International Journal of Chemical Sciences and Applications ISSN 0976-2590.
Vol 2, Issue 3, 2011, pp 172-174 http://www.bipublication.com

EXTRACTION, ISOLATION AND EVALUATION OF ANTI-INFLAMMATORY ACTIVITY OF CURCUMINOIDS FROM CURCUMA LONGA

M. B. Patil[1], S. V. Taralkar[1], V. S. Sakpal[2], S. P. Shewale[1], R. S. Sakpal[3],
[1]Chemical Engineering Department, MAEER's Maharashtra Academy of Engineering, Alandi (D), Pune. India.
[2] RTM Nagpur University Nagpur, India
[3]University Department of Chemical Technology (UDCT), Amaravati, India.

ABSTRACT:
Curcuma Longa (Turmeric) is herb and considered an effective medicine in Ayurveda. It contains number of active ingredients like curcuminoids, turmerone, etc. Curcuminoids is one of the important active ingredients and has number of medicinal uses such as anti-inflammatory, anti –HIV, antitumour, antiviral, anticancer, antifungal and ant parasitic. In present study, soxhlet extraction experiment was carried out for extraction of crude curcuminoids. Isolation of curcuminoids was done with crystallization. The anti-inflammatory activity was also evaluated.

Keywords: Curcuma Longa, Curcuminoids, Anti-Inflammatory

1. INTRODUCTION

Turmeric (Curcuma Longa Linn) a member of Zingiberaceae family, an important medicinal plant is found throughout India. In Hindi, it is called as "Haldi". Turmeric has been valued worldwide as a functional food because of its health promoting properties [1]. Turmeric is of special importance to humans with the discovery that its rhizomes powder, when added to various food preparations, preserves their freshness and imparts a characteristic flavors [2]. Curcuma species has a characteristic dark yellow color, and it has been found to be a rich source of phenolic compounds, viz. curcuminoids [3]. Curcuminoids contain three different diarylheptanoids Curcumin (diferuloylmethane), Demethoxycurcumin (p-hydroxycinnamoylferuloymethane), and Bisdemethoxycurcumin (di-p-hydroxycinnamoylmethane). Curcumin, which is the major constituent of curcuminoids, is reported to be a natural antioxidant with inhibition effects for cytotoxicity and cancer [4]. In addition, Curcuma species possess several other advantages such as the anti-inflammatory and anti-bacterial activities [5] anti-human immunodeficiency virus [1]. The structures of curcuminoids are shown in figure 1.

In present study extraction and isolation of curcuminoids has been done. The isolated curcuminoids was tested with rats for its anti-inflammatory activity.

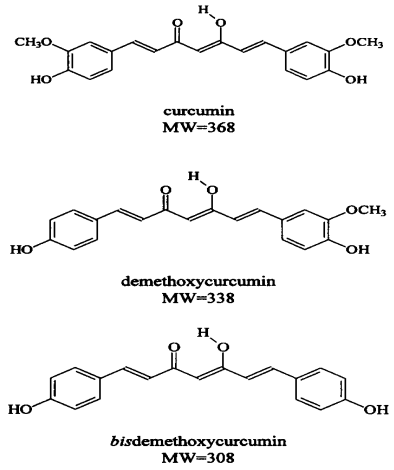

Figure 1: structures of curcuminoids

2. EXPERIMENTAL

2.1 Soxhlet Extraction:

The dried, ground 40g turmeric powder is placed in a Timber of Soxhlet extractor. The curcuminoids were extracted with methanol (150 g) solvent. The extraction was carried out for 6 hours to ensure the complete extraction of curcuminoids. The solvent from crude extract of curcuminoids was then partially evaporated to get the supersaturated solution of curcuminoids for crystallization. About 90% of the solution was evaporated to get the supersaturated

solution. Then this solution was subjected to cooling at 4°C. After crystallization with constant stirring the orange yellow colored crystals of Curcuminoids were separated out by filtration. The separated crystals of curcuminoids were dried and measured to calculate the yield of Curcuminoids.

2.2 TLC Analysis:

The analysis of extracted curcuminoids is done with thin layer chromatographic technique. The glass plate of size 20×20 coated with silica gel was used. Standard borosilicate capillary was used for the applying sample in the prepared plates. These spot are applied at definite distance and allow drying. Chloroform-ethanol-glacial acetic acid (94:5:1) V/V was taken as mobile phase in development chamber and allowed to saturate. The prepared glass was placed in development chamber for separation of curcuminoids. The distance travelled by curcuminoids was 3.32 cm while solvent was upto 4 cm.

The amount of curcuminoids was measured with calibration curve of standard curcuminoids.

2.3 Anti-Inflammatory Test:

Evaluation of anti-inflammatory activity of curcumin by carrageenan induced Rat paw edema methods

Albino rat (wistar strain) [6] of either size weighing between 180- 220 gm was divided into two equal group comprising 5 animals in each group. Initial Rat paw volume was measured using Plethysmometer and marking at the end of ankle was made for repetitive dipping.

The control group animals were received saline only by oral route of administration. The test group animals were received 200 mg / kg body wt. of curcuminoids orally. half an hour all animals were received 0.1 ml 1% wt. / vol. of carrageenan injection in the subcutaneously in the region of hind paw of each animal. The edema volume was determined at 30 min, 1 hr, 2 hr, 3 hr, after carrageenan injection.

3. RESULTS AND DISCUSSION

3.1 Isolation of curcuminoids:

Extract from soxhlet extraction was saturated by evaporating solvent from it and was cooled at 4°C for formation of yellow crystals of curcuminoids. 1.8 gm of curcuminoids crystals was obtained which gives 75% yields by assuming 6% curcuminoids in turmeric powder.

The isolated crystals were analysed with TLC for purity of curcuminoids and it is found that 95% curcuminoids purity in crystals.

3.2 Anti-Inflammatory Test

Mean odema ± SD (Standard Deviation) was calculated and tabulated as shown in Table1 and 2. The % odema inhibition was calculated with respect to untreated group of animals.

Table 1 Group -1 Test:

Sr. No.	Marking	Initial volume	Paw volume after carrageenan injection at(difference)			
			30 min	1 hr	2 hr	3 hr
1.	Head	1.8	0.55	0.53	0.10	0.10
2.	Tail	1.6	0.60	0.53	0.12	0.08
3.	RFL	1.7	0.65	0.57	0.15	0.12
4.	LFL	2.0	0.58	0.50	0.08	0.07
5.	RHL	1.8	0.62	0.60	0.30	0.13
Mean			0.6	0.55	0.15	0.10
SD			±0.034	±0.035	±0.055	±0.070

Table 2. Group-2 (Control):

Sr. No.	Marking	Initial volume	Paw volume after carrageenan injection at(difference)			
			30 min	1 hr	2 hr	3 hr
1.	Head	1.6	0.58	0.50	0.45	0.44
2.	Tail	1.5	0.60	0.53	0.46	0.48
3.	RFL	1.8	0.62	0.60	0.51	0.50
4.	LFL	2.0	0.55	0.53	0.55	0.55
5.	RHL	1.6	0.65	0.57	0.53	0.53
Mean			0.6	0.55	0.50	0.50
SD			±0.034	±0.035	±0.037	±0.043

Table 3 % odema inhibition at

30 min	1 hr	2 hr	3 hr
0%	0%	70%	80%

Table 3 shows the % odema inhibition at various time intervals. After 3 hrs 80% inhibition observes which results in an anti-inflammatory activity of curcuminoids.

CONCLUSIONS:

In this paper, extraction of curcuminoids from turmeric powder with the help of methanol as solvent was carried out and curcuminoids were isolated in the form of crystals with 95 %purity and 75% yield. The isolated crystals shows very good anti-inflammatory activity against %inhibition of odema.

REFERENCES:

1. Peret-Almeida L., Cherubino A.P.F., Alves R.J., Dufosse L., Glo Ria M.B.A, (2005). "Separation and determination of the physico-chemical characteristics of curcumin, demethoxycurcumin and bisdemethoxycurcumin". *Food Research International*, Vol. 38, pp. 1039–1044.
2. Jayaprakasha G.K., Jaganmohan Rao L. and Sakariah K.K., (2005). "Chemistry and biological activities of C. longa". *Trends in Food Science & Technology*, pp. 1–16.
3. Govindarajan V S (1980). "Turmeric--chemistry, technology, and quality". *Crit Rev Food Sci Nutr*, 12, 199-301.
4. Soudamini K.K. And Kuttan R., (1988). "Cytotoxic And Tumor Reducing Properties Of Curcumin". *Indian J. Pharmac*, 20, 95-101.
5. Bhavani Sankar. T.N, Srinivasa Murthy. V. (1979). "Effect of turmeric (curcuma longa) Fractions on the growth of some intestinal and pathogenic bacteria in Vitro". *Ind. J. Exp Biol.* 17, 1363-1366.
6. Warawanna B., Wisut W., Pornchai R. and Pasarapa T., (2009). "Synthetic Curcumin Inhibits Carrageenan-Induced Paw Edema In Rats". *J Health Res 2009*, 23(1): 11-16