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HARIDRA-CURCUMIN THE ACTIVE PRINCIPLE

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ABSTRACT

Haridra (*Curcuma longa* Linn., Zingiberaceae) which has been described in various ancient Ayurvedic text books i.e in Samhita, Chiktisagrantha, Nighantus Rasagrantha has various properties like Anti-Microbial Activity, Anti-Inflammatory, Anti-viral Properties etc. It is a perennial herb, having aromatic, deep orange yellow colour rhizome. Leaves are elliptic – oblong, caudate –acuminate. Inflorescence is central to the leaf tuft and appearing with the leaves. It is used in many forms and through many routes of administration, such as – Nasal, Oral, Application on the skin etc. Curcumin, the principal curcuminiods found in turmeric, is generally considered its active constituent.

KEYWORDS:- Haridra, Curumin, anti-microbial, anti-viral, anti-inflammatory.

INTRODUCTION

Haridra botanically known as *Curcuma longa* Linn. of the Zingiberaceae family, is a perennial herb. It is cultivated all over the Asian countries.[1] Major active ingredients of turmeric include three curcuminoids, curcumin (diferuloylmethane, the primary constituent responsible for yellow color of turmeric), demethoxycurcumin and bisdemethoxycurcumin.[2] *Curcuma longa* include turmerin (a water-soluble pep-tide) as well as essential oils (such as turmerones, atlantones and zingiberene) and curcuminoids including curcumin [1,7-bis-(4-hydroxy-3-methoxyphenyl)-1,6-heptadiene-3,5-dione]. Curcuminoids can be define as phenolic compounds derived from the roots of *Curcuma longa* (Zingiberaceae).[3] Curcumin

was first isolated in 1815, obtained in crystalline form in 1870[4] and ultimately identified as 1,6-heptadiene-3,5-dione-1,7-bis(4-hydroxy-3-methoxyphenyl)-(1E,6E) or diferuloylmethane. In 1910, the feruloylmethane skeleton of curcumin was confirmed and synthesized by Lampe.[5] Curcumin (diferuloylmethane), a polyphenol, is an active principle of the perennial herb Curcuma longa (commonly known as turmeric). The yellow-pigmented fraction of turmeric contains curcuminoids, which are chemically related to its principal ingredient, curcumin. The major curcuminoids present in turmeric are demethoxycurcumin (curcumin II), bisdemethoxycurcumin (curcumin III), and the recently identified cyclocurcumin.[6] Curcumin is a yellow-orange powder that is insoluble in water and ether but soluble in ethanol, dimethylsulfoxide, and acetone. Curcumin has a melting point of 183.8ºC, a molecular formula of C21H20O6, and a molecular weight of 368.37 g/mol. Spectrophotometrically, the maximum absorption (lmax) of curcumin in methanol occurs at 430 nm and in acetone at 415–420 nm.[7]

Pharmacology actions/ Biological activities

1. Anti-viral property[8]

Curcumin inhibit activity of inosine-mono phosphate dehydrogenase (IMPDH) enzyme in either noncompetitive or competitive manner. By inhibition of IMPDH this led to reduce the level of intracellular guanine nucleotides which required for adequate RNA and DNA synthesis. Curcumin mechanism involve in viral entry or other life cycle stages rather than the replication of viral RNA. Therefore, by inhibition of IMPDH Curcumin have potential anti-proliferative, antiviral and anti-parasitic effects.[8] Developing a β-cyclodextrin (CD) functionalized graphene oxide (GO) composite, which displayed excellent antiviral activity and curcumin loading efficiently, showed that the composite could prevent RSV from infecting the host cells by directly inactivating virus and inhibiting the viral attachment, which possessed the prophylactic and therapeutic effects towards virus. The antiviral effect of curcumin was a dose-dependent manner.[9] It has been demonstrated that curcumin as a plant derivative has a wide range of antiviral activity against different viruses: papillomavirus virus (HPV), influenza virus, Hepatitis B virus (HBV), Hepatitis C virus (HCV), adenovirus, coxsackie virus, Human norovirus (HuNoV), Respiratory syncytial virus (RSV) and Herpes simplex 1 (HSV-1)[11,12,13,14]

2. Anti-inflammatory property[15]

Curcumin has been demonstrated to be safe in six human trials and has demonstrated anti-inflammatory activity. It may exert its anti-inflammatory activity by inhibition of a number of different molecules that play a role in inflammation.[15] A number of teams have studied the effect of oral curcumin on inflammatory diseases in humans[16] patients. In a double-blind study, Deodhar and colleagues[16] administered 1200 mg curcumin four times daily to 18 patients with rheumatoid arthritis for 2 weeks; they reported a significant improvement in the patients inflammatory symptomology without apparent toxicity.[17]

3. Anti- bacterial property[18]

In a study, investigation of 3 new compounds of curcumin , namely, indiumcurcumin, indium diacetyl curcumin, and diacetyl curcumin, against Staph. aureus, S.epidermis, E.coli, and P.aeruginosa revealed that Indium curcumin had a better antibacterial effect compared to curcumin itself and it may be a good compound for further studies.[18] Turmeric oil, found to be effective against B. subtilis, B. coagulans, B. cereus, Staph. aureus, E. coli, and P. aeruginosa.[19] Among various studies, an antibacterial study on aqueous extract of C. longa rhizome prove its properties as the MIC (minimum inhibitory concentration) value of 4 to 16g/L and MBC (minimum bactericidal concentration) value of 16 to 32g/L against S. epidermis ATCC 12228, Staph. aureus ATCC 25923, Klebsiella pneumoniae ATCC 10031, and E. coli ATCC 25922.[20] Curcumin also hold inhibitory activity on methicillin-resistant Staph. aureus strains (MRSA) with MICvalueof125–250μg/Ml[21] The methanolic extract of turmeric shows MIC values of 16μg/mL and 128μg/mL against Bacillus subtilis and Staph. aureus, respectively.[22]

4. Anti-diabetic property[23]

Curcumin has been shown to possess potent glucose-lowering effect[23,24] and this is thought to be due to the antioxidant and anti-inflammatory activities of curcumin.[24] Oxidative stress is a known mediator in the pathogenesis of diabetes, resulting in islet destruction and hyperglycemia.[25] Onset of diabetes is associated with enhanced free radical generation and loss of endogenous antioxidants in pancreas.[25]

DISCUSSION

There have been many studies done on curcumin many studies show the different results of curcumin. A difference in curcumin metabolism between humans and rats, a species susceptible to hepatotoxicity with high doses, was demonstrated in a study by Ireson et al.

(2002).[26] Humans appear to be able to tolerate high doses of curcumin without significant side-effects. A phase 1 study by Cheng et al. (2001), found no adverse effects of curcumin ingestion for 3 months of doses upto 8000 mg/d.[27] Other human studies of curcumin include the following: a double-blinded, crossover trial in 18 patients with rheumatoid arthritis (Deodhar et al., 1980).[28]

CONCLUSION

Many medicinal properties have been attributed to *Curcuma longa Linn.* Haridra; as an anti – inflammatory, anti- diabetic .anti- diarroheal, hypo-lipdimic, hepato-protective anti – cancerous etc. Curcumin, a active principle in *Curcuma longa* helps to reduce inflammation as of its anti-inflammatory properties. Based on the studies curucmin also helps in viral infections as of its anti-viral property. Curcumin has been shown to improve systemic markers of oxidative process. Researches suggests that curcumin can help in the management of many conditions such as in the management of metabolic syndrome, arthritis, anxiety oxidative and inflammatory conditions.

REFERENCES

1. https://en.m.wikipedia.org
2. Curcumin: The story so far R.A. Sharma *, A.J. Gescher, W.P. StewardCancer Biomarkers and Prevention Group, Department of Cancer Studies and Molecular Medicine, University of Leicester, Leicester Royal Infirmary, Leicester LE2 7LX, UK
3. Milobedzka J, Kostanecki V, Lampe V. Structure. Chem Ber, 1910; 43: 2163.
4. Heath DD, Khwaja F, Rock CL. Curcumin content of turmeric and curry powders. FASEB J, 2004; 18: A125.
5. Lampe V. Milobedzka. J Ver Dtsch Chem Ges, 1913; 46: 2235.
6. Kiuchi F, Goto Y, Sugimoto N, Akao N, Kondo K, Tsuda Y. Nematocidal activity of turmeric: synergistic action of curcuminoids. Chem Pharm Bull (Tokyo), 1993; 41: 1640–3.
7. Aggarwal BB, Kumar A, Bharti AC. Anticancer potential of curcumin: preclinical and clinical studies. Anticancer Research, 2003; 23: 363–98.
8. Siegel R, Ma J, Zou Z and Jemal A. Cancer statistics. A Cancer Journal For Clinicians, 2014; 64(1): 929.

9. Zhang Q, Li D, Liu Y, Wang H,et al. Potential anticancer activity of curcumin analogs containing sulfone on human cancer cells. Archives of Biological Sciences, 2016; 68(1): 125-133.
10. Gupta AP, Khan S, Manzoor MM, Yadav AK, Sharma G, Anand R and Gupta S: Anticancer curcumin: Natural analogues and structure-activity relationship. In Studies in Natural Products Chemistry, Elsevier, 2017; 54: 355-401.
11. Dulbecco P and Savarino V: Therapeutic potential of curcumin in digestive diseases. World Journal of Gastroenterology, 2013; 19(48): 9256.
12. Maheshwari RK, Singh AK, Gaddipati J and Srimal RC: Multiple biological activities of curcumin: a short review. Life Sciences, 2006; 78(18): 2081-2087.
13. Koohpar ZK, Entezari M, Movafagh A and Hashemi M. Anticancer activity of Curcumin on human breast adenocarcinoma: role of Mcl-1 gene. Iranian Journal of Cancer Prevention, 2015; 8(3): 2231.
14. SayerA. Yeast Is A Cause of Cancer And Turmeric Can Kill Both. Research Confirms. Research, 2015; 4(2): 339.
15. Safety and Anti-Inflammatory Activity of Curcumin:A Component of Tumeric (*Curcuma longa)*NITA CHAINANI-WU, D.M.D., M.P.H., M.S.
16. Satoskar RR, Shah SJ, Shenoy SG. Evaluation of anti-inflammatory property of curcumin (diferuloyl methane) in patients with post-operative inflammation. Int J Clin Pharmacol TherToxicol, 1986; 24: 651–654.
17. Tonnesen HH, Karlsen J, van Henegouwen GB. Studies on curcumin and curcuminoids: VIII – photochemical stability of curcumin. Z Lebensm Unters Forsch, 1986; 183: 116–122.
18. S. Tajbakhsh, K. Mohammadi, I. Deilami et al., "Antibacterial activity of indium curcumin and indium diacetylcurcumin," African Journal of Biotechnology, 2008; 7(21): 3832– 3835.
19. P.S.Negi, G.K.Jayaprakasha, L.J.M.Rao, and K.K.Sakariah, "Antibacterial activity of turmeric oil: a byproduct from curcumin manufacture," Journal of Agricultural and Food Chemistry, 1999; 47(10): 4297–4300.
20. N.Niamsaand, C.Sittiwet, "Antimicrobial activity of Curcuma longaaqueousextract," Journal of Pharmacology and Toxicology, 2009; 4(4): 173–177.
21. S.H.Mun, D.K.Joung, Y.S.Kimetal., "Synergistic antibacterial effect of curcumin against methicillin-resistant Staphylococcus aureus," Phytotherapy Research, 2013; 19(7): 599– 604.

22. S.Ungphaiboon, T.Supavita, P.Singchangchai, S.Sungkarak, P. Rattanasuwan, and A. Itharat, "Study on antioxidant and antimicrobial activities of turmeric clear liquid soap for wound treatment of HIV patients," Songklanakarin Journal of Science and Technology, 2005; 27(2): 269–578.
23. Ireson CR, Jones DJ, Orr S, Coughtrie MW, Boocock DJ, Williams ML, Farmer PB, Steward WP, Gescher AJ. Metabolismof the cancer chemopreventive agent curcuminin human and rat intestine. Cancer Epidemiol Biomarkers Prev, 2002; 11: 105–111.
24. Cheng AL, Hsu CH, Lin JK, Hsu MM, Ho YF, Shen TS,Ko JY, Lin JT, Lin BR, Ming-Shiang W, Yu HS, Jee SH,Chen GS, Chen TM, Chen CA, Lai MK, Pu YS, Pan MH,Wang YJ, Tsai CC, Hsieh CY. Phase I clinical trial ofcurcumin, a chemopreventive agent, in patients with high-risk or pre-malignant lesions. Anticancer Res, 2001; 21: 2895–2900.
25. Deodhar SD, Sethi R, Srimal RC. Preliminary studies onantirheumatic activity of curcumin. Ind J Med Res, 1980; 71: 632–634.