iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 10 **Issue:** XII **Month of publication:** December 2022

DOI: https://doi.org/10.22214/ijraset.2022.48389

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 10 Issue XII Dec 2022- Available at www.ijraset.com

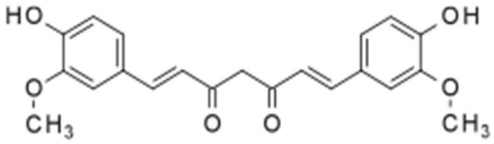
A Study of Importance of Health Benefits in Curcumin

G. Kalaiarasi
Assistant Professor, Department of Food Technology, Dhanalakshmi Srinivasan College of Engineering, Coimbatore, Tamil Nadu, India

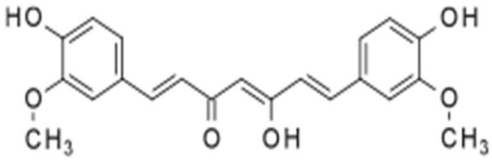
Abstract: ***The present study represents the importance of curcumin which is present in turmeric. Curcumin is belonging to the group of curcuminoids which are natural phenols responsible for turmeric yellow colour. The main constituent of this curcuminoid is it contains enormous number of therapeutic properties such as antioxidant, anti-inflammatory, radio protective, anti-cancer and neuro protective. Curcuminoid is used as dietary supplements, food additives, medical treatment and cosmetics. An average human should consume 2500 mg of curcumin per day to avoid the carcinogenic and cardiovascular defects. Various samples were analysed using improved HPLC method.***
Keywords: Curcumin, curcuminoid, yellow Colour, Therapeutic.

I. INTRODUCTION

In this medical era many plants were used for medicinal uses. Among this turmeric play an important role in medicinal properties due to the presence of curcumin. Turmeric belongs to ginger family and is native to Indian subcontinent. The major turmeric growing areas in India are Andhra Pradesh, Tamil Nadu, Orissa, Maharashtra, Assam, Kerala, Karnataka and west Bengal. Curcumin belonging to the group curcuminoid which is responsible for the presence of yellow color. It is a tautomeric compound existing as enolic form in organic solvents and as a keto form. Curcuminoid contains many therapeutic properties such as antioxidant, anti-inflammatory, anti-cytotoxicity, radioprotective, antimicrobial, cardioprotective, anticancer and neuroprotective. In addition, it is most commonly used as dietary supplement, cosmetics and as a food additive for orange-yellow color. When it reacts electrostatically with phospholipids it provides red color.



Molecular structure of curcumin in keto form



Molecular structure of curcumin in enol form

1) *Botanical Description Of Turmeric:* Turmeric is a perennial herbaceous plant. It appears to be tall, the leaves are simple and appears in two rows. The taxonomic position of curcumin is described as C.longa by Linnaeus.
2) *Chemical Properties Of Curcumin*

Chemical Properties of Curcumin	
Chemical formula	$C_{21}H_{20}O_6$
Molar mass	368.385 g·mol^{-1}
Appearance	Bright yellow-orange powder
Melting point	183 °C (361 °F; 456 K)

3) Nutritional Properties Of Curcumin: 60–70% carbohydrates , 6–13% water, 6–8% protein, 5–10% fat, 3–7% dietary minerals, 3-7% essential oils, 2–7% fibre,1–6% curcuminoids.

II. MATERIALS AND METHODS

Extraction of curcumin from turmeric using ethanol

A. Materials

The sample of turmeric were collected from different regions include Dharmapuri, Salem and Erode. Ethanol is used as a solvent to extract curcumin from turmeric powder.

B. Methods

1) *Grinding And Separation Of Turmeric:* 250g of freshly collected turmeric is dried and then grinded using mixer grinder. The particle size was separated using sieve machine. The particles are separated using 22 mesh, 36 mesh, 60 mesh,100 mesh and 150 mesh.
2) *Solvent Extraction Of Turmeric:* 0.5g of sample is dissolved in 250ml ethanol, refluxed and then filtered. The concentration of each of the filtrate is kept same and then the absorbance is measured using UV-Spectrophotometer at 425nm. Curcumin content 100 per gram is measured using this formula:

$$= \frac{0.0025 \times \text{Absorbance at 425nm} \times \text{Volume made up} \times \text{dilution factor} \times 100}{0.42 \times \text{Weight of the Sample} \times 1000}$$

Since 0.42 absorbance at 425nm = 0.0025g curcumin

Experimental method for extraction of 100 mesh size sample

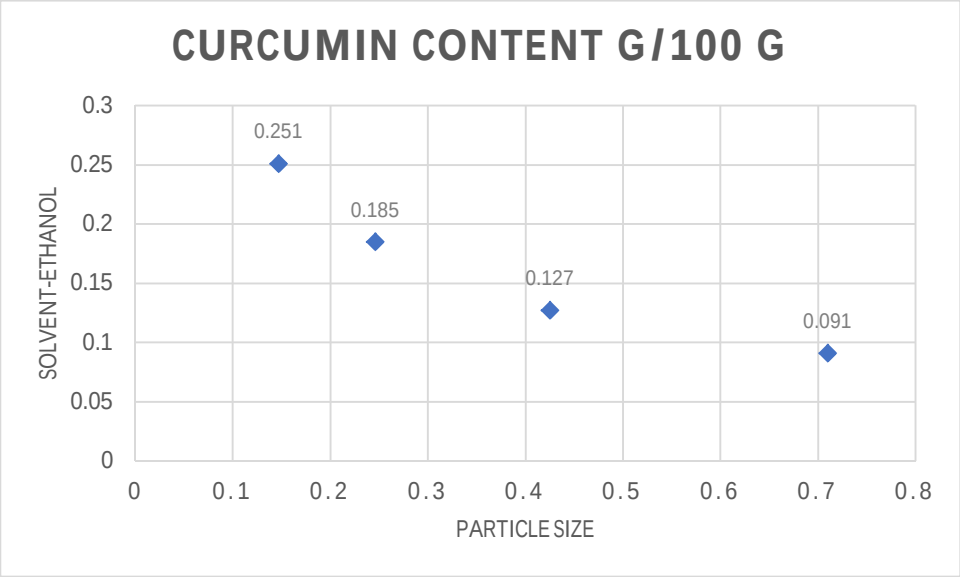
The above procedure is repeated for refluxing the various samples at various time intervals in hours respectively for solvent extraction of turmeric using ethanol. Then the absorbance of each sample analysed using UV-Spectrophotometer at 425nm. The calculations were done using the above-mentioned formula.

III. RESULT AND DISCUSSION

Table 1 Solvent Extraction of Turmeric using Ethanol

Particle Size (mm)	Curcumin content g/100 g
	Solvent-Ethanol
0.710	0.091
0.425	0.127
0.246	0.185
0.147	0.251

The above table shows amount of curcumin present in sample is analysed for various particle size. The size of the particle is separated using various mesh size, it ranges from 22 mesh to 100 mesh. These various size particles were refluxed for a period of 2 hours and the amount of curcumin content in g/100 g were calculated.

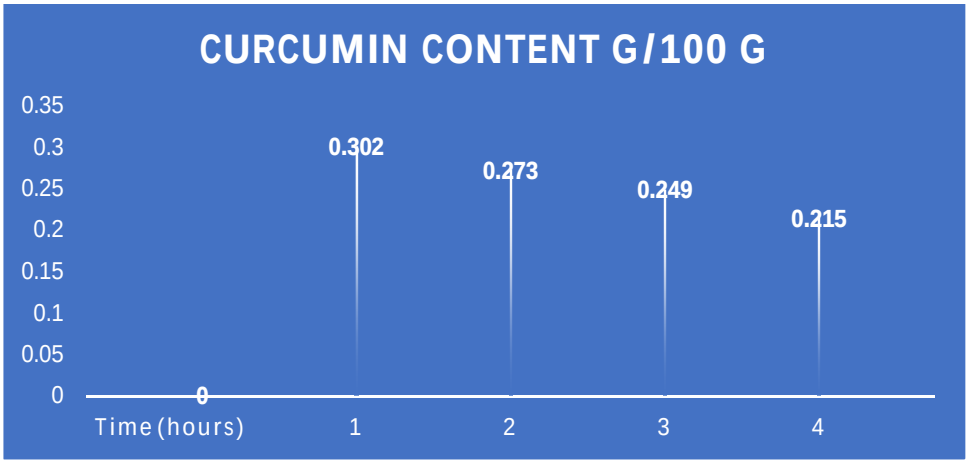


Graph 1 Solvent Extraction of Turmeric using Ethanol

Table 1.2 Solvent Extraction of Turmeric (150 mesh) using Ethanol

Time (hours)	Curcumin content g/100 g Solvent-Ethanol
1	0.302
2	0.273
3	0.249
4	0.215

The above table shows the amount of curcumin present in the sample. Extraction process is done for every one hour by using ethanol as a solvent. The amount of curcumin present in the sample were calculated by using the mentioned formula in g/100 g. The graphical representation for the above solvent extraction is also shown.



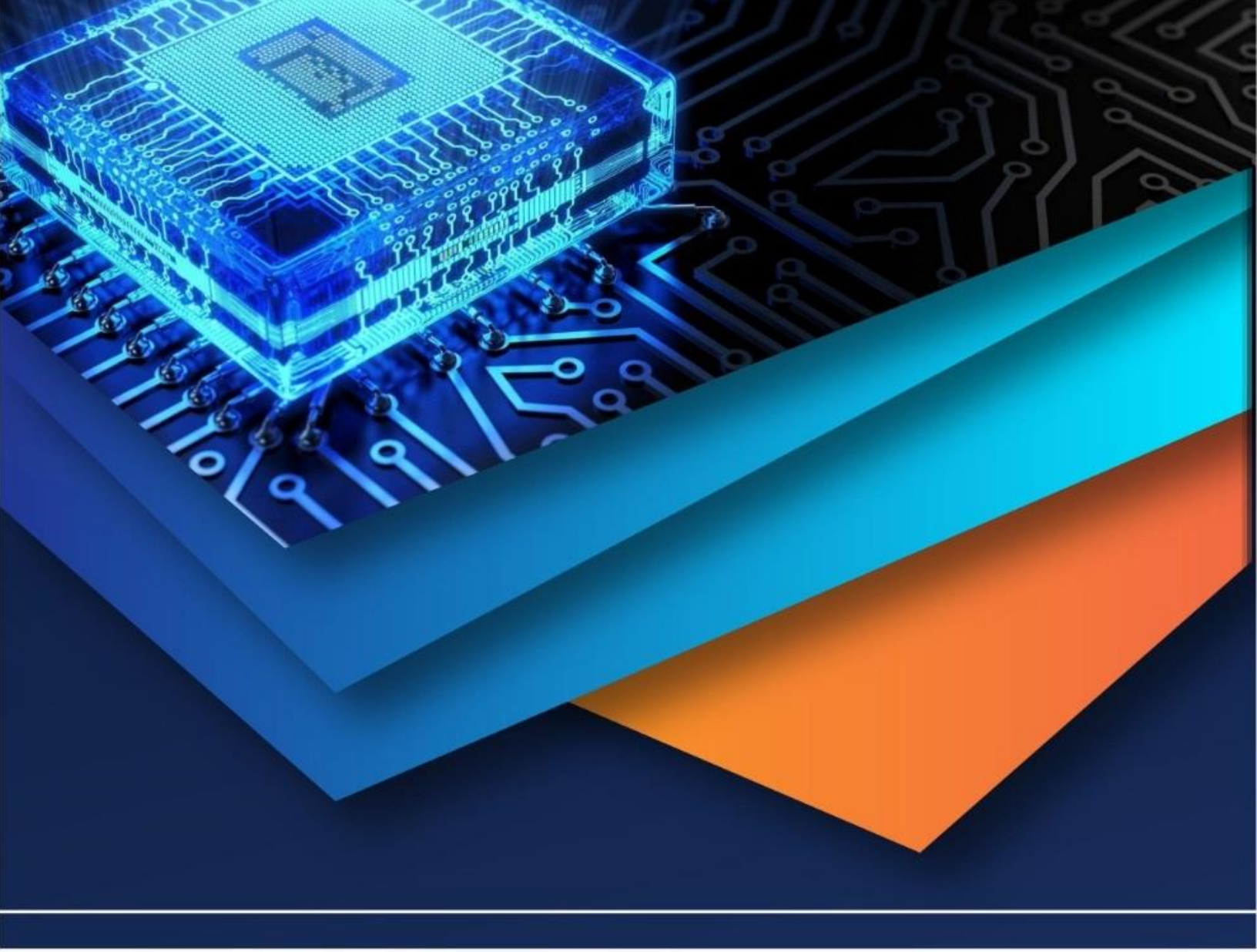
Graph 2 Solvent Extraction of Turmeric (150 mesh) using Ethanol

IV. CONCLUSION

Curcuminoid contains a promising medical property, which means the most important properties includes antioxidant, anticancer, radioprotective. Desmethoxycurcumin and bisdemethoxycurcumin are the compounds used for testing the antioxidant property.. An isolated curcuminoid consist of about 70% liquor mainly oils and remaining resins. By adding this turmeric in their food on daily basis avoid the carcinogenic effects. Based on our study, an average human can consume 2500 mg/day to avoid such cardiovascular effects.

REFERENCES

[1] Aggarwal B. B., Indra D, Bhatt B. B., Ichikawa H., Ahn K. S., Sethi G., Sandur S. K., Natarajan C., Seeram N., and Shishodia S. Curcumin — Biological and Medicinal Properties 7034_book.fm Page 297, 2006
[2] Chattopadhyay I., Biswas K., Bandyopadhyay U., and Banerjee R. K., Turmeric and curcumin: Biological actions and medicinal applications. Current Science, Vol. 87, No. 1, 2004.
[3] Masuda, T., Maekawa, T., Hidaka, K., Bando, H., Takeda Y. and Yamaguchi, H., Chemical studies on antioxidant mechanisms of curcumin: analysis of oxidative coupling products from curcumin and linoleate. Journal of Agriculture and Food Chemistry 49, 2539–2547, 2001.
[4] Sogi S. D. , Sharma S., Oberoi S. P. D., and Wani A. I.. Effect of extraction parameters on curcumin yield from turmeric. Journal of Food Science and Technology Volume 47, Number 3, 300-304, 2009.
[5] Vogel HA, Pelletier J. Curcumin-biological and medicinal properties. J Pharmacol 1815;2. 50e50.
[6] Milobedeska J, Kostanecki V, Lampe V. Structure of curcumin. Ber Dtsch Chem Ges 1910;43:2163e70.
[7] Lampe V, Milobedeska J. Studien über curcumin. Ber Dtsch Chem Ges 1913;46:2235e40.
[8] Sandur SK, Pandey MK, Sung B, Ahn KS, Murakami A, Sethi G, et al. Curcumin, demethoxycurcumin, bisdemethoxycurcumin, tetrahydrocurcumin and turmerones differentially regulate anti-inflammatory and anti-proliferative responses through a ROS-independent mechanism. Carcinogenesis 2007;28: 1765e73.
[9] Liu Y, Hong X. Effect of three different curcumin pigments on the proliferation of vascular smooth muscle cells by ox-LDL and the expression of LDL-R. Zhongguo Zhong Yao Za Zhi 2006;31:500e3.
[10] Kim DSHL, Park SY, Kim JY. Curcuminoids from Curcuma longa L. (Zingiberaceae) that protect PC12 rat pheochromocytoma and normal human umbilical vein endothelial cells from bA (1-42) insult. Neurosci Lett 2001;303:57e61.
[11] Nishiyama T, Mae T, Kishida H, Tsukagawa M, Mimaki Y, Kuroda M, et al. Curcuminoids and sesquiterpenoids in turmeric (Curcuma longa L.) suppress an increase in blood glucose level in type 2 diabetic KK-Ay mice. J Agric Food Chem 2005;53:959e63.
[12] Kiuchi F, Goto Y, Sugimoto N, Akao N, Kondo K, Tsuda Y. Nematocidal activity of turmeric: synergistic action of curcuminoids. Chem Pharm Bull 1993;41: 1640e3.
[13] Sharma R, Gescher A, Steward W. Curcumin: the story so far. Eur J Cancer 2005;41:1955e68.
[14] Asai A, Miyazawa T. Dietary curcuminoids prevent high-fat dieteinduced lipid accumulation in rat liver and epididymal adipose tissue. J Nutr 2001;131:2932e5.
[15] Duvoix A, Blasius R, Delhalle S, Schnekenburger M, Morceau F, Henry E, et al. Chemopreventive and therapeutic effects of curcumin. Cancer Lett 2005;223: 181e90.
[16] Anand P, Sundaram C, Jhurani S, Kunnumakkara AB, Aggarwal BB. Curcumin and cancer: an “old-age” disease with an “age-old” solution. Cancer Lett 2008;267:133e64. [22] Bar-Sela G, Epelbaum R, Schaffer M. Curcumin as an anti-cancer agent: review of the gap between basic and clinical applications. Curr Med Chem 2010;17:190e7.
[17] Ravindran J, Prasad S, Aggarwal BB. Curcumin and cancer cells: how many ways can curry kill tumor cells selectively? AAPS J 2009;11:495e510.
[18] Maheshwari RK, Singh AK, Gaddipati J, Srimal RC. Multiple biological activities of curcumin: a short review. Life Sci 2006;78:2081e7.
[19] Shishodia S, Chaturvedi MM. Role of curcumin in cancer therapy. Curr Prob Cancer 2007;31:243e305.



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY