



## **Antimicrobial Activity of Fruits and Leaves Extracts of *Datura stramonium***

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### **ABSTRACT**

*Aqueous, alcoholic extracts of Datura stramonium was prepared. The antimicrobial activity of the mature leaves and fruits of Datura stramonium was studied against six laboratory microbial strains viz. E.coli, Klebsiella spp., Bacillus subtilis, Staphylococcus aureus, Aspergillus niger, and Rhizopus spp. Aqueous, Methanol and ethanol extracts of leaves and fruits of Datura stramonium showed antimicrobial effects against all the microorganisms. Leaves of Datura stramonium showed maximum activity against gram positive test bacteria and test fungal species while aqueous fruit extracts of Datura stramonium showed maximum inhibitory effect against E.coli. When compared with gentamycin aqueous, ethanol and methanol solutions of leaves and fruits of Datura stramonium seem to be equally effective against E.coli and Rhizopus spp. Both the fresh leaves and the fruit extract showed the best antimicrobial activity against the E.coli, Klebsiella spp., Bacillus subtilis.*

**Key words:** *Datura stramonium extract, Zone of inhibition, Antibacterial activity, Antifungal activity, Agar well diffusion method.*

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### **INTRODUCTION**

Plants are rich in a wide variety of secondary metabolite such as tannins, terpenoids, alkaloids and flavonoids etc, which have been found to exhibit antimicrobial properties [1]. *Datura stramonium* L., also known as thorn apple, Jamestown weed or Devil's trumpet, is a bushy annual belonging to the Solanaceae family [2]. It is an erect annual herb forming a bush up to 3–5 ft (1– 1.5 m) tall. *Datura*, is a genus of flowering plants known for their medicinal properties. One of the most notable medicinal properties of *Datura* is its antimicrobial activity, which refers to its ability to inhibit the growth of microorganisms such as bacteria, fungi, and viruses. *Datura stramonium* Linn (Solanaceae) grows as a wasteland weeds [11] *D. stramonium* is a wild growing plant, used frequently as an anti-asthmatic treatment and it is also known for its hallucinogenic and euphoric effects (7, 10, 12). It is mostly found in the tropical and temperate areas of the world. The antimicrobial properties of *Datura* have been extensively studied and have shown promising results, making it a potential candidate for the development of new antimicrobial agents. In this context, we have explored the antimicrobial activity of *Datura* and its potential applications as medicinal plant [4, 5, 6].

### **MATERIALS & METHODS**

#### **Collection of Plant Material**

Plant material of fresh leaves and fruits of *Datura stramonium* was collected from Karad city, Maharashtra, India.

#### **Preparation of Extract**

For the preparation of plant extract 20 g of leaf powder was extracted in a Soxhlet Apparatus using 200 mL of methanol solvent. The extract were concentrated using rotary evaporator. The extract obtained were weighed and kept at 40C. 15 mg of this residue was dissolved in 1 mL of DMSO (5%) as a solvent, same procedure was used with ethanol and water as solvents and were used as the test extracts for antimicrobial activity [8].

#### **Antimicrobial Assay [3,14]**

Various concentrations of ethanolic, methanolic and water extracts of *Datura* leaves and fruits were prepared and subjected to determination of antimicrobial activity against the test organisms *Bacillus subtilis*, *E.coli*, *Klebsiella spp.*, *Staphylococcus aureus*, *Aspergillus niger* & *Rhizopus spp.* by paper disk agar well diffusion method. The minimum inhibitory concentrations of the extracts were also determined.

## RESULTS, DISCUSSION & CONCLUSION

In the present study, we have collected the leaves and fruits of *Datura stramonium* from karad city and the methanolic, water and ethanolic extracts were prepared from it.

Study result indicates the antimicrobial potential of *Datura stramonium* for its use in medicine (Tables -1 and 2). However, further detailed study should be taken up to explore the possibility of its use in new medications. The antimicrobial activity of the mature leaves and fruits of *Datura stramonium* was studied against six laboratory microbial strains viz. *E.coli*, *Klebsiella*spp., *Bacillus subtilis*, *Staphylococcus aureus*, *Aspergillus niger*, and *Rhizopus*spp (Photoplates 1, 2, 3, and 4). Aqueous Methanol and ethanol extracts of leaves and fruits of *Datura stramonium* showed antimicrobial effects against all the microorganisms. The minimum inhibitory concentration of aqueous extracts of leaves against *Bacillus subtilis* and *Aspergillus niger* was found to be 1:4 and 1:8 dilution of extract. The methanol extract of leaves against *Bacillus subtilis* was found to be a 1:8 dilution of the extracts. The minimum inhibitory concentration of aqueous extract of fruit against *E.coli* and *Aspergillus niger* was found to be 1:4 dilution of the extract and methanol extract of fruit against *Staphylococcus aureus* and *Aspergillus niger* was found to be 1:8 and 1:4 dilution of the extract. The ethanol extract of fruit against *Staphylococcus aureus* and *Rhizopus spp.* was found to be a 1:4 dilution of the extract. The ethanol extract of fruit against *Staphylococcus aureus* and *Rhizopus spp.* was found to be a 1:4 dilution of the extract. The study result indicates the antimicrobial potential of *Datura stramonium* for its use in medicine.

**Table 1: Antimicrobial activity of Datura leaves**

Name of the test microorganism	Zone of Inhibition in mm			
	Ethanol extract	Methanol extract	Aqueous extract	Gentamycin
<i>B. subtilis</i>	20	20	20	35
<i>S. aureus</i>	20	17	18	30
<i>Klebsilla.spp</i>	10	20	15	40
<i>E. coli</i>	15	17	25	39
<i>A. Niger</i>	19	24	20	26
<i>Rhizopus spp</i>	20	20	18	30

**Table 2: Antimicrobial activity of Datura Fruits**

Name of the test microorganism	Zone of Inhibition in mm			
	Ethanol extract	Methanol extract	Aqueous extract	Gentamycin
<i>B. subtilis</i>	15	16	18	20
<i>S. aureus</i>	20	20	19	27
<i>Klebsilla.spp</i>	20	18	16	24
<i>E. coli</i>	18	19	20	18
<i>A. niger</i>	20	15	18	17
<i>Rhizopus spp</i>	24	20	18	18

**Table 3: Minimum Inhibitory concentration of various extracts of Datura fruits & Leaves**

Name of the test microorganism	Minimum Inhibitory concentration of Datura extract against test organisms					
	Ethanol extract		Methanol extract		Aqueous extract	
	Fruits	Leaves	Fruits	Leaves	Fruits	Leaves
<i>B.subtilis</i>	1:4	1:4	1:8	1:8	1:4	1:2
<i>S.aureus</i>	1:4	1:4	1:4	1:4	1:2	1:2
<i>Klebsilla.spp</i>	1;2	1:2	1:2	1:2	1:1	1:1
<i>E.coli</i>	1:8	1:8	1:1	1:1	1:2	1:4
<i>A.niger</i>	1:8	1:8	1:2	1:2	1:8	1:4
<i>Rhizopus spp</i>	1:2	1:8	1:4	1:4	1:2	1:2



**Photoplate 1:** Zone of inhibition against *Rhizopus spp*

**Photoplate 2:** Zone of inhibition against *B.subtilis*



**Photoplate -3:** Zone of inhibition against *E.coli*

**Photoplate -4:** Zone of inhibition against *Aspergillusniger*

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