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TURMERIC AND ITS BIOLOGICAL IMPORTANCE: A REVIEW

Ahmed Younis Saieed[1], Rabeea M. Mahmood[2*] and Nadia Abdul –Hadi Abdul –Ameer[3]

[1]General Directorate of Vocational Education, Ministry of Education, Iraq.
[2*]Animal Production Department, Collage of Agriculture, University of Karbala, Iraq.
[3]Animal Production Department, Kufa Technical Institute, AL- Furat AL-Awssat Technical University, Iraq.

Abstract

Humans have evolved with plants side by side over tens of thousands of years and this kingdom rich in its by-products of taste and aromatic odors distinguished by its physiological and biological effects occupies an important area of scientific research. Modern medicine is confronted with an increasing number of diseases resulting from civilized progress, such as circulatory system disorder, infarction, cancer and infectious diseases caused by all types of viruses and high blood sugar level. Medicinal plants and the active substances extracted from them have registered some effects that give hope and are good for treating these diseases. The purpose of the source review is to find out the effects of turmeric herb on blood quality, blood sugar level and body weight, as well as to study histopathological changes.

Key words: Turmeric, civilized progress, Medicinal plants.

Introduction

Since ancient times, plants have played an important role in both food and medicine, even though treatment with medicinal herbs has been absent for a period of time thanks to the chemicals, Today, it is achieving its rightful status after it has proven its ability to relieve pain / recovery for various diseases (Winslow and Kroll, 1998). After the damage caused by these traditional medicines worsened, most plants contain more than one active substance and then have several indications at the same time (Andrew, 1996). All these reasons led scientists to renew research in plant sources to achieve drug safety and obtain the best results (Kamboj, 2000).

Turmeric (*Curcuma longa*)

It is called turmeric and also with Indian colonel, Indian saffron or Turmeric (Ammon *et al*., 1991). It is a medicinal plant and India and its eastern islands are the largest producer in the world and its cultivation is also spread in Southeast Asia, China, North Australia, Western India, South America and some African countries (Muhammad, 1988). Turmeric is widely used in the world as a spice and coloring agent for food (Eignerl and Schulz, 1999). Used as a carminative from the intestine and in the treatment of colic, it is a therapeutic substance for joint sprain and wound tumors (Phan *et al*., 2001).

***Author for correspondence :** E-mail: rabeeaarrubaii@rocketmail.com

Curcumin is responsible for the yellow color of turmeric and the bioactive ingredient (Phan *et al*., 2001). Its activities include: anti-oxidant activity, low-cholesterol in the blood, anti-cancer, diabetes, parasitic repellent and the elimination of some viruses (Guddadarangavvanahally, 2002). It was found that the herb prevents blood clots and relieves stomach pain. In a study in which turmeric was given as capsules to patients with respiratory infection, where signs of choking, coughing and expectoration were improved (Jain *et al*., 1979). Sinha and his group (1974), through the results of a short clinical trial he conducted on 18 arthritis sufferers, found a clear recovery in joint stiffness and swelling after two weeks of treatment with turmeric at a dose of 120 mg / kg body weight given orally.

Plant description and classification

Turmeric (Curcuma longa) is a medicinal plant belonging to the *Zingiberaceae family* and it is a round plant with short stems with large rectangular leaves and rhizome in the form of small yellow-brown tubers near the surface of the earth and is yellow-brown (Ammon *et al*., 1991). Curcumin the substance that gives turmeric its yellow pigment, contains Curcumin -1 94%, Curcumin –ll at 6% and Curcumin –lll by 0.3% (Ruby, 1995). The isolation of curcumin derivatives in 1815 Pelletier and Vogel for the first time included bidemethoxy curcumin

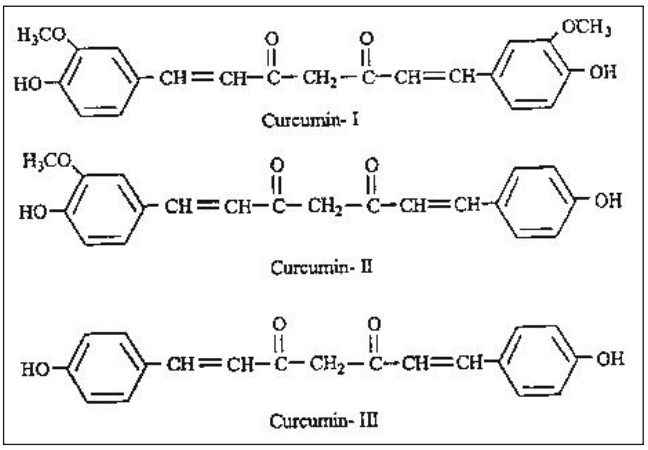

Fig. 1: Shows the chemical composition of curcumin and its derivatives.

and demethoxy curcumin, which accounted for 3-5% of turmeric (Eigner and Scholz, 1999).

His chemical composition was determined by Whiting and Roughly in 1973 (Roughley *et al*., 1973) (Fig. 1). Curcumin is soluble in ethanol, ketone, chloroform, acetic acid and insoluble in water (Aggarwal *et al*., 2003).

The effectiveness of turmeric

1. Anti-cancer effectiveness:

Studies in which herbs and their extracts have been used in the treatment of cancer and the study of their active compounds and the role of each in the treatment of cancerous tumors, Turmeric has anti-cancer properties and protects the body from malignant tumors (Villasenor, 2002 and Hui-nazhang *et al*., 2007).

Aggarwal *et al*., (2003) studied its effect on various cancerous lines and demonstrated its inhibitory effect on the growth of these cells. Turmeric gave encouraging results compared to chemotherapy after using it for 4 months at a dose of 138 mg per day by people with colon cancer (Ricky *et al*., 2001). When giving a curcumin at a dose of 136-180 mg per day to 15 patients with colorectal cancer, it limited the progression of the disease (Sharma *et al*., 2001). In another study of patients with colon cancer, one or two doses of curcumin were administered orally daily for 30 days, which limited the progression of the disease (Ishita *et al*., 2004). The results of an experiment in mice with cancer injected with curcumin 10 mg / kg of body weight into chelation showed the effect of curcumin in preventing tumor development in the intestinal canal (Perkins *et al*., 2002).

Turmeric has the ability to prevent the spread of breast cancer and this result was noticed through a study conducted on mice injected with breast cancer cells in humans, Then it was divided into four groups under different treatments, either leaving it untreated or treated with turmeric or using cancer drug or a mixture of turmeric with cancer drug, After 5 weeks, it was found that cancer had spread to all four groups of animals, but it was less common among the two groups treated with turmeric than the other two groups. For turmeric treatment only, it was less effective in preventing the spread of cancer than the group treated with the drug mixture with turmeric (Shisher *et al*., 2005). Turmeric has the potential to induce programmed death of cancer cells (Aggarwal *et al*., 2003). In a study conducted to examine the chemical protective role of curcumin in gastro-intestinal carcinoma (Gastrointestinal cancer), it was observed that curcumin acts as a catalyst for the programmed death process in cancer cells (Moragoda *et al*., 2001). Moreover, turmeric inhibits the adhesion process of molecules that play an important role in metastasis (Aggarwal *et al*., 2003). Curcumin has been shown to be effective in inhibiting metastasis for melanoma cells (Menon *et al*., 1999).

Turmeric susceptibility to interference with genes related to cancer was observed in a study using curcumin inhibited the activity of the component gene for oral squamous epithelial carcinoma (Rinaldi *et al*., 2002). This further enhanced the programmed death of cancer cells and the same result appeared for a study of human breast cancer cell lines (Mehta *et al*., 1997). Moreover, turmeric has an inhibitory effect on various inflammatory cytokines (Jaqetia and Aggarwal, 2007) which are immune cell secretions and are lipoprotein and are an understanding method between immune cells to coordinate their effectiveness as they work together as an interconnected network according to a system This is fully proven by a study conducted on prostate cancer cell lines (Mukhopadhyay, 2001). Among the results of several studies conducted in the laboratory (*In-vitro*) show the ability of turmeric to inhibit cancer cells and in the different stages of cancer growth, it protects against the occurrence of cancer and has the ability to limit its development (Rajesh *et al*., 2006). In a study by Polasa, (1992) he found that when he consumed 1.5 g of turmeric daily and for a month by 16 smokers, he helped reduce the number of mutagens, While Imaida, (2001) did not notice any significant therapeutic effect of turmeric against prostate cancer.

2. The effect of turmeric on blood sugar level:

He studied the effect of turmeric on blood sugar level, where 300 mg / kg of body weight was dosed from curcumin for rats with diabetes for a period of 8 weeks and a significant decrease in blood sugar level was observed (Halim *et al*., 2002). Arun and Nalini, (2002) had the same result when they curved curcumin for rats

that introduced diabetes. While the blood sugar level was not affected in diabetic rats, they were fed 0.5% of curcumin from their daily food intake for 8 weeks and a clear improvement in body weights was not observed, but it showed a significant decrease in the levels of albumin, urea, creatinine and phosphorous in the blood serum, as well as a decrease. The level of electrolyte in diuresis like sodium and potassium, At the end of the trial period, a decrease in plasma oxidation was observed (Babu and Srinivasion, 1995). Hana *et al*., (2006) did not notice a change in the blood sugar level in diabetic rats who injected 150 mg / kg of body weight curcumin into the chelate for a period of four weeks. Matalik *et al*., (2005) experimented with a herbal product called Dianex that contains water extracts for a group of plants including turmeric on a group of mice with different levels of doses were between 100-500 mg / kg of body weight per day and by mouth for a period of 6 For weeks, the compound was given low blood glucose activity in doses that were between 250-500 mg / kg of body weight, as well as its reduced cholesterol, urea, creatinine and triglyceride levels.

3. The effect of turmeric on the body's immunity:

Several studies were conducted to find out the effect of turmeric on the immunity of the body. In a study conducted in humans, 1 g of turmeric was taken three times a day for a month and it was found that it helps in increasing the numbers of immune cells (Copeland *et al*., 1994). A significant increase in the number of Cluster of differentiation (CD8 and CD4) lymphocytes was observed in people with AIDS after being given a curcumin dose of 2 g per day for a period of 127 days (Mills and Bone, 2000). The result was similar in patients with immunodeficiency after dose 2g per day of curcumin for 20 weeks (Mazumdar *et al*., 1995). Also, a significant increase in the number of T-helper lymphocytes was observed for patients who took the curcumin at a rate of 2.5g per day orally for 20 weeks (John, 1994) on the other hand. No effect was achieved on the numbers of immune cells when using different doses of curcumin 2.7 and 4.8 g orally (Hellinger *et al*., 1996).

4. The anti-inflammatory effect of turmeric:

Chandra and Gupta, (1972) note that turmeric volatile oils have an anti- inflammatory effect and oil, alcohol and aqueous ether extracts, (Yagnanarayan *et al*., 1976) and that the anti-inflammatory curcumin activity may be due to its inhibitory effect of white cell accumulation in inflammatory sites (Kumar *et al*., 2002) and turmeric has been used as a treatment for rheumatism (Andrew, 1996).

Where turmeric was administered by people with the disease at a dose of 400 mg three times daily (Kulkarni, 1991). Curcumin was used by those with a dose of 1.2 g per day, which reduced inflammation and associated clinical signs such as pain and stiffness of the joints (Pubre *et al*., 1970). It is believed that the reduced inflammatory effect of turmeric may be through a decrease in the level of histamine and an increase in the production of natural cortisone by the adrenergic gland (Arora, 1974).

5. The effect of turmeric on liver function:

Turmeric is a popular treatment for jaundice in both Ayurvedic and Chinese herbal medicine (Andrew, 1996). Because it has a high effectiveness in protecting the liver from the effects of pollutants and improving its performance (Shukla and Arora, 2003). It protects the liver from a number of toxic components (Kiso *et al*., 1983), where it has been observed to protect the liver from the effects of carbon tetrachloride Carbon tetrachloride which destroys liver cells that is formed as a result of harmful physiological processes (Hakino, 1985). In a study of rats, curcumin was given 30 mg / kg of body weight by mouth and for 10 working days to protect the liver from the harmful effect of Iron through reduced oxidation of fat (Pulla *et al*., 1994). On the other hand, human studies have been conducted where turmeric has taken a dose of 750 mg twice daily for 30 days and there has been no significant change in liver function tests and the result was similar when used for a dose of 20 mg a day for 60 days (Thamlikitkul, 1989).

6. Other biological effects:

Turmeric is an ancient herb for treating digestive problems such as gastritis and acidity as it helps increase mucus production (Andrew, 1996). In addition, it increases the production and flow of bile (Ozaki and Liang, 1988). Several studies have shown that turmeric acts as a digestive catalyst and helps to secrete digestive enzymes that break down carbohydrates and fats. In a study conducted on rats prepared with food containing 0.5% curcumin, it was found that it speeds up the activities of trypsin, chymotrypsin and lipase in the pancreas (Platel and Srinivasan, 2000). Rasyid and Lelo, (1999) studied its astringent effect when taken at a dose of 20 mg. Research has shown that turmeric has an anticoagulant effect, in which the blood remains soft by inhibiting the action of enzymes causing platelet aggregation (Kosuge *et al*., 1985; Srivastava *et al*., 1985). Kumar, (2001) showed that turmeric aqueous extract has an anti-bacterial effect as curcumin has shown an effect in reducing the growth of some bacteria such as *Lactobacillus*, *Staphylococcus* and *Streptococcus* in the laboratory, as well as its anti-fungal and antiviral effect (Mazumdar *et al*., 1995) and gave the ethanol extract of turmeric *In*

vitro activity of *L.amazonesis* and *Entameoba histolytica* parasites (Koide *et al*., 2002). Curcumin has an anti-parasitic effect, *Plasmodiu falciparrum* (Reddy *et al*., 2005). On the other hand, the effect of aqueous turmeric extracts on fertility has been tested, giving a 100% antifertility effect in rats administered orally (Garg, 1974).

7. The role of turmeric in treating some diseases:

Due to its anti-inflammatory, blood-thinning and reduced anti-inflammatory properties for cholesterol, it is used today to reduce the risk of strokes and heart attacks (Andrew, 1996; Srivastava *et al*., 1985). In an experiment conducted on rabbits, I experimentally developed arteriosclerosis Atherosclerosis and doses different levels of turmeric orally 3.2 and 1.66 g / kg body weight. It was observed that the level of cholesterol in the blood plasma decreased compared to the control group, as well as the low level of phospholipids and triacersides (Ramirez-Tortosa, 1999). The same result was obtained through a study conducted on rats using atherosclerosis, which was also dosed with different levels of turmeric 0.2g and 1.0g per 100g of food ingredients (Asai and Miyazawa, 2001). Moreover, curcumin gave resistance to opacification in rats (Awasthi *et al*., 1996). And that it was effective in healing the case of iritis when consumed by people with a dose of 375 mg orally at an average of three times daily for 12 weeks (Lal *et al*., 1999). urmeric has been shown to be in other conditions such as Glaucoma Ocular inflammation (Padmini Srinivasan *et al*., 2004) and it has shown its efficacy in treating Alzheimer's disease when used in various doses PPm 500 and 160 by its effect in inhibiting the number of brain platelets that are believed to in turn develop Alzheimer's disease And the resulting amnesia (Lim *et al*., 2001). Turmeric may reduce the occurrence of Ulcers caused by certain medications such as Indomethacin and NSAIDS by increasing the intestinal mucosa (Unnikrishnan and Rao, 1995).

Plant toxicity

It was clear from the results of animal and human experiments that turmeric has a wide range of security when consumed, so no signs of poisoning have been shown to humans when used daily and with low doses or with high concentrations, for example when giving turmeric in low concentrations 0.5, 1.5 and 2.2 g / day (Sharma *et al*., 2001) and 1-8 g / day (Chainani, 2003) up to a dose of 10 g per day (Aggarwal *et al*., 2003) or when taking curcumin in doses of 500, 1000, 2000, 4000, 8000 mg / day by mouth ritual for a period of 3 months (Cheng, 2001) where no toxic signs were seen on people treated with it. In animals where rats, guinea pigs and monkeys for both sexes were dosed High in turmeric up to 2.5 g / kg body weight, no visible changes or effects in the weight of the kidneys, liver and heart were observed and no behavioral or pathological abnormality or death rate was reported on it (Holder *et al*., 1978). When using a dose of 3 g / kg body weight of curcumin for experimental animals, no behavioral or pathological abnormality was shown on it and no mortality was recorded (Bhavani Shankar *et al*., 1980).

The adverse effects of turmeric

Despite the wide range of security when using turmeric with high doses, it is necessary to take into account that the use in large quantities and for long periods has some negative effects. In a study conducted on patients with duodenal ulcers the cause of turmeric when consumed at a dose of 6 g / day Stomach heartburn for a number of these patients (Van Dau, 1998). On the other hand, it is recommended not to take high doses of turmeric during pregnancy because it may cause contractions in the uterus and it should be taken with caution by people with gallstones or obstruction in the duct of the gallbladder because of its astringent effect on the gallbladder (McGuffin *et al*., 1997; Blumenthal *et al*., 1998). The usual dose of turmeric at 250-500 mg three times a day in humans is recommended for treatment (Foster, 1998).

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