA production. Curcumin effectively inhibited endothelial cell proliferation in a dose-dependent manner.[4] Curcumin demonstrated significant inhibition of bFGF mediated corneal neovascularization in the mouse. Curcumin had no effect on phorbol ester-stimulated VEGF production. These results indicate that curcumin has direct antiangiogenic activity in-vitro and in-vivo.

Anti-inflammatory Activity: Curcumin possesses significant anti-inflammatory activity in acute as well as in chronic models of inflammation. It is as potent as phenylbutazone in the carrageenan oedema test but only half as potent in chronic tests. Curcumin has been demonstrated to be safe in six human trials and has demonstrated anti-inflammatory activity.[5] It may exert its anti-inflammatory activity by inhibition of a number of different molecules that play a role in inflammation. Curcumin has been shown to regulate numerous transcription factors, cytokines, protein kinases, adhesion molecules, redox status and enzymes that have been linked to inflammation.

Anti Bacterial Activity: The antibacterial study of curcumin shows the ability to inhibit growth of a variety of periodontopathic bacteria and Porphyromonas gingivitis Arg and Lys specific proteinase (RGP and KGP, respectively) activities.[6] In addition, curcumin suppressed P. gingivitis homotypic and Streptococcus gordonii biofilm formations in a dose dependent manner. Bacterial growth was suppressed almost completely at very low concentrations of curcumin. A concentration of 20 µg/mL of curcumin inhibited these P. gingivitis biofilm formations by more than 80%. On the other hand, 100 µg/mL of curcumin did not suppress the growth of Aggregatibacteractinomycetemcomitans. Furthermore, at relatively high concentrations, curcumin targets bacterial membranes (Escherichia coli).

Chemoprotective activity: Curcumin activate the DDR (DNA damage response), providing an opportunity and rationale for the clinical application of these nutraceuticals in the chemoprevention of prostate cancer. Chemoprotective effects in esophageal epithelial cells exposed to bile acids; Curcumin reverses bile acid suppression of gene expression of SOD-1 and also able to inhibit bile acid induction of COX-2 gene expression. Curcumin has demonstrated these chemopreventive properties in cell cultures, animal models and human investigations.

Hepatoprotective: The powder of the rhizome mixed with amla juice is used in jaundice. Corriliyum (Anjana) with Haridra, Red ochre (Gairika), and Amalaki (Emblicaofficinalis) cures jaundice. Curcumin, the most common antioxidant constituent of Curcuma longa rhizome extract, was reported to enhance apoptosis of damaged hepatocytes which might be the protective mechanism whereby curcumin down-regulated inflammatory effects and fibrogenesis of the liver. The ethanolic extract of Curcuma Longa rhizomes showed a significant hepatoprotective effect when orally administrated in doses of 250 mg/kg and 500 mg/kg, and the protective effect was dosedependent.[7] The main constituents of Curcuma longa rhizome ethanolic extract are the flavonoid curcumin and various volatile oils, including tumerone, atlantone, and zingiberene. The hepatoprotective effects of turmeric and curcumin might be due to direct antioxidant and free radical scavenging mechanisms, as well as the ability to indirectly augment glutathione levels, thereby aiding in hepatic detoxification. The volatile oils and curcumin of Curcuma longa exhibit potent antiinflammatory effects.

Curcumin prevents drug resistance: The Curcumin is a potent drug resistance preventer. It exhibits novel ability to prevent the upregulation of P-glycoprotein and its mRNA induced by adriamycin (ADM). The prevention capacity is also functionally associated with the elevated intracellular drug accumulation and parallel enhanced ADM cytotoxicity.

Antidermatophytic activity: Fresh juice of rhizome of Haridra is used as antiparastic in many skin affections. Its rhizome powder mixed with cow's urine is taken internally in itching and dermatitis. Curcuma longa L.[8] leaves have good promise as an antifungal agent that could be used as a therapeutic remedy against human pathogenic fungi on account of its various in vitro and in vivo antifungal properties, viz., strong fungicidal action, long shelf-life, its tolerability of heavy inoculum density, thermo stability, broad range of antidermatophytic activity and absence of any adverse effects. Curcumin obtained from the turmeric rhizome (Curcuma longa)[9] have shown to possess the ability to protect the skin from harmful UV induced effects by displaying antimutagen, antioxidant, free radical scavenging, anti-inflammatory and anti-carcinogenic properties.[10]

Anti-Fibrotic Activity: Idiopathic pulmonary fibrosis (IPF) is a progressive disease of unknown etiology that can result in respiratory failure. The resulting fibrotic changes in lung architecture lead to decreased gas exchange and pulmonary compliance.[11,12] Notably, curcumin effectively reduces profibrotic effects in fibroblasts in vitro via the inhibition of key steps in the signaling pathway of transforming growth factor beta (TGF b) a multifunctional cytokine belonging to the transforming growth factor.

Conclusion

Turmeric has a broad spectrum actions with certain effects and is beneficial for long term and daily usage. Turmeric is an auspicious beauty agent, daily applied on the forehead by Hindu females. Turmeric is the household spice for diverse cuisines in all parts of India since many centuries. Generally the rhizome powder of Turmeric is used as a spice all over India but only a few people are aware of its therapeutic properties. Turmeric is regarded as one of the best drug in many diseases like Diabetes, Skin diseases etc, which is in use since ages owing to its multiple pharmacological activities. Turmeric is enriched with many useful phytoconstituents which are responsible for its efficacy. Curcumin is one such phyto constituent, a nutraceutical substance with numerous pharmacological activities proven experimentally and clinically. It has been established beneficial in treating Antiinflammatory, Anti-allergic, Anti oxidant, Anti-hyperglycaemic and Anti cancer properties. Till date many researches have been carried out on the medicinal effects of Turmeric, this review will give a new impetus to utilise turmeric in various disorders.

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