



# Antimicrobial Activity and Phytochemical Analysis of *Urginea Indica* from Bastar District of Chhattisgarh

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**ABSTRACT**

*Urginea indica* is a medicinal plant found in Bastar District of Chhattisgarh. The present study reports the antimicrobial activity and phytochemical analysis of *Urginea indica*. The antimicrobial activity was tested against various bacteria and fungi. The results showed that *Urginea indica* has significant antimicrobial activity against *Bacillus cerus*, *Bacillus subtilis*, *Staphylococcus aureus*, *Staphylococcus epidermidis*, *Escherichia coli*, *Proteus vulgaris*, *Pseudomonas aeruginosa*, *Klebsiella pneumoneae*, *Aspergillus niger* and *Candida albicans*. The phytochemical analysis revealed the presence of various compounds including alkaloids, flavonoids, saponins, and tannins. The study concludes that *Urginea indica* has potential antimicrobial activity and can be used as a natural source of antimicrobials.

**Keywords:** *Urginea indica*, antimicrobial activity, phytochemical analysis, Bastar District, Chhattisgarh.

## INTRODUCTION

**M**edicinal plants have been used since ancient times for the treatment of various ailments. *Urginea indica* is a medicinal plant found in Bastar District of Chhattisgarh. The present study reports the antimicrobial activity and phytochemical analysis of *Urginea indica*. The antimicrobial activity was tested against various bacteria and fungi. The results showed that *Urginea indica* has significant antimicrobial activity against *Bacillus cerus*, *Bacillus subtilis*, *Staphylococcus aureus*, *Staphylococcus epidermidis*, *Escherichia coli*, *Proteus vulgaris*, *Pseudomonas aeruginosa*, *Klebsiella pneumoneae*, *Aspergillus niger* and *Candida albicans*. The phytochemical analysis revealed the presence of various compounds including alkaloids, flavonoids, saponins, and tannins. The study concludes that *Urginea indica* has potential antimicrobial activity and can be used as a natural source of antimicrobials.

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*Staphylococcus epidermidis*, *Escherichia coli*, *Proteus vulgaris*, *Pseudomonas aeruginosa* & *Klebsiella pneumoniae* viz, *Aspergillus niger* & *Candida albicans*.

**MATERIALS AND METHODS**

**Selection of medicinal plant**

*Urginea indica*

**Collection of the sample**

*Urginea indica*



Figure 1: *Urginea indica*

Table 1:

*Urginea indica*

Plant Parts	Characteristics	Different Solvents used for extraction			
		Chloroform	Acetone	Methanol	Aqueous
Root Extract					
Stem Extract					
Leaf Extract					

**Extraction procedure**

...

**Microorganisms used for the test**

*Bacillus cereus*, *Bacillus subtilis*, *Staphylococcus aureus*, *Staphylococcus epidermidis*, *Escherichia coli*, *Proteus vulgaris*, *Pseudomonas aeruginosa*, *Klebsiella pneumoniae*, *Aspergillus niger* & *Candida albicans*.

4<sup>th</sup>

**Inoculum preparation**

One loop of bacterial culture was inoculated into 10 ml of sterile nutrient broth. The inoculum was incubated at 37°C for 24 hours. The concentration of the inoculum was adjusted to 10<sup>8</sup> CFU/ml.

**Antibacterial activity**

The antibacterial activity was determined by the agar diffusion method. The bacterial suspension (100 µl) was spread on a sterile agar plate. The extract (200 µl) was applied to the center of the plate.

10<sup>8</sup>

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Table 2:

*Urginea indica*

Bacteria	Different Solvents for extraction				Standard antibiotics	
	Chloroform	Acetone	Methanol	Aqueous	P*	S**
<b>Root</b>						
<i>B. cerus</i>	+	+	+	-	+	+
<i>B. subtilis</i>	-	-	-	-	+	+
<i>S. aureus</i>	+	+	+	-	+	+
<i>S. epidermidis</i>	+	+	+	-	+	+
<i>E. coli</i>	-	-	-	-	+	+
<i>P. vulgaris</i>	-	-	-	-	-	+
<i>P. aeruginosa</i>	+	+	+	-	-	+
<i>K. pneumoneae</i>	+	+	+	-	-	+
<b>Stem</b>						
<i>B. cerus</i>	+	+	+	-	+	+
<i>B. subtilis</i>	-	-	-	-	+	+
<i>S. aureus</i>	+	+	+	-	+	+
<i>S. epidermidis</i>	+	+	+	-	+	+
<i>E. coli</i>	-	-	-	-	+	+
<i>P. vulgaris</i>	-	-	-	-	-	+
<i>P. aeruginosa</i>	+	+	+	-	-	+
<i>K. pneumoneae</i>	+	+	+	-	-	+
<b>Leaf</b>						
<i>B. cerus</i>	-	-	-	-	+	+
<i>B. subtilis</i>	-	-	-	-	+	+
<i>S. aureus</i>	+	+	+	-	+	+
<i>S. epidermidis</i>	+	+	+	-	+	+
<i>E. coli</i>	-	-	-	-	+	+
<i>P. vulgaris</i>	-	-	-	-	-	+
<i>P. aeruginosa</i>	+	+	+	-	-	+
<i>K. pneumoneae</i>	-	-	-	-	-	+

**Antifungal activity**

The antifungal activity was determined by the agar diffusion method. The fungal suspension (100 µl) was spread on a sterile agar plate. The extract (200 µl) was applied to the center of the plate.

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Qualitative phytochemical analysis

*Urginea indica*

Test for Alkaloids

Test for Alkaloids: ...

Test for Flavonoids

Test for Flavonoids: ...

Test for Saponins

Test for Saponins: ...

Test for Tannins

Test for Tannins: ...

Test for phytosterols

Test for phytosterols: ...

Test for Glycosides

Test for Glycosides: ...

Test for Quinones

Test for Quinones: ...

Test for Resins

Test for Resins: ...

RESULTS AND DISCUSSION

RESULTS AND DISCUSSION: ... *Urginea indica* viz., ... *Bacillus*



cerus, *Bacillus subtilis*, *Staphylococcus aureus*, *Staphylococcus epidermidis*, *Escherichia coli*, *Proteus vulgaris*, *Pseudomonas aeruginosa* & *Klebsiella pneumoniae*.

*Bacillus cerus*  
*Staphylococcus epidermidis* & *Staphylococcus aureus*  
*Bacillus cerus* & *Staphylococcus epidermidis* & *Staphylococcus aureus*,

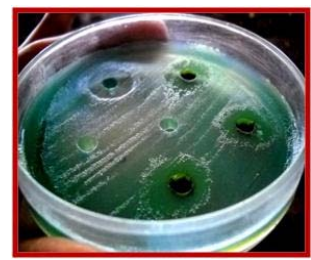
*Pseudomonas aeruginosa* & *Klebsiella pneumoniae*  
*Proteus vulgaris* & *Escherichia coli*  
*Pseudomonas aeruginosa* & *Proteus vulgaris* & *Escherichia coli*

*Pseudomonas aeruginosa* & *Klebsiella pneumoniae*  
*Proteus vulgaris* & *Escherichia coli*  
*Pseudomonas aeruginosa* & *Proteus vulgaris* & *Escherichia coli*

*Aspergillus niger* & *Candida albicans*  
*Aspergillus niger* & *Candida albicans*  
*Aspergillus niger* & *Candida albicans*

*Aspergillus niger* & *Candida albicans*  
*Aspergillus niger* & *Candida albicans*  
*Aspergillus niger* & *Candida albicans*

*Pseudomonas aeruginosa*



(a) *Pseudomonas aeruginosa*

*Bacillus cerus*



(b) *Bacillus cerus*

Figure 2: *Pseudomonas aeruginosa* & *Bacillus cerus*

Fungal Species	<i>A.niger</i>	<i>C.albicans</i>
<b>Root</b>		
1	-	-
2	+	+
3	+	+
4	-	-
5	+	+
<b>Stem</b>		
1	-	-
2	+	+
3	+	+
4	-	-
5	+	+
<b>Leaf</b>		
1	-	-
2	+	+
3	+	+
4	-	-
5	+	+



(a) *Candida albicans*



(b) *Aspergillus niger*

Figure 3: *Candida albicans* & *Aspergillus niger*

*U. indica* & *B. cerus*

*P. aeruginosa*

*Candida albicans*

*Aspergillus niger*

*Urginea indica*

Table 4:

Bacterial Species	Different Solvents used for extraction								
	Chloroform			Acetone			Methanol		
	Root	Stem	Leaf	Root	Stem	Leaf	Root	Stem	Leaf
<i>B. cerus</i>	+	+	-	+	+	-	+	+	-
<i>B. subtilis</i>	-	-	-	-	-	-	-	-	-
<i>S. aureus</i>	+	+	+	+	+	+	+	+	+
<i>S. epidermidis</i>	+	+	+	+	+	+	+	+	+
<i>E. coli</i>	-	-	-	-	-	-	-	-	-
<i>P. vulgaris</i>	-	-	-	-	-	-	-	-	-
<i>P. aeruginosa</i>	+	+	+	+	+	+	+	+	+
<i>K. pneumoneae</i>	+	+	-	+	+	-	+	+	-

Table 5:

*Urginea indica*

Fungal Species	Different Solvents used for extraction					
	Acetone			Methanol		
	Root	Stem	Leaf	Root	Stem	Leaf
<i>A. niger</i>	+	+	+	+	+	+
<i>C. albicans</i>	+	+	+	+	+	+

Table 6:

*Urginea indica*

Phytochemical Test	Chloroform	Acetone	Methanol	Aqueous
<b>Alkaloids</b>				
DM	-	+	-	-
GV	-	+	-	-
G	-	+	-	-
<b>Flavonoids</b>				
G	+	+	+	+
H	+	+	+	+
<b>Tannins</b>				
E rB	-	+	-	-
B	-	+	-	-
<b>Phytosterols</b>				
W	+	+	+	+
W B	+	+	+	+
<b>Saponins</b>				
W	-	+	-	-
<b>Glycosides</b>	-	+	+	+
<b>Quinones</b>	-	+	-	-
<b>Resins</b>	+	+	-	-

Table 7:

*Urginea indica*

Phytochemical Test	Chloroform	Acetone	Methanol	Aqueous
<b>Alkaloids</b>				
Alkaloids	-	+	-	-
Alkaloids	-	+	-	-
Alkaloids	-	+	-	-
<b>Flavonoids</b>				
Flavonoids	-	+	+	+
Flavonoids	-	+	+	+
<b>Tannins</b>				
Tannins	-	+	-	-
Tannins	-	+	-	-
<b>Phytosterols</b>				
Phytosterols	+	+	+	+
Phytosterols	+	+	+	+
<b>Saponins</b>				
Saponins	-	+	-	-
Glycosides	-	+	+	+
Quinones	-	-	-	-
Resins	+	+	-	-

Table 8:

*Urginea indica*

Phytochemical Test	Chloroform	Acetone	Methanol	Aqueous
<b>Alkaloids</b>				
Alkaloids	-	-	-	-
Alkaloids	-	-	-	-
Alkaloids	-	-	-	-
<b>Flavonoids</b>				
Flavonoids	-	+	+	+
Flavonoids	-	+	+	+
<b>Tannins</b>				
Tannins	-	-	-	-
Tannins	-	-	-	-
<b>Phytosterols</b>				
Phytosterols	+	+	+	+
Phytosterols	+	+	+	+
<b>Saponins</b>				
Saponins	-	-	-	+
Glycosides	-	-	-	+
Quinones	-	-	-	-
Resins	+	-	-	-

Urginea indica

**CONCLUSION**

Urginea indica is a medicinal plant. It contains various phytochemicals. The study shows that it has antibacterial and antifungal activity. The active ingredients are identified as Bacillus cerus, Pseudomonas aeruginosa, Aspergillus niger and Candida albicans.

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10. [Reference 10]
11. [Reference 11]
12. [Reference 12]
13. [Reference 13]
14. [Reference 14]
15. [Reference 15]
16. [Reference 16]
17. [Reference 17]
18. [Reference 18]
19. [Reference 19]
20. [Reference 20]



Q	Q	Q	Q	Q	Q	Q	Q
0	Portulaca oleracea	3	Pilanthus acmella				
2	Allium humile	In vitro	2	Bauhinia rufescens			
2			3				
2	Solanum aculeastrum		3	agnus-Castus		Vitex	
2			3				
2	Distemonanthus benthamianus		8				
2	Citrus sinensis		3				
2		curcuma,	8				
2	Enantia chlorantha		9				
2	Acanthephippium bicolor		4				
0			4				

Source of Support: N Conflict of Interest: N