International Journal of Science and Research (IJSR)
ISSN: 2319-7064
Impact Factor 2024: 7.101

# Antioxidant and Antibacterial Activity of *Lantana camera* Leaves

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**Abstract:** ***Lantana camara L., colloquially called as Surinam tea plant, Spanish flag wild or red sage, belonging to family Verbenaceae. It is a native to tropical and subtropical regions and sprawls as array of strains and diverse varieties. Lantana camara was presumably introduced In India before nineteenth century. Lantana camara is a flowering ornamental, erect, hairy aromatic shrub, it is a most widespread, variable straggling plant with variegated flower characteristic. The plant is sprawled all round India with their ability to accustom in diverse climatic and atmospheric conditions. leaves and twigs are used as a green mulch. Different parts of plant have been considered to possess various constituents like phenolic compounds, essential oils, flavonoids, alkaloids, quinine, tannin, carbohydrates, proteins, glycosides, steroids, iridoid glycosides, oligosaccharides, saponins, terpenoids. Lantana camara Predominantly the leaves have been used in the treatment of wound healing, scratching, toothache stomachache, bronchitis, rheumatism, biliary fever, antiseptic and in variety of infections***

**Keywords:** *Lantana camara*, leaves, antioxidant, antibacterial, hydroalcoholic

## 1. Introduction

*Lantana camara L.*, called by the multiple vernacular names like Surinam tea plant, Spanish flag wild or red sage etc. is a shrubby aromatic hedge belonging to family Verbenaceae. It is a native to tropical and subtropical part of the world, The flourish well and sprawls as array of strains and varieties. Lantana camara was presumably introduced In India before nineteenth century. *Lantana camara* is a flowering ornamental, erect, hairy aromatic shrub, it is regarded as a most pervasive, catholic, straggling plant with variegated flower characteristic. The plant is sprawled all round subtropical and tropical part with their ability to accustom in diverse climatic and atmospheric conditions. The leaves possess peculiar characteristics features with decussate with leathery texture, rough bristled upper surface, pubescent lower surface and dentate leaf margin leaves and twigs are used as a green mulch. Different parts of plant have been considered to possess various constituents like phenolic compounds, essential oils, flavonoids, alkaloids, quinine, tannin, carbohydrates, proteins, glycosides, steroids, iridoid glycosides, oligosaccharides, saponins, terpenoids. *Lantana camara* predominantly the leaves have been used in the treatment of wound healing, scratching, toothache stomachache, bronchitis, rheumatism, biliary fever, antiseptic and in variety of infections. Retrospective researches presaged that leaf extract could offer protection against multiple disorders. Due to presence of vital corresponding component, antioxidant, antibacterial activity has been chosen for the study. [1-5]

## 2. Materials and Methods

Analytical grade chemicals and reagents had been used for the purpose of study all the chemicals were procured from Central Drug House (P) LTD. New Delhi, the glassware used in the study was borosilicate and ASGI mark. Pharmaspec Shimadzu UV-VIS Spectrophotometer model UV-1700, Japan has been used.

### Collection and Processing of Plant Material

The leaves of *Lantana camara* have been collected in the month of September from sideways to the road, Bhopal MP. The collected plant leaves were thoroughly washed with tap water then shade dried till crumpled. The dried leaves were used to made coarse powder. The powder is shifted to obtain uniform size, The powdered was then subjected to extraction with selected solvents

### Extraction of Plant Material

The hydro alcoholic extract has been prepared by soaking the powdered sample in 80% ethanol. 250g of coarsely powdered plant sample was macerated with 80% ethanol for seven consecutive days in closed flask with occasional stirring. The extract was collected and filtered using whatman filter paper, the filtrate was evaporated and concentrated to remove excess solvent under reduced pressure at 35°C in rotary evaporator. The concentrated extract was then placed in the desiccators to expunge residual solvent.

### *In-vitro* Anti-oxidant Activity

Antioxidant potential of *Lantana camara* leaves extract has been evaluated by DPPH radical scavenging method. The comparison of sample data was made with ascorbic acid as standard antioxidant compound. 0.1mM solution of 2,2-Diphenyl-1-picrylhydrazyl (DPPH) was prepared in methanol.[6-8]

### Preparation of Sample/Standard

One mg of ascorbic acid and *Lantana camara* dried powdered extract were dissolved individually in 1ml of methanol to get 1mg/ml standard and sample stock solution. Dilutions were made to get the viable concentration of 20,40,60,80,100 µg/ml for both standard and sample in methanol. 2 ml of 0.1mM DPPH reagent was added and mixed thoroughly to each test tubes of sample and standard. The mixture is then incubated for 30 minutes in dark condition away from light then absorbance of standard and sample were recorded at the wavelength 517 nm. [6-8]

**Preparation of Control**

Three milliliters of 0.1mM DPPH solution was prepared. The solution was incubated for 30 minutes at room temperature in dark condition. Absorbance of the control solution has been recorded against methanol as blank at 517 nm. The antioxidant activity of sample/ standard was reckoned by using formula. [6-8]

Percentage Inhibition = [(Abs of control- Abs of sample/ Abs of control x 100]

**Antibacterial Activity**

Antimicrobial efficiency of the sample extract has been tested through well diffusion assay against gram positive bacteria *S. aureus* MTCC 10787 and gram-negative bacteria *E. coli* MTCC 42. The nutrient culture media was prepared by addition of twenty-eight-gram nutrient agar in one litre of distilled water. The media pH was checked after formulation and recorded for future reference. The media was sterilized through autoclave at 121ºC at 15 lbs pressure for 15 minutes, sterilized media was stand to cool and poured into plates before it gets solidified the process was carried out in laminar air flow. [9-13]

**Well diffusion assay**

The sample solution was prepared by mixing 1% and 2% of test extract discretely with distilled water. The culture of specific bacterial strain was spread on prepared media. Standard solution for comparison with test was prepared by dissolving one mg of ofloxacin and gentamycin in 1ml of distilled water to get 1mg/1ml of standard solution. The inoculum of *E. coli* MTCC42 and *S. aureus* MTCC 10787 were prepared, preliminary test organisms were inoculated in 10 mL of nutrient broth. The bacterial suspension was optimized to get $10^8$ CFU/ml. 100 µl of the inoculum was taken and transferred in to clear and sterile solidified agar media. Three wells of 6 mm were made by sterile cork-borer. The initial two wells were filled with test sample with concentration of 1% and 2% furthermore, third well were filled with 50µl of standard drug. The standard and sample were vault in sterile condition and allowed to diffuse for 30 minutes at room temperature. All samples were incubated for 24 hours at 37ºC. The incubated plates were inspected for effect of test sample and standard. The clearing zone observed around the well portend antimicrobial efficiency of tested compounds. The zone of inhibition was measured and calculated in mm with ruler to the back of the inverted petri plate. [9-13]

**Table 1:** DPPH radical scavenging activity of ascorbic acid

| Concentration (µg/ml) | Percentage inhibition |
|---|---|
| 20 | 58.985 |
| 40 | 67.124 |
| 60 | 75.792 |
| 80 | 83.298 |
| 100 | 88.900 |
| Control | 0 |
| IC50 | 16.45 |

**Table 2:** DPPH radical scavenging activity of *Lantana camara*

| Concentration (µg/ml) | Percentage inhibition |
|---|---|
| 20 | 55.391 |
| 40 | 64.904 |
| 60 | 70.613 |
| 80 | 79.386 |
| 100 | 81.183 |
| Control | 0 |
| IC50 | 17.80 |

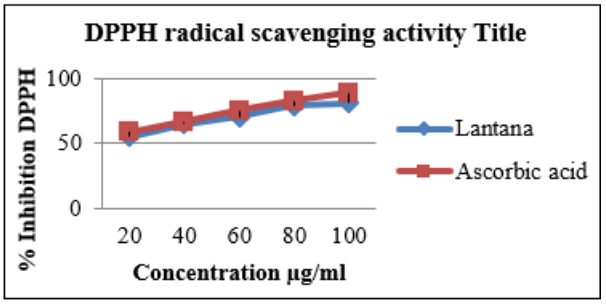


**Figure 1:** Graph represents the percentage inhibition *vs* concentration of sample extracts

**Table 3:** Antimicrobial activity of extract against *S. aureus*

| Extract | Plate 1 | Plate 2 | Plate 3 | Mean±SD |
|---|---|---|---|---|
| 1% | 8 mm | 7 mm | 8 mm | 7.33±0.653 |
| 2% | 14 mm | 15 mm | 16 mm | 15 ±1.132 |
| Control | 0mm | 0mm | 0mm | 0±00 |
| Gentamycin (1mg/ml) | 22 mm | 21 mm | 25 mm | 22.66±2.356 |

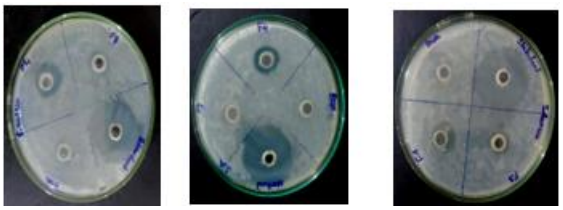

**Figure 2:** Antimicrobial activity of extract against *S. aureus*

**Table 4:** Antimicrobial activity of extract against *E.coli*

| Extract | Plate 1 | Plate 2 | Plate 3 | Mean±SD |
|---|---|---|---|---|
| 1% | 15 mm | 14 mm | 16 mm | 15 ±1.132 |
| 2% | 19 mm | 18mm | 19 mm | 18.66±0.653 |
| Control | 0mm | 0mm | 0mm | 0±00 |
| Gentamycin (1mg/ml) | 25 mm | 26 mm | 25 mm | 25.33±0.653 |

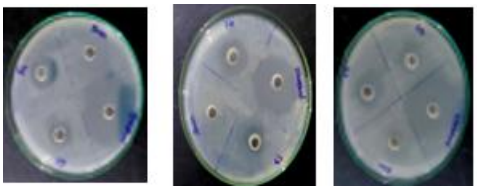

**Figure 3:** Antimicrobial activity of extract against *E. coli*

## 3. Result and Discussion

The DPPH radical scavenging potential of standard and extract has been compared to access the antioxidant potential of ethanolic extract the result indicated that the ethanolic extract of leaves had good antioxidant potential with $IC_{50}$ of 17.80 compared to standard $IC_{50}$ of 16.45. The antibacterial efficacy was tested against gram positive *S. aureus* and gram-

negative *E. coli.* bacteria. The ethanolic extract of leaves displayed greater potential of antibacterial against *S. aureus* at 2% concentration with the inhibition of 15 ±1.132 as compared to 1% with the inhibition of 7.33±0.653. the antibacterial activity of leaves extract against *E. coli.* has been acclivitous at 2% concentration with the zone of inhibition of 18.66±0.653 as compared to 1% with inhibition of 15 ±1.132, while compared both strain it was found that the extract had greater antibacterial against gram negative *E. coli.* The results supported that the plant had good antioxidant and antibacterial action that could be used for their rewarding effect in different formulations.

## 4. Conclusion

*Lantana camara* is a tropical plant thrived profusely in different part of world. Increasing demand of herbal products inclined to explore the new potential substance from natural origin that could give better and safer alternative and efficiently. In this study we have tested the antioxidant and antibacterial potential of *Lantana camara* leaves. The results presage that the *Lantana camara* extracts had positive outcome on the parameter tested and could be used for its antibacterial and antioxidant potential. Further study needed to refine the extract by using isolated components and some more pharmacological evaluation needed expand the regime of drug.

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