A REVIEW ON A LIFE OF SPICE TURMERIC (CURCUMA LONGA)

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***ABSTRACT*:** *Spice, turmeric is a member of a ginger family, which is obtained from the rhizomes of curcuma longa the principle curcuminoid, curcumin is found in turmeric, it has proven medicinal uses for centuries in subcontinent, particularly anti-inflammatory and anti-cancer activities. Curcumin is the reason behind the actions accompanying with turmeric demonstrated by the research conducted in the past half century. Research in the future of curcumin has an auspicious possibility.*

Key words: curcuminoid, curcumin, traditional uses of curcuma longa

1. INTRODUCTION

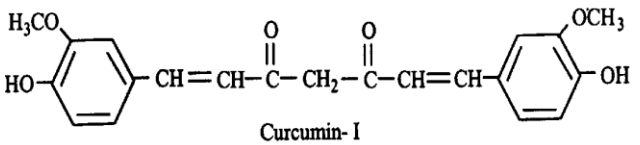
Zingiberaceae (ginger) family, having a member called Curcuma longa, which is a perennial herb. In height it grows three to five feet, and in tropical climates like Asia, China, India and other countries it is extansively cultivated. Its flowers are of yellow color which are in funnel shaped and leaves which are oblong and pointed [1]. Keto and Enol are the two forms in which curcumin tautomerically exists. A tautomeric form of curcumin enol is in solid and solution phase is the most stable. Rosocyanine a red color compound develop by countering the boric acid with curcumin. Quantification of boron can be done with the help of curcumin [2]. The portion of a plant rhizome used medicinally. For flavor and color in food widely use of turmeric occurs. In textile, pharmaceutical industries and in religious ceremonies of Hindu turmeric is used expansively in different forms. In Ayurvedic and Chinese medicine systems a long habit of turmeric use is found. To heal disorders of biliary, anorexia, cough, diabetic wounds, hepatic disorders, rheumatism, and sinusitis conventional Indian medicine uses turmeric. Blood clumps development decreases with the help of turmeric which aids in preventing atherosclerosis [3]. Turmeric is an aromatic tonic and carminative described by the old Hindu texts. To restore to health the inflammation and sprains produced by injury, used the turmeric by applying over the exaggerated area by mixing it with slaked lime as a household remedy. To treat the sore throat in different regions of India, powder of turmeric given to the patient orally. Zingberone, atlantone, and tumerone, and various volatile oils, (diferuloylmethane) flavonoid of curcumin are the active constituents of turmeric. Toxicity triggered by the heavy metals, cadmium and lead diminished by curcumin, by binding these heavy metals with it. Defensive action to the brain describes with this property of curcumin. Curcumin for the inhibition of glutathione S-transferase, 5-lipoxygenase and cyclooxygenase entertain as an inhibitor. Turmeric aids in reduction of back pain, arthritis and bursitis. By means of aptosis induction the anticancer action of turmeric is mediated. Turmeric used as a coloring and food preservative agent in the food industry. At very high dosage of turmeric and curcumin, both are tolerated without toxic action [4].

2. TRADITIONAL USES

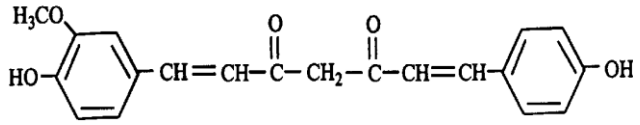
As a liver protector, for bile duct secretions work as a stimulant, diuretic, to heal catarrh, antifever and anti-inflammatory turmeric is used traditionally in countries of Middle East. For the disinfection purpose of wounds and sprains turmeric is used as curing agent. To diminish or avoid the hair growth on the skin, turmeric is used by the South Asian women's by applying it on the skin. The jaundice Treatment in Haiti is done by the turmeric by preparing the rhizome extract with salt. Turmeric is used as antidote aligned with the poisoning by the tree manzanillo-hippomane mancinella in the island of Guadeloupe. Turmeric is helpful in the treatment used against the measles disease in the north-east part of Brazil [5].

2.1 CHEMICAL COMPOSITION OF TURMERIC

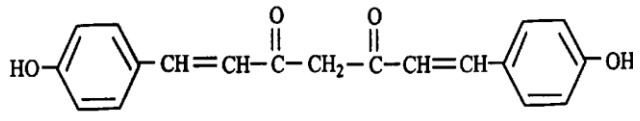
Turmeric contains (6.3%) of protein, (69.4%) of carbohydrates, (3.5%) of minerals, (5.1%) of fat and moisture contain by spice turmeric. By the process of steam distillation an essential oil is obtained (5.8%) from rhizomes having compounds borneol (0.5%), cineol (1%), sabinene (0.6%), sesquiterpenes (53%), zingiberene (25%) and α-phellandrene (1%). Yellow color of curcumin is dependable of (diferuloylmethane) (3-4%), encompasses of (94%) curcumin I, (6%) curcumin II, and (0.3%) curcumin III.(Fig.). The melting point of turmeric ranges from 176-1770C. Turmeric shows solubility in ethanol, alkali, ketone, acetic acid and chloroform. (1, 7-bis (4-hydroxy-3-methoxyphenyl)-1, 6-heptadiene-3, 5-dione is the chemical formulation of curcumin [4].



Curcumin- I



Curcumin- II



Curcumin- III

Fig.

3. CURCUMIN ACTIVITIES

3.1 Insecticidal action:

Bioactive ingredients of turmeric, helps to control animal and agriculture pests by interfering in the pest development and behavior. The products obtained from turmeric acts as insect repellents [6].

3.2 Detection of plaque:

The most common dental diseases include plaque, and it is not simply spotted. Plaque detected by using an agent which tints plaque and aids in detecting it. For the detection of plaque extracts obtained from turmeric and curcumin is used [7].

3.3 Dental problems relief action:

Turmeric water which is made by (boiling two cloves, turmeric powder and guava dried leaves in water). Sore of teeth diminishes with the help of roasted turmeric. Teeth and gums made strong by using the pieces of turmeric which are burnt. Paste produces by mixing the turmeric 1 tsp with salt $^1/_2$ tsp and mustard oil $^1/_2$ aids in release from gingivitis and periodontitis, by rubbing twice a day this paste to teeth and gums [8].

3.4 Plaque and gingivitis preventing action:

Mouthwash of turmeric aid in the plaque control, and it is a low cost measure for plaque control. Extracts of turmeric rhizomes by which 30% proliferation of gingival fibroblast cells of induces and the 92% proliferation gingival fibroblast cells inhibited by other fractions [10].

3.5 Fissure and pit sealant:

Dental caries growth on the tooth made more disposed, because of the fissures and pits existence on the surface of tooth. Dental caries development decreases on the tooth by applying the pit and fissure sealant. Turmeric extract, extract of Annatto and β-Apo-8 Carotenol, one dye selected from this group combines with acrylic containing monomer polymerizable resin system composition form a fissure and pit sealant [7].

3.6 Oral lichen planus:

Moderately shared prolonged mucocutaneous disease lichen planus, by which oral mucosa is affected. White markings, white plaque, erythema, corrosions presented by lichen planus. Oral lichen planus controlled by curcuminoid dosage 6000mg/d [9].

3.7 Antioxidant action:

As compare to the vitamin C, the soluble extracts of turmeric and curcumin constituent in water and fat show strong antioxidant activity [13]. It helps in to defend hemoglobin to be oxidized. Derivatives of curcumin, demethoxycurcumin and bis-demethoxycurcumin comprise of antioxidant effect. Reactive oxygen species (ROS) production hamper by curcumin. Oxygen free radicals scavenged by curcumin. In human damage induced by H_2O_2 inhibited by the controlling effect exert by curcumin. In vivo ROS production lowers by curcumin. Hemoglobin oxidation also protected by curcumin [4].

3.8 Anticarcinogenic action:

Three stages of cancer tumor elevation, angiogenesis, and tumor development at these stages curcumin show the ability to inhibit cancer. Cell propagation and growing tumor inhibited by curcumin in two different studies of colon and prostate cancer [11]. Scavenging the free radical and antioxidant properties of curcumin and turmeric are the basis for anticarcinogenic property. A level of glutathione also increases indirectly by turmeric and curcumin. Formation of nitrosamine also inhibited. Carcinogens and mutagens hepatic detoxification aided with curcumin and turmeric [12].

3.9 Anticoagulant action:

In rat thoracic aorta collagen and adrenaline-induced accumulated platelet introverted by curcumin in vitro and vivo, which show its anticoagulant activity [4].

3.10 Antidiabetic action:

By taking a very low dose of curcumin helps in avoid galactose-induced cataract development. In diabetes mellitus advanced glycation end products induced complications also diminish by curcumin. Alloxan-induced diabetes in rat the blood sugar level reduces by turmeric and curcumin [28].

3.11 Antifungal action:

Curcuma longa oil and the extracts of ether and chloroform enclose antifungal properties. Aspergillus flavus, A. parasiticus, Fusarium moniliforme and Penicillium digitatum against them oil of turmeric is active [27].

3.12 Antiprotozoan action:

Anti- Entamoeba histolytica action show by the extract of rhizomes in ethanol. In vitro anti- leishnmania actions show by curcumin. Anti-L.amazonesis effect show by the several curcumin sysnthetic derivatives [4].

3.13 Gastrointestinal action:

Numerous shielding effects on the gastrointestinal tract apply by curcuma longa constituents. P-tolymethylcarbinol and intestinal spam introverted by sodium curcuminate. Secretions of pancreatic enzyme, bicarbonate, secretin, and gastrin enhanced by a turmeric component. Pyloric ligation, anxiety, liquor, and Indomethacin, ulcer caused by these sources inhibited in rats by turmeric, increasing gastric wall mucus. Gastric ulcers caused by helicobacter pylori, which development inhibited by the aid of curcumin [22], [23].

3.14 Antifertility action:

Turmeric rhizomes aqueous extracts and petroleum ether when fed to rats orally, the results show antifertility effect 100%. By the help of these extracts implantation is inhibited completely. Testosterone converts to 5α-dihydrotestosterone by 5α-reductase inhibited by curcumin. Sperm motility in the human also inhibit by the help of curcumin [4].

3.15 Anti-inflammatory action:

Potent anti-inflammatory properties show by curcumin of curcuma longa. Skin irritation and allergies associated inflammation counteract with help of curcumin when it applied topically. In acute and chronic inflammation reduction turmeric shows its effectiveness in vitro and vivo studies. Inflammation associated with the neutrophil aggregation inhibited by curcumin in monkeys. Rats with Freund's adjuvant-induced arthritis, curcuma longa given them orally which show inflammatory swelling reduction extensively lesser as compare to the controls [16] [17].

3.16 Antimicrobial action:

Bacteria, parasites, and pathogenic fungi growth inhibited by curcuma longa vital oils and the extract of turmeric. A study of animals were conducted, in which pathogenic molds , dermatophytes, or yeast used to infect the guinea pigs, oil of turmeric inhibited dermatophytes and pathogenic fungi when applied orally. Yeast isolates not affected by oil of turmeric or curcumin. Guinea pigs infected with fungi and dermatophyte show improvement in lesion and lesions vanished after the post-turmeric application for the period of

seven days. Turmeric I-percent diet supplementation help in gaining weight and the lesions scores reduction in small intestine, in the study conducted on chicks which were infected by Eimera maxima a caecal parasite. Leishmania and Plasmodium falciparum major organisms moderate activity shown by turmeric against them [18].

3.17 Cardiovascular action:

Lowering cholesterol and triglyceride levels, inhibiting platelet aggregation and reduction in the susceptibility of low density lipoprotein (LDL) to lipid peroxidation are the protective effects of turmeric on the cardiovascular system. These effects are associated with the low doses of turmeric, because high dose not help in lowering the lipid peroxidation of LDL [14]. Extracts of turmeric effect levels of cholesterol due to uptake in intestine of cholesterol is decreased and in liver cholesterol conversion into bile acids is increased. Platelet aggregation inhibited by curcuma longa constituent's consideration to be via potention of synthesis of prostacyclin and inhibition of synthesis of thromboxane [15].

3.18 Photo-protector action:

Antioxidant activity is the basis of this action. 25% skin surface lipids are unsaturated, due to which free radicals are attacked easily on them. The damage which free radicals caused accelerates when ultraviolet rays of sun penetrate through the skin. Collagen and elastin fibres, basis for the elasticity and integrity of the skin, degraded by inherent enzymes when exposure to these radiation is prolonged, which lead to the deterioration in the texture of skin. Epidermal cells protection from ultraviolet B radiation damage and suppressing inflammation effective results shown by turmeric extract. UV rays mutagenic induction also inhibited by curcumin [29,4].

3.19 Lactation and pregnancy action:

There is no evidence, that the pregnancy or lactation harmfully affected by dietary intake of turmeric as a spice, during pregnancy and lactation curcumin supplements protection has not been established [19].

3.20 Wound healing action:

The local application of turmeric seen that it is effective and the healing wound action of turmeric studied extensively. From ancient times turmeric is used in Chinese medicine. Wound healing process shows improvement on the diabetic rat skin when curcumin apply topically on the skin wounds. Beta transforming growth levels increases and the nitric oxide synthase enzyme activity also increases involve in the reparation action mechanism [4].

3.21 Antifibrotic effect:

In rats bleomycin-induced pulmonary fibrosis suppresses by curcumin. Biomarkers of inflammatory response and total cell count increases, by giving curcumin 300 mg/kg dosage orally and bleomycin-induced inhibits. Bleomycin-induced alveolar macrophage manufacture of TNF-a, superoxide and nitric oxide suppresses by curcumin [4].

3.22 Hepatoprotective action:

Comparable to silymarin turmeric have hepatoprotective characteristics. Antioxidant properties of turmeric results the hepatoprotective effect, and pro-inflammatory cytokines formation also decreases by turmeric. Acute and subacute liver damage persuaded by CCl4 in rats, this liver injury significantly decreases by giving curcumin [24]. Aflatoxin production induces fatty changes, hyperplasia and necrosis also reversed by curcumin and turmeric [25]. Excretion of cholesterol, bilirubin and bile salts increases by the salt of curcumin, sodium curcuminate. Solubility of bile also increases, therefore possibly preventing and treating cholelithiasis [26].

3.23 Anti-hyperlipidemia action:

To decrease blood lipids turmeric shows potential in vitro studies. For cardiovascular protection and lipid lowering more clinical studies necessitate performing to discover optimal dosages [14].

3.24 Gastric ulcer action:

Group of 25 patients, having gastric ulcer endoscopically-diagnosed a trial is conducted. A dose of 600 mg turmeric powdered given daily five times to them. 48 percent of patients recover from gastric ulcer after the period of 4 weeks. Blood abnormalities and no unfavorable reaction were noted [20].

3.25 Immunity action:

Curcumin can also help the body fight off cancer should some cells escape mitosis. The lining of the intestine after ingestion of curcumin, they found that CD4+ T-helper and B type immune cells were greater in number. Immunity also enhanced by curcumin [2].

3.25 Cosmetic action:

Extract of turmeric loaded with curcuminoids, extensively recognized among others for its anti-oxidant, antimicrobial and anti-inflammatory properties. Prostacyclin's synthesis not affected by the turmeric mechanism of action which acts as a liposomal membranes stabilizer, activity of and leucotrienes and thromboxane inhibited, inhibitor for prostaglandin. Potential strain for industrial application [21].

4. CONCLUSION

Since the emergence of civilization, medicinal plant has provided bountiful leads to battle diseases. Curcuma longa after the broad investigation of the literature observed as a common magic potion in the herbal medicine with miscellaneous pharmacological action. Numerous types of chemical compounds found in curcuma longa which is accountable for the numerous activity of plant. Against the cancer and inflammatory disorders trials were conducted by using curcumin as a therapeutic agent. Drugs for modern welfare can be established by conducting trials and clinical research for the curcumin bioactivity, action mechanism and pharmacotherapeutics. Numerous diseases can be control with the help of curcumin, by developing modern drugs.

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