
The Antibacterial effect of Curry Leaf on body odor causing bacteria *Corynebacterium xerosis* and *Corynebacterium minutissimum*

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Abstract:

Aim of this study was to investigate antimicrobial efficacy of curry leaf on body odor causing bacteria *Corynebacterium xerosis* and *Corynebacterium minutissimum*. This study was carried out on fixed oil and alkaloidal content of ethanolic extract of freshly collected and dried curry leaves extracted by Soxhlet extraction.

The study reveals very significant antibacterial activity antagonistic to body odor causing bacteria *Corynebacterium xerosis* and *Corynebacterium minutissimum*. Different concentration of (50 mg/ml, 100mg/ml, 150 mg/ml, 200 mg/ml, 250mg/ml & 500 mg/ml) extracts were studied among which maximum zone of inhibition was observed with 500 mg/ml. Increase in active concentration of curry leaf extract shows increase ZOI against ***Corynebacterium xerosis*** e.g. 50 mg/ml there is no visible zone of inhibition and at concentrations 100 mg/ml, 150 mg/ml, 200 mg/ml, 250mg/ml & 500 mg/ml zone of inhibition observed are 10 mm, 10.25 mm, 10.5 mm, 10.92 mm & 11 mm respectively. Furthermore, study result effect of curry leaf extract on ***Corynebacterium minutissimum*** at concentrations from 50 mg/ml, 100mg/ml, 150 mg/ml, 200 mg/ml, 250mg/ml & 500 mg/ml shows zone of inhibition 9 mm, 10mm, 11mm, 12 mm, 12.5 mm & 19 mm respectively.

Keywords: Curry Leaf, Body Odor, *Corynebacterium xerosis*, Zone of inhibition, *Corynebacterium minutissimum*.

INTRODUCTION

Unsystematic use of synthetic antiperspirants and deodorants is one of the prime cause of increasing origination of multidrug resistant pathogenic strains those does not counter to the standard treatment. Natural deodorants attract those who prefer natural lifestyles. Natural deodorants work as a safeguard against social embarrassment and discomfort without resulting in a long-term health hazard. Current market studies clearly indicates the increase in search of natural or herbal medicines because those have lesser side effects compared with chemically synthesized antibacterials (Anita Joshi et al, 2009).

The curry tree (*Murraya koenigii* or *Bergera koenigii*) is a tropical to sub-tropical tree in the family Rutaceae, Which is native to India and Sri Lanka. *Murraya koenigii* or *Bergera koenigii*, a tree which produces an aromatic leaf often used in Indian cuisine. For the European plant sometimes referred to as curry plant. Chemically some of the primary alkaloids found in the curry tree leaves, stems, and seeds are as follows: Mahanimbine, girinimbine, 2-methoxy-3-methyl-carbazole, koenimbine, mahanine, Undecalactone, isomahanine.

BACKGROUND:

(Bhandari PR, 2012) *Murraya koenigii* is a culinary important plant of Indian origin, and also been a component of many formulations used in the Ayurvedic system of medicine since many centuries. A scrutiny of literature reveals some notable pharmacological activities of the plant. Carbazole alkaloids which are abundantly present in the leaves, fruits, roots and bark of this plant, have been reported for their ant diabetic, anticancer, antibacterial, anti-nociceptive and antioxidant activities. Besides these activities, the plant is described to have a wide array of therapeutic activities. Phytochemistry and pharmacology of this plant necessitates a comprehensive review of its prospects as an important therapeutic agent for the management of numerous diseases commonly affecting humans. The current review provides a detailed report of the phytochemical, pharmacological, clinical and preclinical works carried out on this culinary plant and also throws light on its therapeutic prospects.

(Hanan Al Harbi et al, 2016) critically analyzed curry leaves methanolic extract & found is efficacy against *Staphylococcus* sp. in producing a maximum of 21.67 mm inhibition zone as compared to a maximum of 12.67 mm inhibition zone for *Proteus* and a maximum of 11.67 mm inhibition zone for *E.coli*.

Study conducted by (Mini Priya R et al, 2014), examined hydro-distilled essential oil of *Murraya koenigii* leaves for chemical, antimicrobial and antioxidant activity by Gas Chromatography (GC) and Gas Chromatography-Mass Spectrometry (GC-MS) analysis, resulting in the identified compounds, those were further classified into four groups that are oxygenated monoterpenes (72.15%), monoterpene hydrocarbons (11.81%), oxygenated sesquiterpenes (10.48%) and sesquiterpenes hydrocarbons (03.12%). Further researchers had analysed antibacterial properties of oil & has shown maximum zone of inhibition ability against *Corynebacterium tuberculosis*, *Pseudomonas aeruginosa*, *Streptococcus pyogenes*, *Klebsiella pneumonia* and *Enterobacter aerogenes*.

This study was undertaken to evaluate the antibacterial properties of the ethanolic Soxhleted extract of Curry leaves (*Murraya Koenigii*) on body odor causing bacteria *Corynebacterium*

xerosis and *Corynebacterium minutissimum* by using the paper disc diffusion method.

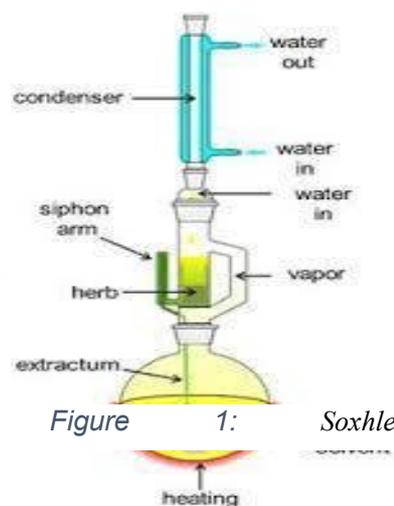
METHODOLOGY:

The curry leaves used in this study was obtained from Mumbai, Maharashtra area, leaves were shade dried at room temperature for 3 days and then dried branches and blacken leaves are removed. Only good condition curry leaves were selected for extraction.

Fixed oils and Alkaloids were extracted by ethanol using continuous hot percolation process or Soxhlet extraction. Flask containing the boiling water. Soxhlet Extractor in which the drug to be extracted is packed. It has a side tube which carries the vapors of the solvent from the flask to the condenser and a siphon tube which siphons over the extract from Soxhlet extractor to the flask. A condenser in which the vapors of the solvent are condensed again into solvent.

Procedure:

The drug is packed in a paper cylinder made from a filter paper and it is placed in the body of Soxhlet extractor. The solvent is placed in the flask. The apparatus is then fitted as shown in figure. When solvent is boiled on heating flask, it gets converted into vapors. These vapors enter into the condenser through the side tube and get condensed into hot liquid which falls on column of the drug. When the extractor gets filled with the solvent, the level of siphon tube also raises up to its top. The solvent containing active constituents in the siphon tube siphon over and run into the flask, thus emptying the body of extractor. This alteration of filling and emptying the body of extractor goes on continuously until the drug is exhausted (normally 15 times). The soluble active constituent of the drug remain in the flask where solvent is repeatedly volatilized.



Determination of antimicrobial activity:

a. Preparation of Test sample:

1. The disk is made from whatman filter paper 6mm diameter.
2. Disc is soaked with the following concentrations (50mg/ml, 100mg/ml, 150mg/ml, 200mg/ml, 250mg/ml & 500 mg/ml) of curry leaves ethanolic extract, 01 ml to each disc.

b. Culture Used:

1. *Corynebacterium xerosis*
2. *Corynebacterium minutissimum*

c. Test:

Zone of inhibition (Paper disc diffusion method).

d. Procedure:

1. Inoculate a loopful culture into Tryptic soy Broth.
2. Incubate at 37°C for 18-24 hrs.

3. 0.1 ml of the 18-24hrs old culture is spread onto the Tryptic Soy agar plates.
4. The samples are diluted in alcohol to obtain the required concentration of samples.
5. Sterile whatman filter paper discs of size 6mm are dipped in the prepared dilutions and are put on the plates spread with the culture.
6. The plates are incubated at 36°C for 24hrs.
7. The zone of inhibition is measured with the help of vernier caliper.

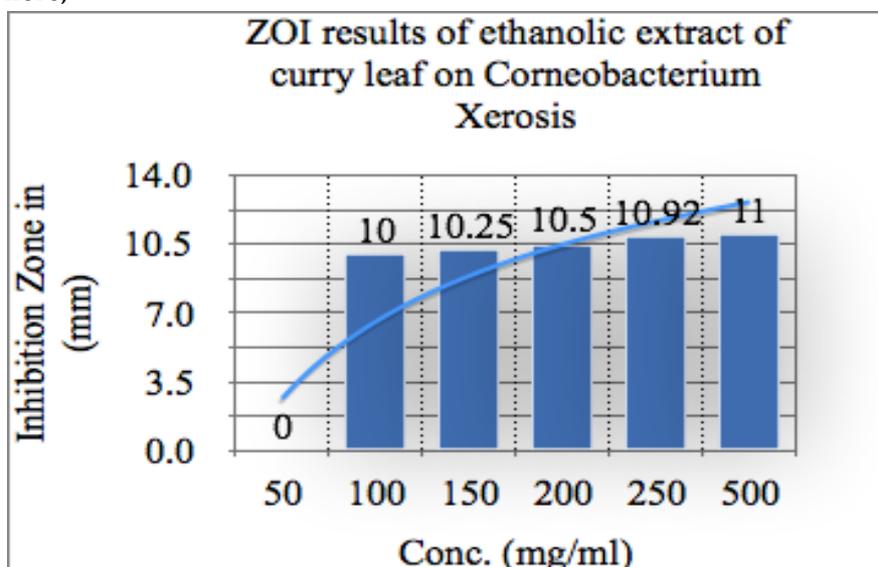
e. Statistical Analysis:

Results were calculated on the basis of measurement of zone of inhibition observed in diameter (mm) by using vernier caliper. No ZOI is represented as No inhibition.

Results & Discussions:

The antibacterial efficacy of Soxhlet alcoholic extract of curry leaves (*Murraya Koenigii*) was tested at different concentrations against odor causing bacteria *Corynebacterium xerosis* and *Corynebacterium minutissimum* & results are described by using inhibition zones measurements.

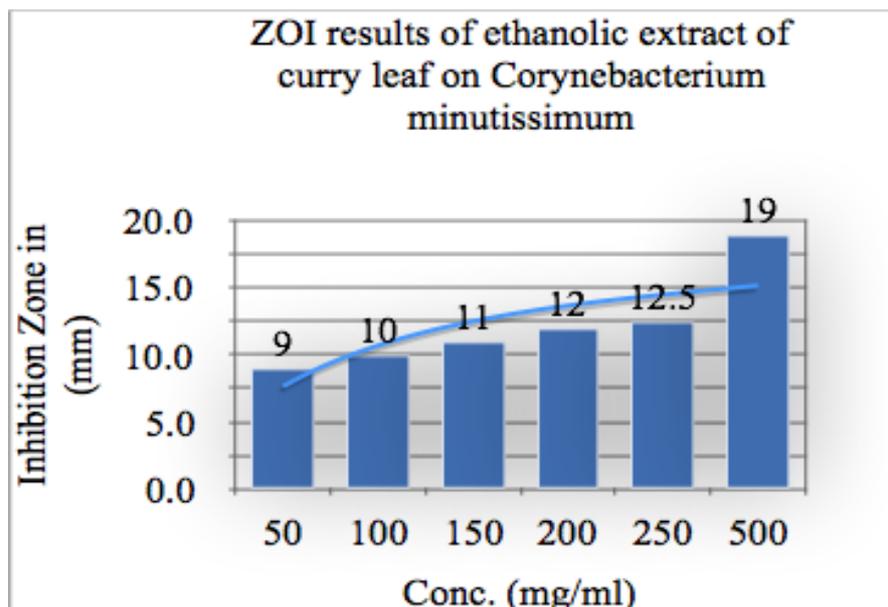
Increase in concentration of curry leaf extract shows increase ZOI against ***Corynebacterium xerosis***. For 50 mg/ml there is no visible zone of inhibition, whereas with increase in concentrations from 100mg/ml, 150 mg/ml, 200 mg/ml, 250mg/ml & 500 mg/ml the zone of inhibition was found to be 10 mm, 10.25 mm, 10.5 mm, 10.92 mm & 11 mm respectively. Figure 2 be placed here,



* ZOI: Zone of Inhibition

Fig. no. 2: Comparison of Zone of inhibition for different dilutions of curry leaves (ethanol extract) on *Corynebacterium xerosis*.

Further study result of effect of curry leaf extract on *Corynebacterium minutissimum* at concentrations from 50 mg/ml, 100mg/ml, 150 mg/ml, 200 mg/ml, 250mg/ml & 500 mg/ml shows zone of inhibition 9 mm, 10mm, 11mm, 12 mm, 12.5 mm & 19 mm respectively. Figure 3 be placed here,



* ZOI: Zone of Inhibition

Fig. no. 3: Comparison of Zone of inhibition for various dilutions of curry leaves (ethanol extract) and effect on *Corynebacterium minutissimum*

Conclusion:

This study clearly proves the antibacterial efficacy of curry leaf (*Murraya koenigii*) extract. Curry leaves do have strong antibacterial properties against odor causing bacteria *Corynebacterium xerosis* and *Corynebacterium minutissimum*. Curry leaf has excellent medicinal properties without any side effects that synthetic antibiotics can produce in humans.

This study proves that curry leaf is a natural herbal remedy to counter bacterial infection in humans and its herbal origin makes it useful to use daily & prolong, which is an another drawback of synthetic antibacterials.

Current study clearly concludes antibacterial efficacy of curry leaf extract (*Murraya koenigii*) Ethanolic extract of curry leaf was found to be effective against ***Corynebacterium xerosis* and *Corynebacterium minutissimum*** which are known as odor causing bacteria on human skin. This study clearly indicates that curry leaves can be used as a therapeutic natural remedy against bacterial infection.

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