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A review of Zard Chob (*curcuma longa* Linn) an efficient anti-inflammatory unani drug

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Abstract

The herbal medicines got attention and recognition of modern world community due to their efficacy, safety and holistic approach. Unani Medicine is one of the oldest methods of treatment in India and other parts of the world. Zard Chob has a special place in Unani Medicine which is in medicinal use as Mohallile auram from 1st century BC. As per classical Unani literature, Zard Chob is used for its Muhallile waram (Anti-inflammatory), Musakkin (Analgesic), Daf-e-Taaffun (Antiseptic), Daf-e-Humma (Antipyretic), Munaqqi-e-fuzlat, Musaffi-e-Dam (Blood Purifier), Mudammil-e-Qurooh (Wound Healer), Jaali (detergent) and Kasir Riyah (carminative) activities besides its use as cosmetic. Paste of Zard Chob is used to treat common eye infections, for dressing of wounds, to treat bites, burns, acne etc. It is also used internally to treat digestive and liver problems, skin diseases, diabetes, arthritis, cancer and many others ailments. Modern scientists have carried out researches on the Curcumin the main active ingredient of Zard Chob and they have proven it as an anti-inflammatory, antioxidant, anti-mutagenic, antidiabetic, antibacterial, hepatoprotective, expectorant and anti-cancerous pharmacological activities in their studies. In this review an attempt has been made to highlight the researches carried out on Zard Chob on its anti-inflammatory effects which prove the claims of the Unani medical scholars made centuries ago. This review will give a new impetus to utilize Zard Chob and its formulation in various other pathological disorders as per the claims of Unani medical scholars.

Keywords: Zard chob, curcumin, mouhallile- auram, purification

Introduction

Zard Chob (*curcuma longa* linn) belongs to family Zingiberaceae. In Arabic it is referred as Urooq-us-sufr, Urooq-us-sabbagheen, Baq'lat-ul-khatatiftl. While in Sanskrit, it is known as Aneshta Bhadra and Dirgharga. In Hindi it is named as Haridra, while in Urdu language it is mentioned as Zard Chob but in English it is named as Turmeric & Indian saffron, in Persian it is named as Zard chob and in Unani known as khalidunium, Tubagha, in Punjabi Halder &, Halja and in French it is named as curcuma [12, 32].

Historical background

The exact origin of Zard Chob is not known but it is believed to be native of South India and Indonesia. In these parts Zard Chob has been used for thousands of years as their food & traditional medicine.

The Greek physician Deesqaridoos (Dioscorides) used Zard Chob in the 1st century AD during his time as "Army Doc" for the Roman Empire. The Assyrians knew about Zard Chob, this orange root (rhizome) was described in a book of Herbal Remedies from 600 BC.

Morphological description

Zard Chob is the dried rhizome of *curcuma longa*. The primary and secondary rhizomes are dug up, steamed or boiled and dried. The primary rhizome are ovate or pear shaped and are known as "bulb" or "round" turmeric while the more cylindrical secondary rhizome are known as "fingers" and contain more coloring matter [38].

Chemical constituent

Zard Chob contains about 5% of volatile oil, resin and a crystalline yellow substance curcumin.

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- Volatile oil contains sesquiterpenes, alcohols, ketones and monoterpenes.
- The rhizome also contains free arabinose (1%) fructose (12%), and glucose (2%) [10, 15, 38].
- Zard Chob contains lipid soluble curcumin and water soluble turmerin. [10, 15, 38]
- From Rhizome three antioxidant compounds; curcumin, 4-hydroxycinnamoyl (feruloyl), and bis-(4-hydroxycinnamoyl) methane have been isolated and 2-(hydroxymethyl) anthraquinone has also been identified in rhizome.
- Two sesquiterpenes along with Beta-taraxerone isolated from rhizomes; curcumin (1.11%), demethoxycurcumin (0.86%) and bis-demethoxycurcumin (1.62%) have been identified in rhizome. [10, 15, 38]

Zard Chob (*curcuma longa*) in view of unani system of medicine

Unani system of Medicine is based on Hippocratic theory of four Akhlat (Humors) i.e. Dam (Blood), Balgham (Phlegm), Safra (Bile), Sauda (Black bile). A proper balance of Akhlat (Humors) within body ensures efficient metabolism, prevents the buildup of toxins and maintains the health. Humorous imbalance is often the root cause in development of a particular illness. In Unani system of medicine, treatment is carried out on four principle modes of treatment to correct the imbalance of Akhlat (Humors). These are;

1. Ilaj bit Tadbeer (Regimental therapy)
2. Ilaj bil Ghiza (Dietotherapy)
3. Ilaj bid Dawa (Pharmacotherapy)
4. Ilaj bil Yad (Surgery)

Temperament: It is of Hot & Dry in 1st stage [24]

Miqdae-e-khuraq (dose): 1-7gms [16, 24]

In a dose-escalating study on 25 cancer patient it was concluded that curcumin is not toxic to humans up to 8,000 mg/day when taken by mouth for 3 months. [9]

Afa'al (pharmacological actions): It is Musakkin (Analgesic) [4, 16, 19, 24], Mohallil-e-warm (anti-inflammatory) [4, 14, 19, 24], Daf-e-Taaffun (Antiseptic) [4, 24] Musaffi (Blood Purifier) [4, 16, 24], Mudammil-e-Qurooh (Wound Healer) [4, 16, 24], Jaali (Detergent) [4, 24].

Mawaq-e-istamal (therapeutic uses): It is applied locally as sprinkling powder, as paste, as ointments on external injuries, Waja-ul-asnan (Toothache), Qurooh (Wounds & ulcer) [4, 16], Aasshob-e-chasm (Conjunctivitis) [4, 16, 24], and as cosmetic. It is used internally to treat internal injuries, Zeeq-un-nafas (Bronchial Asthma) [24], Arthritis, gastrointestinal ailments, skin diseases [4, 16, 24]

A. Pharmacological studies

Anti-inflammatory and antioxidant activities of curcumin
Curcumin has been found effective in Acute and chronic inflammatory diseases.

In vitro studies have shown that curcumin inhibits xanthine oxygenase activities in NIH3T3 cells [25], nitric oxide production in RAW264.7 murine macrophages [7] and reactive oxygen species (ROS) generation in activated rat peritoneal macrophages [22]. Curcumin also inhibits the production of pro-inflammatory monocyte/ macrophage-derived cytokines [interleukin-8 (IL-8), monocyte inflammatory protein-1 (MIP-1), monocyte chemoattractant protein-1 (MCP-1), interleukin-1β

(IL-1β), and tumor necrosis factor-α (TNF-α)] in PMA- or LPS-stimulated peripheral blood monocytes and alveolar macrophages. [1]

In a study the results indicate curcumin to be a scavenger of nitric oxide and this compound is implicated in inflammation and cancer. [34]

In a study topical application of curcumin markedly inhibited TPA- and arachidonic acid-induced epidermal inflammation (ear edema) in mice. [20] The pleiotropic activities of curcumin derive from its complex chemistry as well as its ability to influence multiple signaling pathways, including survival pathways such as those regulated by NF-kappaB, Akt, and growth factors; cytoprotective pathways dependent on Nrf2; and metastatic and angiogenic pathways. [19]

Anti-oxidative: In an *in vitro* study the effects of turmeric on fish lipid peroxidation during standard cooking practices and on time-dependent changes in the peroxidation of fish homogenate were evaluated. The results suggest that turmeric may be considered as a safe, cheap and readily usable antioxidant for food preparations. [13]

A recent study revealed that oxidative stimulation of G proteins in human brain membranes by metabolic pro-oxidants, homocysteine and hydrogen peroxide, can be depressed significantly by curcumin. [23] Curcumin was shown to inhibit lipid peroxidation in a rat liver micro some preparation [29, 33] as well as in rat brain homogenates, where curcuminoids actually exhibited more potent antioxidant activity than alpha-tocopherol. [33]

In vivo studies have also demonstrated an inhibitory effect of curcumin on inflammation. For example, curcumin inhibited inflammation induced by carrageenan [30, 37] and acute lung injury induced by cyclophosphamide. [37]

In rats, curcumin had comparable anti-inflammatory activity to phenylbutazone, a commonly used agent, phenylbutazone produced a significant leucopenia and lymphocytopenia and curcumin did not. [38] In an animal study it was found that the curcumin (diferuloyl methane) possesses significant anti-inflammatory activity in acute as well as in chronic models of inflammation and is as potent as phenyl beta zone in the carrageenan edema test. [35]

Curcumin happens to be a potent antioxidant that can neutralize free radicals. Curcumin also boosts the activity of body's own antioxidant enzymes.

In an animal study the rats exhibited increase in antioxidant defense mechanisms in case they were fed curcumin for 7 days before being treated with cyclophosphamide to induce lung injury. [37] Topical application of curcumin markedly inhibited TPA-and arachidonic acid-induced epidermal inflammation (ear edema) in mice [21] Thus, curcumin exhibits substantial antioxidant properties in a wide variety of experimental settings.

A comparison of crude curcuminoid extract and purified curcumin was made to evaluate hepato and immunoprotective effect of *Curcuma longa* (turmeric) in Carbon tetrachloride (CCl₄) induced cellular hepatic damage was evaluated. Treatment with curcuminoid crude extract at two different doses, showed a significant cellular recovery among hepatocytes, which was reflected in a reduction of hepatic enzymes and TBAR values. [2]

Action on articular chondrocytes: It has been concluded in a study that curcumin protects human chondrocytes from catabolic action of interleukin-1 beta (IL-1β) including matrix metalloproteinase (MMP) 3 regulation, inhibition of collagen

type II and down regulation of $\beta 1$ -integrin expression. Curcumin blocks IL-1 β induced proteoglycan degradation, AP1/NF-KB signaling, chondrocyte apoptosis and activation of caspase-3. [16]

B. Clinical studies

Anti-inflammatory activity

Curcumin is the main active ingredient in Zard Chob and it has powerful anti-inflammatory effect, it helps the body fight foreign invaders and also has a role in repairing damage. Curcumin actually targets multiple steps in inflammatory pathway at the molecular level.

Based on early cell culture and animal research clinical trials indicate Curcumin may have potential as a therapeutic agent in disease such as inflammatory bowel disease, pancreatitis, Arthritis, Chronic anterior uveitis. [34]

1. Inflammatory bowel disease (IBD)

Curcumin was given in the following types of IBD.

Ulcerative colitis: In a randomized, double-blind, multicenter trial on 89 patients having quiescent ulcerative colitis, 45 patients were treated with curcumin 1g after breakfast and 1g after the evening meal and sulfasalazine or mesalamine, 44 patients were given placebo and sulfasalazine or melamine for 6 months. The relapse rates were 4.65% in the curcumin-treated group and 20.51% in the placebo group. [17]

Ulcerative proctitis: The patients with ulcerative proctitis were given 550mg of curcumin twice daily for 1 month and then 550mg three times daily for another month. Significant decrease in symptoms as well as in inflammatory indices (ESR and CRP) was observed in all patients with proctitis. [25]

Crohn's disease: In 4 patients with Crohn's disease, curcumin was administered at a dose of 360mg three times a day for 1 month and then 360mg four times a day for another 2 months. There was a mean reduction of 55 points in the Crohn's disease activity index, and reductions in ESR and CRP were observed in these patients. [25]

2. Irritable bowel syndrome (IRBS): A partially blinded, randomized, two-dose, pilot study assessed the effects of turmeric extract on IRBS symptoms in healthy adults. [8]

Turmeric was given to the volunteers in tablet form: 102 patients were given one tablet containing 72 mg of standardized turmeric extract, and 105 patients were given two tablets a day, both for 8 weeks. The prevalence of IRBS was reduced by 53% and 60% in the one-tablet and two-tablet groups, respectively, and was associated with a marked decrease in IRBS symptoms. [8]

3. Bronchial asthma: In an open labeled, randomized, clinical trial, A-Receiving standard therapy for bronchial asthma for 30days (n=30) and test drug group-receiving standard therapy for bronchial asthma + Cap Curcumin 500mg BD daily for 30days (n=30). The results showed that curcumin capsules help in improving the airway obstruction which was evident by significant improvement in the mean FEV1 values. There were no clinically significant adverse events though there was no apparent clinical efficacy. [3]

4. Postoperative inflammation: In patients undergoing surgery, oral use of curcumin reduces post-operative inflammation. After surgery, patients were randomly receive curcumin

(400mg), placebo (250) mg lactose powder), or phenylbutazone (100mg) three times a day for 6 days. Spermatic cord edema, spermatic cord tenderness, operative site pain, and operative site tenderness reflected by intensity score (TIS) were measured. TIS on day 6 decreased by 84.2% in the curcumin group, by 61.8% in placebo group, and by 86% in phenylbutazone group. Although TIS values for the curcumin and phenylbutazone groups were similar on day 6, curcumin proved to be superior by reducing all four measures of inflammation. [31]

5. Arthritis: In a double blind study 18 Patients were randomly assigned to receive either curcumin (1.2g/day) or phenylbutazone (0.3g/day) for 2 weeks. Curcumin was well-tolerated, had no adverse effects, and exerted an anti-rheumatic activity identical to that of phenylbutazone as shown by improvement in joint swelling, morning stiffness, and walking time. [14]

In another recent study, curcumin alone (0.5g) and in combination with diclofenac sodium (0.05g) was found to be safe and effective in 45 patients with rheumatoid arthritis. [10]

Furthermore, the level of CRP was suppressed in these patients after curcumin administration.

In other study on 50 patients with osteoarthritis evaluated the efficacy of Meriva at a dose that corresponded to 200mg of curcumin per day. After 3 months of treatment, the global WOMAC score was decreased by 58%; walking distance was increased from 76 m to 332 m, and CRP levels were significantly decreased. In comparison, only modest improvement in these measurements was observed in the control group. [6]

In other clinical study, the long-term efficacy and safety of Meriva with osteoarthritis was evaluated on 100 patients for a period of 08 months. The patients in test group (50 patients) received 1 g/day of Meriva for 8 months and control group got best available treatment. The WOMAC score was decreased by more than 50%, whereas treadmill walking performance was increased almost threefold compared with the control. Serum inflammatory biomarkers namely IL-1 β , IL-6, soluble CD40 ligand, soluble vascular cell adhesion molecule-1, and ESR were also significantly decreased in the treatment group. [5]

In a randomized, double-blind, placebo controlled, cross-over study in patients with osteoarthritis, the clinical efficacy of a herbomineral formulation containing roots of *Withania somnifera*, the stem of *Boswellia serrata*, rhizomes of *Curcuma longa* and a zinc complex (Articulon-F), was evaluated. After a one-month single blind run-in period, 42 patients with osteoarthritis were randomly allocated to receive either a drug treatment or a matching placebo for a period of three months. After a 15-day wash-out period the patients were transferred to the other treatment for a further period of three months. Treatment with the herbomineral formulation produced a significant drop in severity of pain (P less than 0.001) and disability score (P less than 0.05). Radiological assessment, however, did not show any significant changes in both the groups. [26]

From the above studies it is proved that Zard Chob (*Curcuma longa*) is a potential anti-inflammatory agent especially in Inflammatory Bowel Disease (IBD) and its various types i.e. Crohn's Disease, Ulcerative Proctitis, Ulcerative Colitis, Irritable Bowel Syndrome (IRBS), Bronchial Asthma, Arthritis. These results approve the claims of Unani scholars about the pharmacological effects and therapeutic uses of Zard Chob as mentioned above. Further the escalating dose and long term clinical studies have proven that *Curcuma*

longa in crude form is more efficient clinically than Curcumin-the main ingredient of Zard Chob and it safe to use in human beings. It has been also concluded that Curcuma longa is safe at the maximum dose of 8gm/day for 3 months which is slightly higher than the maximum dose of Zard Chob 07 gm/day prescribed by Unani scholar's centuries ago. There is an urgent need to initiate collaborative studies on the basis of Unani pathological theories of various diseases and take up clinical trials on various formulations described by scholars of Unani medicines in classical literature to find out solution of inflammatory diseases like IBD, IBS, Arthritis, Bronchial Asthma with the proved anti-inflammatory, safe drugs-Zard Chob (*Curcuma longa*).

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