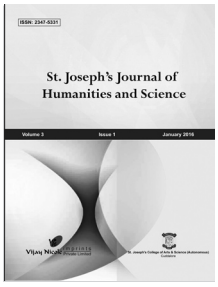
St. Joseph's Journal of Humanities and Science
ISSN: 2347 - 5331
http://sjctnc.edu.in/6107-2/



Turmeric and Curcumin: From Home to Hospital

A. Lawrance[a]*
P. Marie Arockianathan[a]
G. Meera[a]

ABSTRACT

Curcumin, an active part of turmeric (Curcuma Longa linn) has been described as a traditional medicine, as a treatment for many diseases and is referred by totally different names in numerous countries, The active principle is known as curcumin (or) diferuloylmethane, a yellow pigment in turmeric (curry powder) has been shown to exhibit various activities. It has been utilized (or) in ancient days as a house remedy for various diseases as eating disorder, caugh, hepatic disorder, diabetic wounds, rheumatism and inflammation. The foremost necessary features of curcumin is that it has no side effects despite being a therapeutic agent with many useful functions. Some clinical trials suggest a possible therapeutic role for curcumin in diseases like familial adenomatous polyposis, inflammatory bowel diseases, ulcerative colitis, colon cancer, carcinoma, hypercholesterolemia, coronary-artery disease, inflammation, psoriasis, chronic anterior uvetis and arthritis. Thus, curcumin a spice once releted to the house, and also been used in hospitals to prove it is "Curecumin".

Keywords: Curcumin, natural products, apoptosis, anticancer and wound healing.

1. INTRODUCTION

Natural secondary plant products are used throughout human life for many functions. Medicines derived from plants have placed a crucial role within the health care of the many cultures, each ancient and modern [1]. Turmeric [Curcuma longa L] could be a healthful plant extensively employed in Ayurveda, Unani and Siddha medication as home remedy for a various diseases [2]. C.longa.L, botanically associated with ginger [Zingiberaceae family] could be a perennial plant having a tubular stem with massive rectangular leaves and bears ovate and rectangular rhizomes.

The Rhizomes of turmeric plays a crucial role as a colouring agent in foods, cosmetics and textiles [3]. Composition of Turmeric the most yellow bioactive pigments within the rhizomes act as a result of curcumin and was isolated in 1815, obtained in crystalline form in 1870, and ultimately known as 1,6 – heptodiene-3,5-dione-1,7-bis (4-hydroxy-3-methoxy phenyl) – (1E,6E) (or) diferuloylmethane [4].

Curcumin could be a yellow-orange powder that's insoluble in water and either however soluble in solvent. Curcumin melts in 183^{0}C, a chemical formula of $C_{21}H_{20}O_6$, and a mass of 368.37g/mol spectrophotometrically, the most absorption of curcumin in methonal occurs at 430 nm and in acetone at 415-420 nm [5].

Curcumin exists in enolic and ß-diketonic forms. the very fact is that the curcumin in solution exists primarily in its organic compound forms [6], Which has

[a]St. Joseph's College of Arts & Science (Autonomous), Cuddalore-607001, Tamilnadu, India.
*E-mail: lawrancea6@gmail.com, Mobile: + 91 9486594309.

a crucial bearing on the antioxidant ability of curcumin. Metabolism of Turmeric, the absorbed curcumin in human and animal is very rapidly metabolized to glucuronide and sulfate conjugates and excreted primarily in digestive fluid and to a lesser extent in urine. Unchanged curcumin is additionally very low concentration in blood [7].

Table-1 Chemical composition of turmeric (Modified)

Compositions	Percentage
Protein	6.3%
Fat	5.1%
Minerals	3.5%
Carbohydrates	64.4%
Moisture	13.1%
Essential oil	5.8%
A-phellandrane	1%
Sabinene	0.6%
Cineol	1%
Borneol	0.5%
Zingiberene	25%
Sesquiterpines	53%

Modified[8]

2. TRADITIONAL USES OF CURCUMIN AND TURMERIC

Turmeric powder, curcumin and its derivatives and many other extracts from the rhizomes were found to be bioactive. The structure and some of these compounds are presented in figure [1-3].

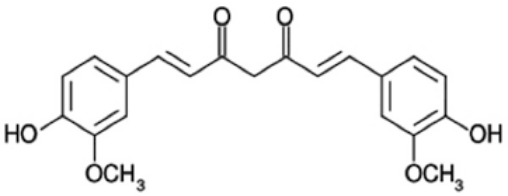


Fig.1 Chemical Structure of Curcumin

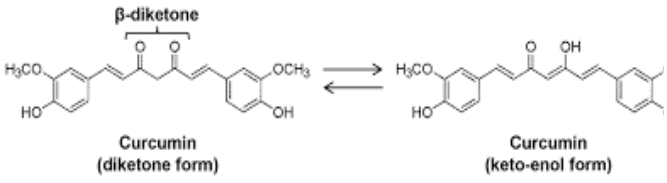


Fig.2 Curcumin Diketone form to Keto-enol Form

Fig.3 Curcumin & Turmeric

3. DIFFERENT SPECIES OF TURMERIC PLANT AND THEIR BOTANICAL CLASSIFICATION

Botanical Classification of Curcuma Longa:

Family : Zingiberaceae (Ginger Family)

Genus : Curcuma

Species : Longa

Scientific Name : Curcuma Longa

Botanical Classification of Curcuma Amada:

Family : Zingiberaceae (Ginger Family)

Genus : Curcuma

Species : Amada

Scientific Name : Curcuma Amada

Common Name : Mango Ginger

Part used : Rhizomes

Botanical Classification of Curcuma Aromatica:

Family : Zingiberaceae (Ginger Family)

Genus : Curcuma

Species : Aromatica

Scientific Name : Curcuma Aromatica

Botanical Classification of Curcuma Zedoaria:

Family : Zingiberaceae (Ginger Family)

Genus : Curcuma

Species : Zedoaria

Scientific Name : Curcuma Zedoaria

Common Name : Zedoary Root, White Turmeric

Part Used : Rhizomes

It is used as a coloring agent in cheese, butter and different food items [9]. In people drugs, turmeric and natural curcuminoids are applied as therapeutic preparation over the centuries in numerous elements of the globe. In Ayurvedic drugs curcumin could be a well documented treatment for various respiratory problems (Eg: asthma, allergic reaction and bronchial hyperactivity).

Turmeric powder is employed to treat wounds, bruises, inflamed joints and sprains in the Kingdom of Nepal. In current ancient Indian drugs, it is used for the treatment of liver disorder, anorexia, rheumatism, running nose, diabetic wounds, caugh and sinusitis. It has been used therapeutic result significantly as an anti-inflammatory drug.

Beneficial Effects of Turmeric and Curcumin has shown to possess antitumor effects by blocking transformation, tumour initiation, tumour promotion, invasion, ontogenesis and metastasis. Additionally its antitumor effects it has been effective against a range of conditions in vitro and in vivo presymptomatic studies [11]. Curcumin has shown to be effective against coronary artery disease and myocardial infarct.

The administration of curcumin reduced blood glucose and glycosylated haemoprotein levels in rat model of type-2 polygenic disorder. Curcumin seems to suppress oxidative damage, inflammation, psychological feature defiuts and amyloid accumulation in Alzheimer's illness. It seems to indicate protecting effects in cystic fibrosis, human immunodefeciency virus and experimental alcoholic liver disease [12].

Anticancer and Wound Healing Properties of Curcumin Treatment with curcumin in wound tissue resulted in increased expression of fibrenectin and scleroprotein by fibroblasts and exaggerated the speed of formulation of granulation. A uncontrolled ontogenesis has been related to pathological conditions like tumour growth and metastasis, rheumatism, diabetic retinopathy and hemangiomas. Curcumin treatment leads to inhibition of angiogenic differentiation of human venae umbilicalis epithelium cell (HUVEL) and inhibits basic fibroblast growth factor. Curcumin is additionally a powerful inhibitor compound to ascorbic acid and E [13-15]. Curcumin in cell death [Programmed Cell Death] Bax and bcl-2 biomolecule plays a role within the inhibition of cell death. The bax associated with bcl-2 determines survuival on death an cell death stimulus. Bax promotes the cell death as up- regulated genes, whereas bcl-2 inhibits cell death as down-regulated genes [16]. Treatment with curcumin the bax biomolecule expression and bax/bcl-2 ratio clearly diminished, bcl-2 protein molecule expression clearly increased.

This shows that curcumin induce cell death pathway in human beings [17]. Curcumin prevent gall stone formation. Curcumin have ability to induce bladder remotion and therefore reduce gallstone formation, a possible risk issue for gall bladder cancer.

Some compounds that may induce the gall bladder to contract and empty itself (fatty meals, aminoacids and a few drugs) are shown to reduce gallstone formation. In human 20mg curcumin 29% contraction of the gall bladder. 40mg and 80mg curcumin made 50% and 72 % contraction of the gall bladder volume respectively [18]. These results shown that curcumin will effectively induce the gall bladder to empty and thereby low risk of gallstone formation and ultimately gall bladder cancer [19].

Anticoagulant Activity of Curcumin shows anticoagulant activity by inhibiting albuminoid and Adrenalin iatrogenic thrombocyte aggregation in vitro furthermore as in vivo in rat thorasic aroto [20]. Curcumin Lowers liquid body substance, cholesterin and reduces low density lipoprotein (LDL) and high density compound protein (VHDL) considerably in plasma and total cholesterin level in liver in conjunction with a rise of a-tocopherol levels in healthy volunteers.

Daily administration of curcumin (500mg) for 7 days led to a major results decrease in liquid substance lipoid peroxides, a 29 percentage increase in serum liquid body substance cholesterin and an almost 12 percentage decrease to total serum cholesterol [21-23]. The inhibitor activity of curcumin was documented as early as 1975. It acts as a scavenger of o_2 free radicals and hydroxyl group free radicals. It will protect haemoprotein from oxidation [24].

Curcumin inhibits lipoid peroxidation by scavenging free radicals and therefore blocking the lipoid chain reaction, the same as a-tocopherol. The repressing action on lipoid peroxidation was reflected within the decrease in levels of free radicals (such as OH•, O•2-) and increase in cardial glutathione content25. These naturally occuring sulfhydryl teams to keep up membrane integrity and facilitate to push the non-enzymatic detoxification of hydroxyl group radicals and lipoid peroxides [26].

Safety analysis with Turmeric and Curcumin: The common intake of turmeric by Asians varies from 0.5 to 1.5g/day/person, which produces no harmful symptoms. In animals (wistar rats, guinea pigs and monkeys) were feed with turmeric much higher (2.5g/kg body wt) than ordinarily consumed by humans [27]. Curcumin In human, curcumin has no toxicity once administrated at doses of 1-8g/day and 10g/day [28].

5. CONCLUSIONS

Turmeric has been utilized in Ayurvedic medication since history with biological applications. Intensive analysis over the second half century has been created clearly that almost all chronic ill health will solely be cured by natural merchandise. Curcumin & turmeric as a foodstuff, non toxic, extremely promising natural inhibitor compound, it low value, its tried chemopreventive and therapeutic potential and its medicine is safety from the house to the hospital.

REFERENCES

[1]. Khurana. A. Journal of Liquid Chromatography, 11 (1988) 2295–2304.

[2]. Dhillon. N. Clinical Cancer Research. 14 (2008) 4491–4499.

[3]. Esatbeyoglu. T, Huebbe. P, Insa. M. A, Dawn Chin. E, Wagner. A. E and Rimbach. G. Angewandte Chemie International Edition. 51 (2012) 5308–5332.

[4]. R. Motterlini, R. Foresti, R. Bassi and C. J. Green. Free Radical Biology and Medicine, 28; (2000) 1303–1312.

[5]. A. Zanotto-Filho, K. Coradini and E. Braganhol. European Journal of Pharmaceutics and Biopharmaceutics, 83 (2013) 156–167.

[6]. G. Leonarduzzi, B. Sottero, and G. Poli. Pharmacology and Therapeutics, 128 (2010) 336–374.

[7]. C. Syng-Ai, A. L. Kumari, and A. Khar. Molecular Cancer Therapeutics, 3 (2000) 1101–1108.

[8]. Firn. R. Nature chemicals, 3 (2010) 74-75.

[9]. M. Yoshino, M. Haneda and M. Naruse. Toxicology *in Vitro*, 18 (2004) 783–789.

[10]. H. Sasaki, Y. Sunagawa and K. Takahashi. Biological and Pharmaceutical Bulletin, 34 (2011) 660–665.

[11]. P. Anand, A. B. Kunnumakkara, R. A. Newman and B. B. Aggarwal. Molecular Pharmaceutics, 4 (2007) 807–818.

[12]. N. Zhoua, X. Zanb, Z. Wang and Z. D. Carbohydrate Polymers, 94 (2013) 420–429.

[13]. Darvesh. A. S. Expert Opin.Investig. Drugs, 21 (2012) 1123–1140.

[14]. Aggarwal. B. B, Kumar. A and Bharti. A. C. Anticancer Research. 23 (2003) 363–398.

[15]. T. Atsumi, S. Fujisawa, and K. Tonosaki. Oral Diseases, 11 (2005) 236–242.

[16]. M. M. Yallapu, M. Jaggi, and S. C. Chauhan. Current Pharmaceutical Design, 19 (2013) 1994–2010.

[17]. Gupta. S, Prasad. S, Ji. H. K, Patchva. S, Webb. L. J, Priyadarsini. K. I and Aggarwal. B. B. Natural Product Reports. 28 (2011) 1937–1955.

[18]. G. Viswanath, A. Jithan, and V. M. Reddy. International Journal of Pharmaceutical Sciences and Nanotechnology, 1 (2009) 335–340.

[19]. Tonnesen. H. H. & Karlsen. J. Z. Lebensm. Unters.Forsch. 180 (1985) 402–404.

[20]. M. H. Leung, T. Harada and T. W. Kee. Current Pharmaceutical Design, 19 (2013) 2070–2083.

[21]. Wilken. R, Veena. S. M, Wang. M. B and Srivatsan. E. S. Molecular Cancer,10 (2011) 1–19.

[22]. F. Zhang, N. K. Altorki, J. R. Mestre, K. Subbaramaiah and A. J. Dannenberg. Carcinogenesis. 20 (1999) 445–451.

[23]. Carroll. R. E. Cancer Prevention and research, 4 (2011) 354–364.

[24]. S. Aggarwal, H. Ichikawa, Y. Takada, S. K. Sandur, S. Shishodia and B. B. Aggarwal. Molecular Pharmacology, 69 (2006) 195–206.

[25]. S. V. Jovanovic, S. Steenken, C. W. Boone and M. G. Simic. Journal of the American Chemical Society, 121 (1999) 9677–9681.

[26]. A. P. Ranjan, A. Mukerjee, L. Helson, and J. K. Vishwanatha. Journal of Nanobiotechnology, 10 (2012) 38.

[27]. S. Mishra, N. Kapoor and A. M. Ali. Free Radical Biology and Medicine, 38 (2005) 1353–1360.

[28]. Grykiewicz. G and Silfirski. P. Acta Biochimica Polonica, 59 (2012) 201–212.