



EXTRACTION OF CURCUMIN FROM TURMERIC BY USING SOXHALET UNIT

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ABSTRACT

Economic part of turmeric is rhizomes. Rhizomes are horizontal underground stems. Mostly in India people use turmeric as medicine in Ayurveda as Anti-bacterial, Anti-oxidant, Anti-inflammatory, etc. Curcumin is a colour pigment present in turmeric which gives yellow colour to the turmeric as well as medicinal properties. Curcumin has anti-cancerous medicinal property it has ability to cure the cancer. Hence curcumin can be replaced against expensive medicinal treatment therapy of cancer. Here we are working on extraction of curcumin from turmeric in low cost through biotechnology 3.9% of the curcumin from turmeric extracted using acetone as solvent by soxhlet apparatus method. Indian farmers can sold curcumin as secondary most valuable product compare to turmeric in the market. For Indian farmer curcumin work as an Agri-gold.

Keywords: Turmeric, Rhizomes, Curcumin, anti-cancerous, solvent, low cost, Agri-gold, colour pigment, Soxhlet unit.

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INTRODUCTION:

Turmeric plant is mostly found in south asia. Turmeric is medicinal plant. Turmeric is Indian traditional medicinal plant. The scientific name of turmeric is *curcuma longa l*. Turmeric has various medicinal properties such as anti-oxidant, anti-inflammatory, anti-bacterial, etc. Turmeric has yellow colour which obtained due to color pigment curcumin present in turmeric. Curcumin, dimethoxycurcumin and bisdemethoxycurcumin these three compounds are present in turmeric. Commonly these three compounds called as curcumoid. Curcumin is main compound present in turmeric which gives yellow color to turmeric plant. Curcumin is very expensive but it is anti-cancerous in nature. Curcumin is good supplement to avoid growth of cancerous cells in your body. If we use regularly as a supplement there is no growth of cancerous cells in our body. Cancer cell are present in human body but these are of two types hazardous and non-hazardous. In the region of Nanded district selam, china selam, Krishna, kadappa, etc types of varieties of turmeric are present. These varieties of turmeric contain 3 % to 4 % curcumin. The aimed of the experiment was to check the presence of curcumin in turmeric by using soxhalet unit [1-7].

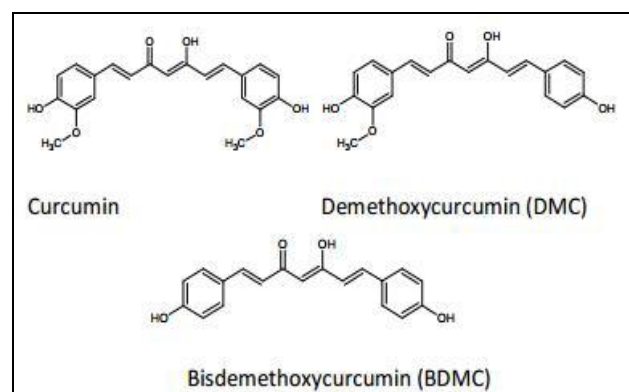


Figure 1: Chemical structure of curcumin and its analogs

SELECTION OF TURMERIC FOR EXTRACTION:

The salem, china salem, Krishna, these variety of turmeric was selected from the region of Nanded. Fresh rhizomes of turmeric are isolated. Wash the rhizomes and cut into small pieces. Keep this small cut of turmeric in oven for drying at 105°C for 3 hours or in refrigerator. Make fine powder of turmeric for extraction.



Figure 2: turmeric sample used for experiment

SELECTION OF SOLVENT FOR EXTRACTION

Use organic solvent for extraction because these are volatile in nature they can be evaporating easily. In

organic solvent curcumin easily dissolved. Avoid use of water because the solubility of curcumin in water is very low. For 100gm of curcumin extraction 1500ml organic solvent is required.

METHOD FOR EXTRACTION:

Take fleshy rhizomes of turmeric. The rhizomes of turmeric were dried in oven at 105 °C for 3 h. dried rhizome were grinded and obtained uniform powder. The turmeric powder was stored in refrigerator to prevent moisture uptake. 10 g turmeric powder was weighed and embedded in a thimble and kept in the Soxhlet apparatus which was gradually filled with acetone as the extraction solvent. The extraction was carried out at 60 °C within 8 h. After the extraction, the acetone was separated from the extract using rotary evaporator under vacuum at 35°C. The residue was dried and weighed. Presence of Curcumin content was checked by using TLC.



A



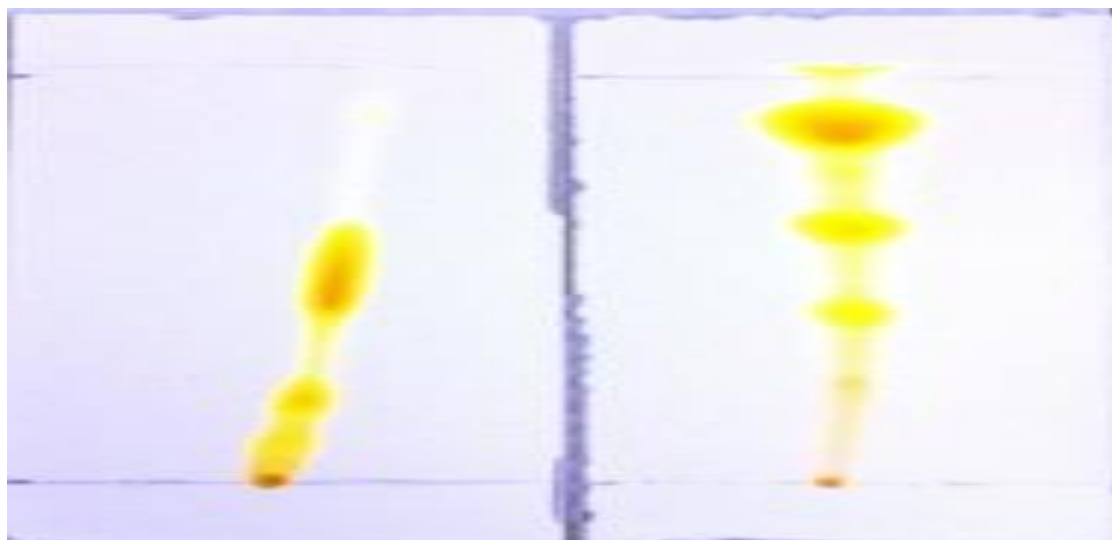
B

Figure 3: A; Soxhalet unit and B; extracted curcumin

DETECTION OF CURCUMIN BY USING THIN LAYER CHROMATOGRAPHY:

Acetone extract were tested in TLC for presence of three curcumoids. The TLC pre-coated silica gel (0.25mm thick) plate were developed using a spreader.

Glass tank which was pre-saturated with the mobile phase for 1 hour and each plate was developed to a height of about 10cm. The composition of mobile phase was optimized in ratio 8:2:2. After development plates were removed and dried and spots were observed under UV light.



A B
Figure 4: TLC of isolated curcuminoids

$RF = \frac{\text{Distance travel by solute}}{\text{Distance travel by solvent}} = \frac{6.8}{9.2} = 0.73$, Therefore the R_f value of curcumin is 0.73 approximately.

APPLICATION:

1. BENEFITS TO COMMON PEOPLE/ PATIENT

- Curcumin has anticancer property.
- Antibacterial, Antioxidant activity
- Low cost of medicine for cancer treatment.
- Working of Curcumin in cell

2. MEDICINAL USE

- Anti-cancerous
- Anti-oxidant
- Anti-inflammation
- Antibiotic
- Boosts effectiveness of cancer therapies.
- Curcumin shows antimicrobial activity against bacteria (*streptococcus*, *staphylococcus*, *lactobacillus*, etc)
- Curcumin decreases blood cholesterol [4-7].

EXTRACTED CURCUMIN:



Figure 4: Extracted curcumin

RESULT:

$$\% \text{ of curcumin} = \frac{\text{Dry wt. of extracted curcumin}}{\text{total wt. of turmeric}} \times 100$$

Table 1: Extraction of curcuminoid using Soxhlet METHOD

Variety	Solvent	Curcuminoid (%)
Selam (10 gm)	Ethanol	3.6
	Methanol	3.4
	Acetone	3.9
Kadappa (10 gm)	Ethanol	3.1
	Methanol	3.7
	Acetone	3.8
China selam (10gm)	Ethanol	3.3
	Methanol	4.0
	Acetone	4.2

CONCLUSION:

Different solvents with different polarity were used for the extraction of curcumin from turmeric rhizomes. Various solvents were used such as acetone, ethanol, methanol, etc. after concentrating each extract total yield were calculated and determine the percentage of curcumin from each extraction as shown in **table 1**. By this experiment it was concluded that in the turmeric approximately 3 % to 4 % curcumin is present. From the overall result it was observed the more yield of curcumin was obtained in acetone solvent extraction. After extraction yellow coloured extract was obtained, that extract it was called as curcumoid. After the extraction sample turmeric losses their colour and it becomes white in colour.

AKNOLEDGEMENT:

I hereby declared that the total work of extraction of curcumin was done under guidance of Dr. M. N. Cherekar, Head of department of biotechnology and bioinformatics, Assistant prof. Mr. P. N. Narwade, Assistant Prof. Vinay Hibare at Laboratory of Mgm’s college of Computer science and Information technology, MGM Campus, Nanded-431605.

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