

A Comparative evaluation of anti-Bacterial activity using different brands of Curcumin against natural flora

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Abstract

Herbal medicine is the use of medicinal plants. Plants have been the basis for medical treatments through much of human history, and such traditional medicine is still widely practiced today. Modern medicine makes use of many plant-derived compounds as the basis for evidence-based pharmaceutical drugs. Many herbs are applied topically to the skin in a variety of forms. Essential oil extracts can be applied to the skin, usually diluted in a carrier oil. Many essential oils can burn the skin or are simply too high dose used straight; diluting them in olive oil or another food grade oil such as almond oil can allow these to be used safely as a topical.

Keywords: Hyperthermia; Temperature; HSP-70; Chemotherapy; Radiotherapy; Thermodox

1. Introduction

Turmeric (*Curcuma longa L*) is the shining star among the cornucopia of tradition medicinal plants and it possess a traditional medicinal value in Indian system of medicine “[1].”. In north India, turmeric is commonly called Haldi, a word derived from the Sanskrit word Haridra, and in the south India it is called manjil, a word that is frequently used in ancient Tamil literature. It has a long history of usage in traditional medicine in India and China. Ancient Indians have known the medicinal properties of turmeric, thus curcumin, for several millennia. The bioactive polyphenol component of turmeric is curcumin. Also known as diferuloylmethane, with an ability to prevent and cure diseases. Turmeric contains about 2-5% curcumin alone. Commercial curcumin contains 3 main types of curcuminoids.



Figure 1 Turmeric

- Curcumin (diferuloylmethane or curcumin I about 77%)

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- De-methoxy curcumin (Curcumin II about 17%)
- Bis dimethoxy curcumin (Curcumin III about 3%).

2. Types of microorganisms

2.1. Bacteria

Bacteria are ubiquitous, mostly free-living organisms often consisting of one biological cell. They constitute a large domain of prokaryotic organism.

2.2. Fungi

Fungi is any member of the group of eukaryotic organisms that includes microorganisms such as yeasts and molds, as well as the more familiar mushrooms “[2].”.

2.3. Algae

Filamentous algae are usually considered as ‘macrophytes’ since they often form floating masses that can be easily harvested, although many consist of microscopic, individual filaments of algal cells.

3. Mechanism of action

The mechanism of action by which curcumin shows Anti-Inflammatory effect is by attenuating inflammatory response of TNF- α stimulated human endothelial cells by interfering with NF- κ B “[3].” Further more curcumin is also capable of preventing platelet derived growth factor “[4].”.

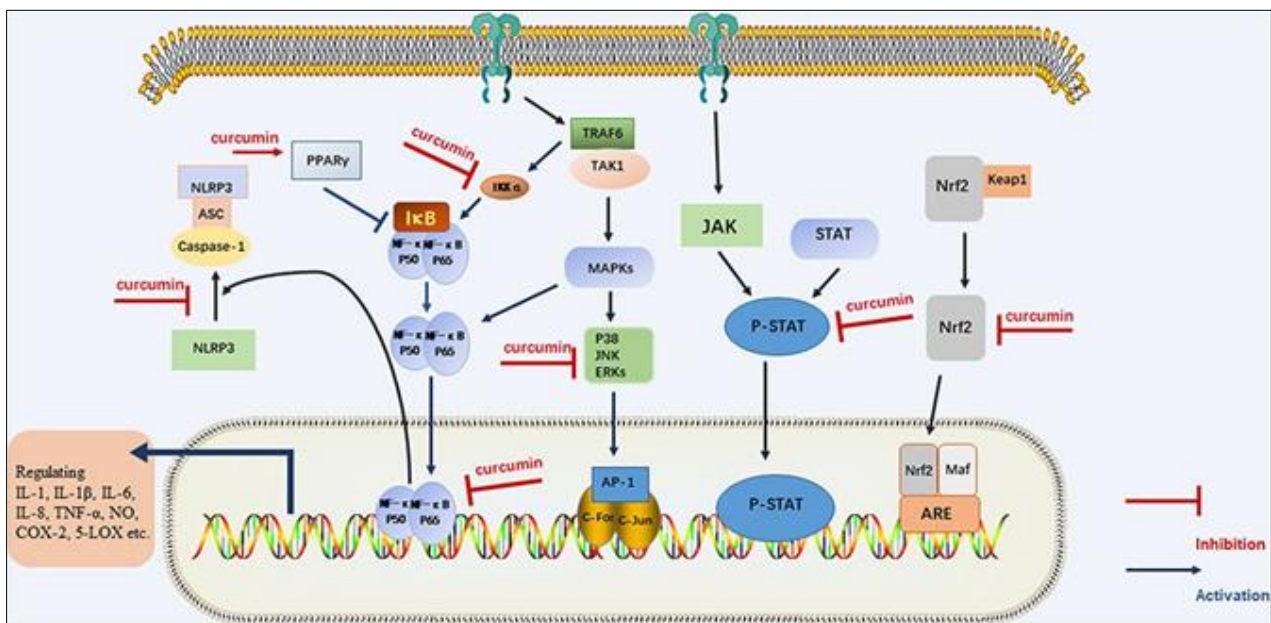


Figure 2 Mechanism of Anti-Inflammatory effect of curcumin “[5].”.

4. Pharmacological actions

A number of studies have been carried out on curcuma longa in recent years showing the diverse pharmacological effects. These are as follows

- Acne
- Anti-Depressant
- Anti-Allergic
- Anti-Fungal

- Anti-Bacterial
- Anti-Oxidant

Aim and objectives

The objective of the present study

- Preparation of plant extracts using thin layer chromatography
- The effect of powder extracts was tested against natural microflora growing on tomato, Cucumber.
- Considering above facts present work was aimed at evaluation of the antibacterial activity of powder extracts of *Curcuma longa* Lin. belonging to Family Zingiberaceae. Plants was investigated for antibacterial activity against different bacterial, fungal, mold strain.

5. Plant profile

5.1. Synonyms

Saffron Indian; haldi (Hindi); Curcuma; Rhizoma cur-cumae.

5.2. Biological Source

Turmeric is the dried rhizome of *Curcuma longa* Linn. (syn. *C.Domestic* valeton),, belonging to family Zingiberaceae.

5.3. Geographical Source

The plant is a native to southern Asia and is cultivated extensively in temperate regions. It is grown on a larger scale in India, China, East Indies, Pakistan, and Malaya.

5.4. Cultivation

Turmeric plant is a perennial herb, 60–90 cm high with a short stem and tufted leaves; the rhizomes, which are short and thick, constitute the turmeric of commerce. The crop requires a hot and moist climate, a liberal water supply and a well-drained soil “[6].” It thrives on any soil-loamy or alluvial, but the soil should be loose and friable. The field should be well prepared by ploughing and turning over to a depth of about 30 cm and liberally manured with farmyard and green manures. “[7].” Sets or fingers of the previous crop with one or two buds are planted 7 cm deep at distance of 30–37 cm from April to August. The crop is ready for harvesting in about 9–10 months when the lower leaves turn yellow. The rhizomes are carefully dug up with hard picks, washed, and dried. “[8].”

5.5. Botanical Description

Table 1 Taxonomy

Binomial Name	<i>Curcuma longa</i>
Kingdom	Plantae
Sub kingdom	Tracheobionts
Division	Magnoliphyta
Super Division	Spermatophyta
Class	Magnoliopsida
Sub Class	Zingiberidae
Order	Zingiberales
Family	Zingiberaceae
Genus	<i>Curcuma</i>
Species	<i>C. Longa</i>

5.6. Chemical constituents

Table 2 Chemical constituents

Constituents	Percentage%
Curcuminoids	5%
Essential oils	6%
Curcumin-1	60%
Zingiberene	25%

5.7. Plan of work

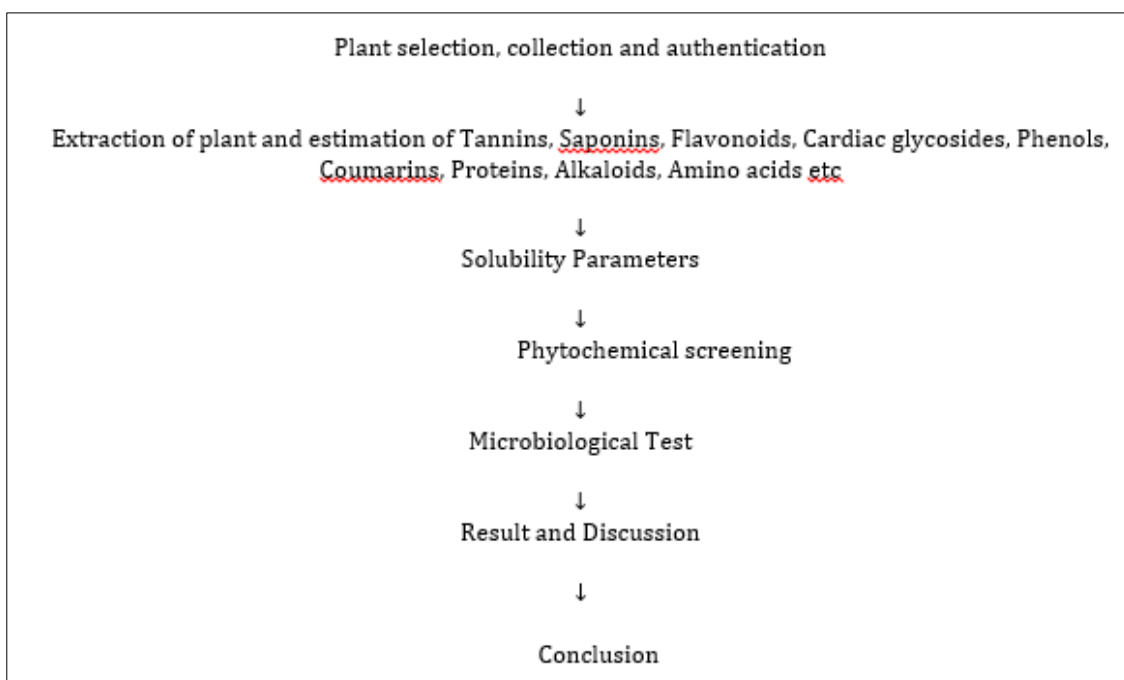


Figure 3 Plan of Work

Table 3 List of chemicals and Equipment's

Chemicals	Equipment's
Boric Acid	TLC Plates
Acetonitrile	Test tubes
Concentrated HNO ₃	Round Bottom Flask
Aqueous HCl	Heating mantle
Agar Medium	Filter paper

5.8. Media preparation

Take potato tubers, peel off and weigh "200 g". Chop the tubers into small pieces with the help of a knife. Transfer the chopped potatoes into a beaker containing 100 ml of distilled water. Boil the contents with the help of a heater for about 20 minutes. Decant supernatant, filter dour folds with the help of muslin cloth. This filtrate is called potato extract. Transfer dextrose "20 g" and agar "15 g" into the extract and gently heat and shake to dissolve the ingredients. Transfer media to measuring cylinder and make volume 1 liter by adding distilled water. Major the pH and adjust to 5.6 by using HCl or NaOH as required, drop – wise. Pour the medium into two or more Erlenmeyer flasks, put cotton plug, cover the

plug with Aluminium foil / paper and autoclave at 121 °C for 20 minutes. When the temperature cools down take out the flask and use if required or store at room temperature.

5.8.1. Extraction and isolation of Curcumin from turmeric

Commercial turmeric powder(50g) was mixed with oxalic acid(2g) and (9g) boric acid in 100 ml acetonitrile in a round bottom flask. The mixture was then heated for 10 minutes. After cooling, water was added followed by stirring to obtain a dark coloured product “[9].” The product was then filtered and then concentrated ammonia was added to the filter paper where by the complex dissolved out, leaving the vegetable matter present in the turmeric powder in the filter funnel. The filtrate was diluted and Neutralised with aqueous HCL solution to obtain curcumin in powder form upon stirring. It was then collected and the product was dried and weighed. The product thus obtained was identified by TLC “[10].”

6. Results

Table 4 Results of phytochemical constituents

Phytochemicals	Acetone	Methanol	Ethanol	Chloroform
Alkaloids				
Wagner's	+	+	+	-
Dragen droff's	+	+	+	+
Hager's	+	+	+	+
Saponins	+	+	+	+
Anthro quinone	+	+	+	+
Leuco anthocyanin	+	+	+	+
Phlobatannin's	+	+	+	+
Steroids	-	+	-	+
Phenol	+	+	-	-
Tannins	+	+	+	+
Anthocyanins	+	+	+	+
Emodin's	+	+	+	+

Table 5 Zone of inhibition of Natural turmeric by disc diffusion method

Sample	Concentration	Zone of inhibition(mm)
Standard (Penicillin)	100	9.54
Test 1	75	9.23
Test 2	50	8.75
Test 3	25	7.89

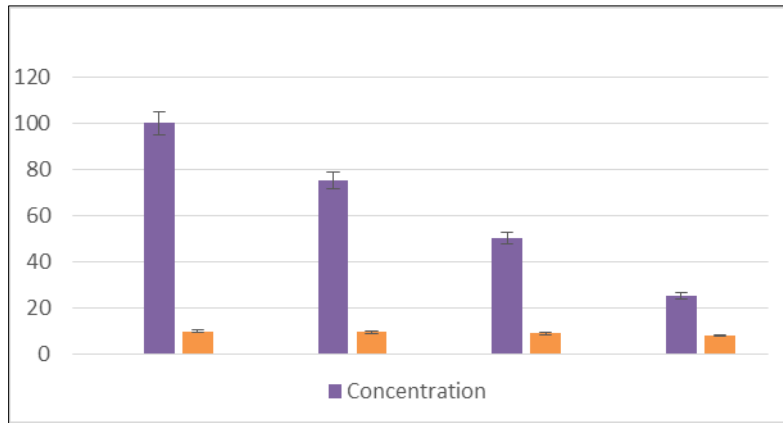


Figure 4 Graph of Natural Turmeric

Table 6 Zone of inhibition of Aashirwad brand turmeric by disc diffusion method

Sample	Concentration(ug/ml)	Zone of inhibition
Standard (Penicillin)	100	9.54
Test 1	75	8.50
Test2	50	8.23
Test 3	25	7.05

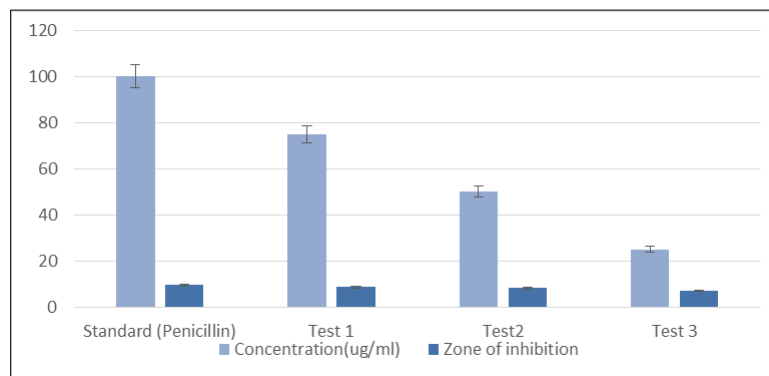


Figure 5 Graph of Aashirwad Brand

Table 7 Zone of inhibition of dhanalakshmi brand by disc diffusion method

Sample	Concentration	Zone of inhibition
Standard (Penicillin)	100	9.54
Test1	75	8.21
Test2	50	7.14
Test3	25	6.29

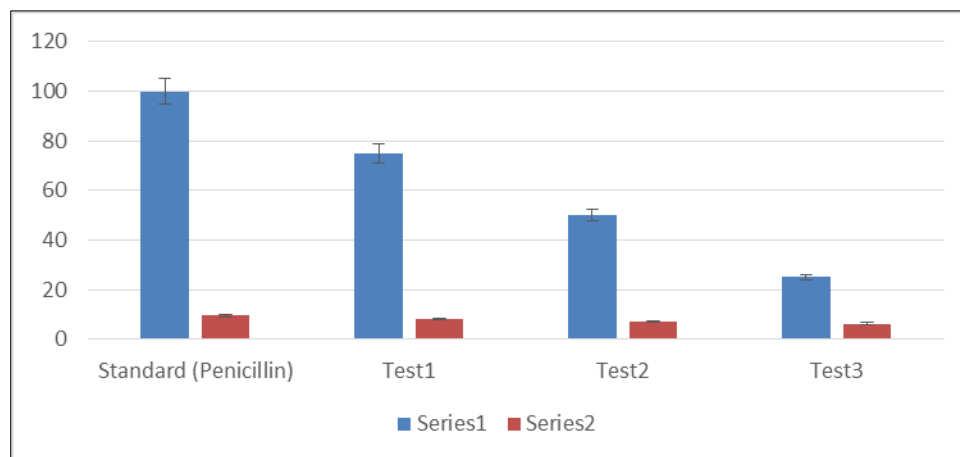


Figure 6 Graph of Aashirvad Brand

7. Discussion

The extracts of plants have been long used to prevent and treat infections as well as illnesses. In support, many studies have reported the potential use of medicinal plants and herbs as an antimicrobial agent. The beneficial effect of plants is attributed to the natural compounds found in plants known as secondary metabolites. A wide array of secondary metabolites such as tannins, alkaloids, flavonoids, and terpenoids has been found *in vitro* to have antibacterial properties. Turmeric (*Curcuma longa L.*) possesses curcuminoids, a phenolic compound, which is responsible for the antibacterial activity. Natural Curcumin shows more Anti-bacterial activity when compared to remaining samples.

8. Conclusion

Salves, oils, balms, creams and lotions are other forms of topical delivery mechanisms. Most topical applications are oil extractions of herbs. This oil can then be made into salves, creams, lotions, or simply used as an oil for topical application

Vegetables are intentionally rotten and various bacteria, fungi, molds are grown on them. The inoculum was prepared by isolating microbes from rotten fruits and Streaked on potato dextrose agar media and incubated for 24 hrs. Now a loop of microbial colonies are taken and dissolved in distilled water. Curcumin is extracted by thin layer chromatography process and two different concentrations 75 µg/ml, 50µg/ml and 25ug/ml are taken and tested against microbial culture plates of Vegetables, fruits and bread with the help of small discs.

Control is taken at a concentration of 50µg/ml and zones of inhibitions are observed. The zones formed by Pencillin(std) are nearer to 75% concentration of curcumin extract. So 75% concentration curcumin can be used as effective Antibacterial agent. Antifungal potential of curcumins essential oil attracted the attention of the agricultural industry with essential oil being considered for the control of postharvest pathogens. Application of curcumin extract on fruits and vegetables may prevent spoilage. Further research is to be done to formulate products using curcumin plant extracts.

Compliance with ethical standards

Acknowledgments

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Disclosure of conflict of interest

The authors declare that there is no conflict of interest in publishing this paper.

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