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ANTIBACTERIAL POTENTIAL OF *ADHATODA VASICA* AND *BAUHINIA RACEMOSA* AGAINST MULTI DRUG RESISTANT *KLEBSIELLA* SPECIES

Rahul Rajendra Shelke*[1] and Dr. Meera Chavan[1]

Department of Microbiology, Walchand College of Arts and Science Solapur, Dist- Solapur, Maharashtra, India.

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***Corresponding Author**
Rahul Rajendra Shelke
Department of Microbiology, Walchand College of Arts and Science Solapur, Dist- Solapur, Maharashtra, India.

ABSTRACT

Historically plants provided best source of drug compounds. In the present study *Adhatoda vasica* and *Bauhinia racemosa* showed good antibacterial activity against multi drug resistant *Klebsiella species*. Well diffusion method was used for checking antimicrobial potential of medicinal plants. Different type of *Klebsiella* species isolated from urine sample on MacConkeys agar medium which were labeled as K1 to K10. These isolates identified with the help of VITEK-2 compact and 16srRNA sequencing this sequence submitted on ENA, their accession no. released. Drug resistant capacity of *klebsiella* species was checked on VITEK -2 compact. *Adhatoda vasica* showed best antibacterial activity against *Klebsiella* species and maximum species showed resistant against *Bauhinia racemosa*.

KEYWORD: *Adhatoda vasica*, multi drug resistant, *Bauhinia racemosa*, *Klebsiella spp*., VITEK-2.

INTRODUCTION

Today's most problematic urinary tract infection causing multi drug resistant bacteria are *pseudomonas* and *Klebsiella* species. These bacteria are resistant to antibiotic but medicinal plants are most effective against different type of infection. In medicinal plants present the bioactive compounds which showed the antibacterial activity against *Klebsiella, Pseudomonas, Staphylococci, Proteus.* Multi drug resistant bacteria to one or more therapeutic classes but it showed inhibition zone against some medicinal plants. It detect the

given bacteria are sensitive to these particular plant extract. Treatment of Multi drug resistant bacteria are very difficult. Maximum *Klebsiella* and *Pseudomonas* species which is isolated from urine sample it cause urinary tract infection that affects any parts of the urinary tract. Urinary tract infection is greater in women than men mostly UTI causing Gram negative bacteria that belong to the family *Enterobacteriaceae*, the main risk of multi drug resistant bacteria for human, health is that resistance genes are transferred from environmental bacteria to human pathogenic bacteria.

In the developing countries like India diseases are major cause of death. As human life become faster, he wants fast recovery from illness. Antibiotics give fast relief so its use increased. Antimicrobial agents are essential for reducing infectious diseases. The bacterial resistances to antimicrobial agents are hazardous for human health. It increases hospitalization. Due to indiscriminate use of antibiotics the situation is alarming worldwide. Alternative to treat various infectious diseases plants used for traditional medicine. In many countries primary health care is traditional medicine. India is well known for Ayurveda, as traditional medicine. Herbal medicines have been the source to overcome the side effect of currently available antimicrobial agents. Medicinal plants are renewable resources so that farmers can use them in traditional agriculture. India has diverse vegetation and rich sources of herbal plants. There are 45000 species of wild plants are present in Indian subcontinent, out of which 7500 to 8000 species of medicinal plants are used for tribal health care and only 1500 are in use in Ayurveda. Currently to treat bacterial and other infections most of the drugs were isolated from natural resources.

MATERIALS AND METHODS

Collection of Medicinal plant leaves

Adhatoda vasica and *Bauhinia racemosa* plant leaves were collected from Chincholi forest area, Tal- Barshi, Dist- Solapur.

Isolation and Cultivation of different *Pseudomonas and Klebsiella Species*

Klebsiella species were isolated on MacConkeys agar medium, Gram staining, colony character, biochemical characterization and also VITEK-2 compact used for identification of *Klebsiella* species.

16srRNA sequencing and Phyologenetic analysis carried out for confirmation of *Pseudomonas* and *Klebsiella* species.

Antibiotic Susceptibility test

In this test we have to check the given bacteria are resistant or sensitive to the different antibiotics paper disc method was used and also VITEK-2 used to check Antimicrobial sensitivity test.

Extraction of Plant Material

The plant material leaves were used leaves dried and produce fine powder which is used for to check antibacterial potential against multi drug resistant bacteria for dried powder distilled water used as solvent

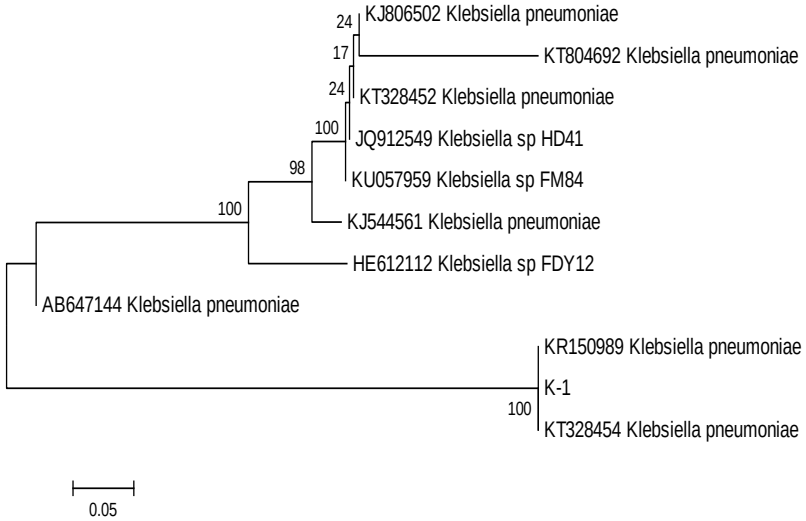
Antibacterial potential of Plant extract

Well diffusion method was used to check antibacterial activity. In this method used nutrient agar plates after incubation plant showed inhibition zone around the well.

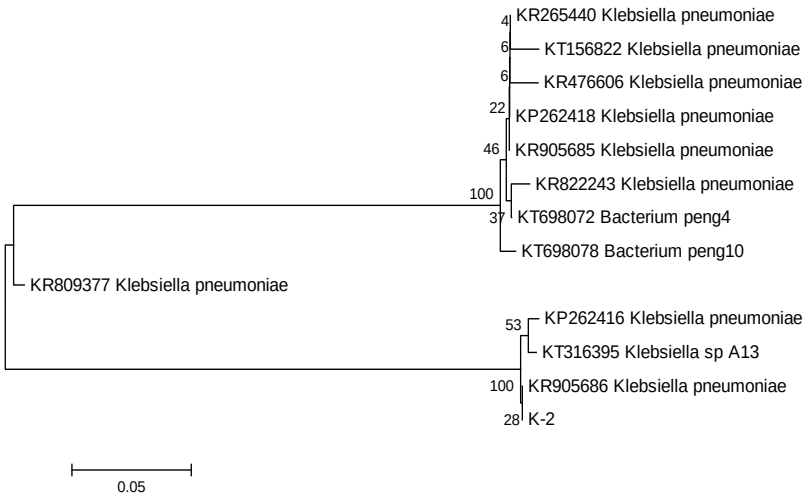
RESULT AND DISCUSSION

Klebsiella species were isolated from clinical sample on MacConkeys agar medium after incubation Gram staining, colony character, Biochemical characterization study carried out Over the span of study it was discovered that confines K1-K10 were gram negative, fermentative, non-motile, catalase positive, oxidase negative, VP positive and negative for MR, indole generation test and also 16srRNA sequencing was done. These sequences are submitted on ENA their accession numbers were released also phylogenetic analysis was done these all over process used for identification and confirmation of *Klebsiella* species.

Phylogenetic analysis of some *Klebsiella* species



K1 (Accession no. LT599734)



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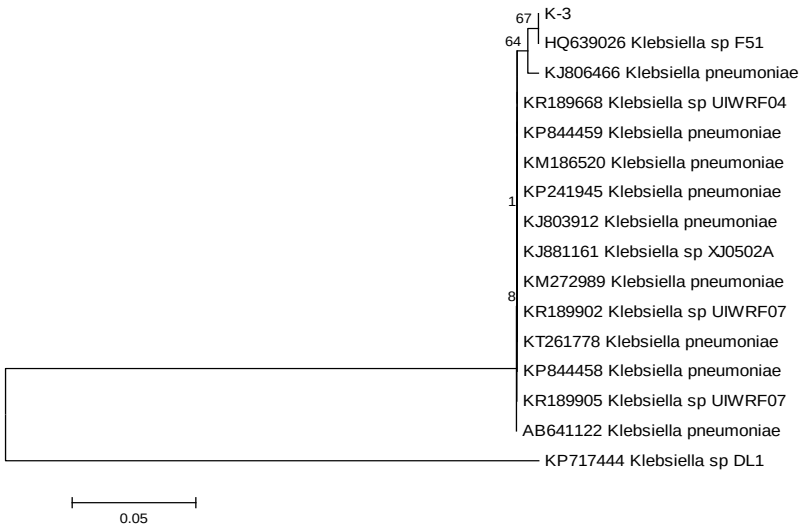

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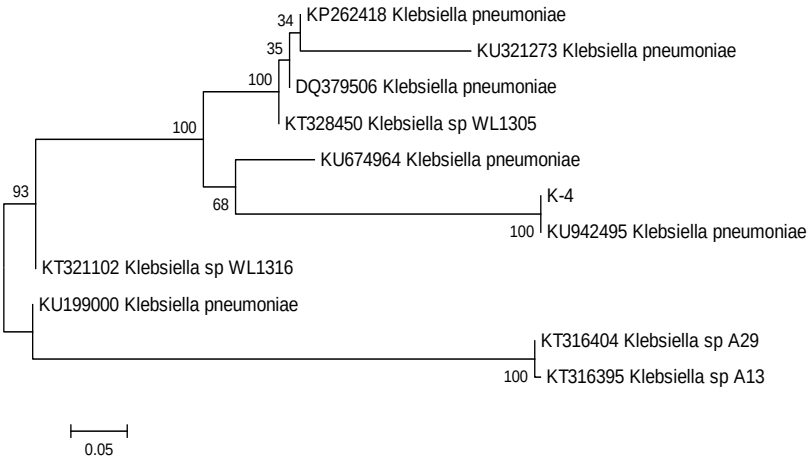

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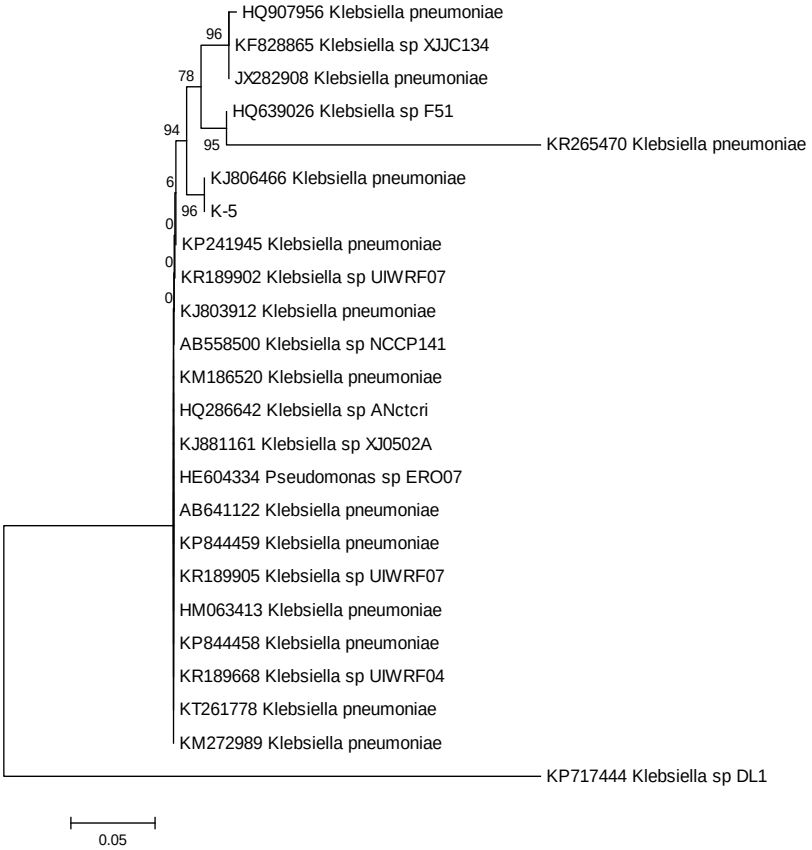

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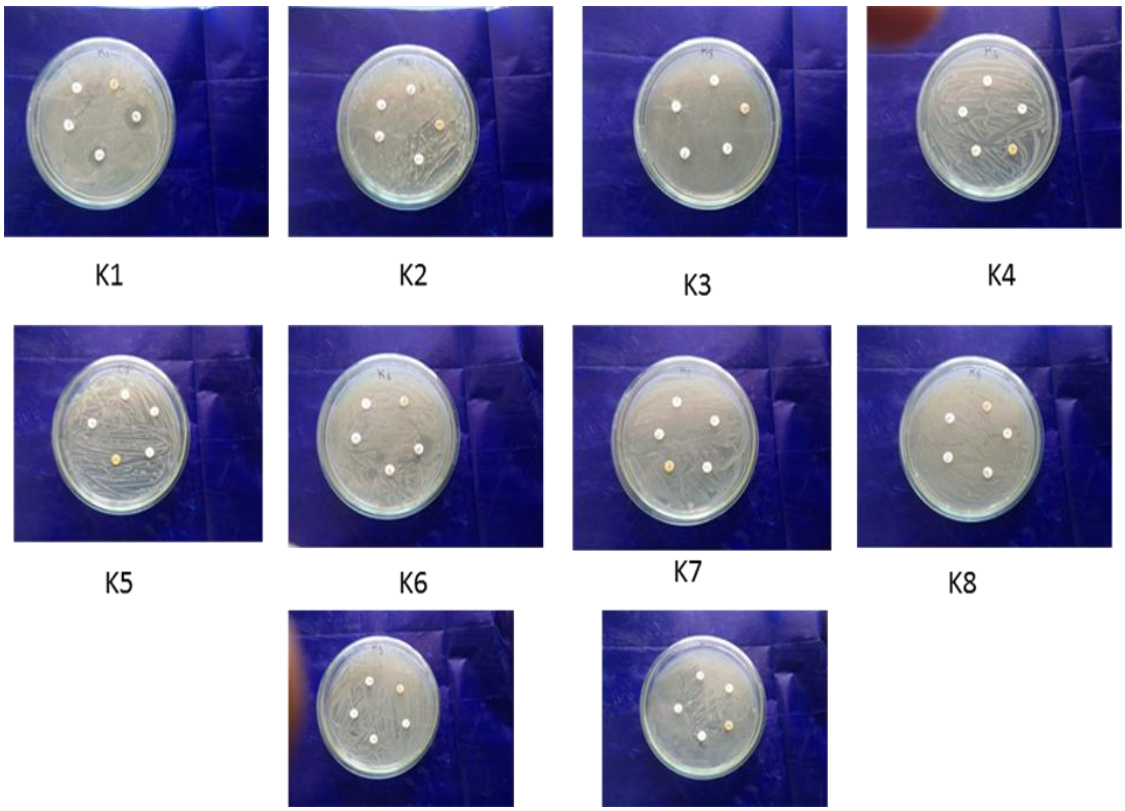


Fig.1 Antibiotic Sensitivity Test against *Klebsiella* species (K1 to K10).

Antibacterial activity of *Adhatoda vasica* and *Bauhinia racemosa against Klebsiella* species

Klebshiella pneumoniae isolates showed variable result in their antibiotic sensitivity pattern against seven commercial antibiotic discs tested. The highest rate of resistance was against streptomycin (70%) followed by 50% to chloramphenicol, Erythromycin, cephradine and gentamicin. Almost 30-40% of the *Klebshiella pneumoniae* isolates were resistant to ciprofloxacin, co-trimoxazole and azithromycin (Podschun et al., 1998).

Table 1.

Klebsiella species	*Adhatoda vasica* (Inhibition zone Diameter)	*Bauhinia racemosa* (Inhibition Zone Diameter)
K1	20 mm	0 (Resistant)
K2	14 mm	18 mm
K3	0 (Resistant)	0 (Resistant)
K4	15 mm	0 (Resistant)
K5	22 mm	12 mm
K6	0 (Resistant)	0 (Resistant)
K7	14 mm	0 (Resistant)
K8	24 mm	15 mm
K9	15 mm	0 (Resistant)
K10	16 mm	0 (Resistant)

In this table showed maximum multi drug resistant *Klebsiella* species are sensitive to *Adhatoda vasica* but only K3 & K6 are resistant, but maximum multi drug resistant *Klebsiella* species are resistant to *Bauhinia racemosa*.

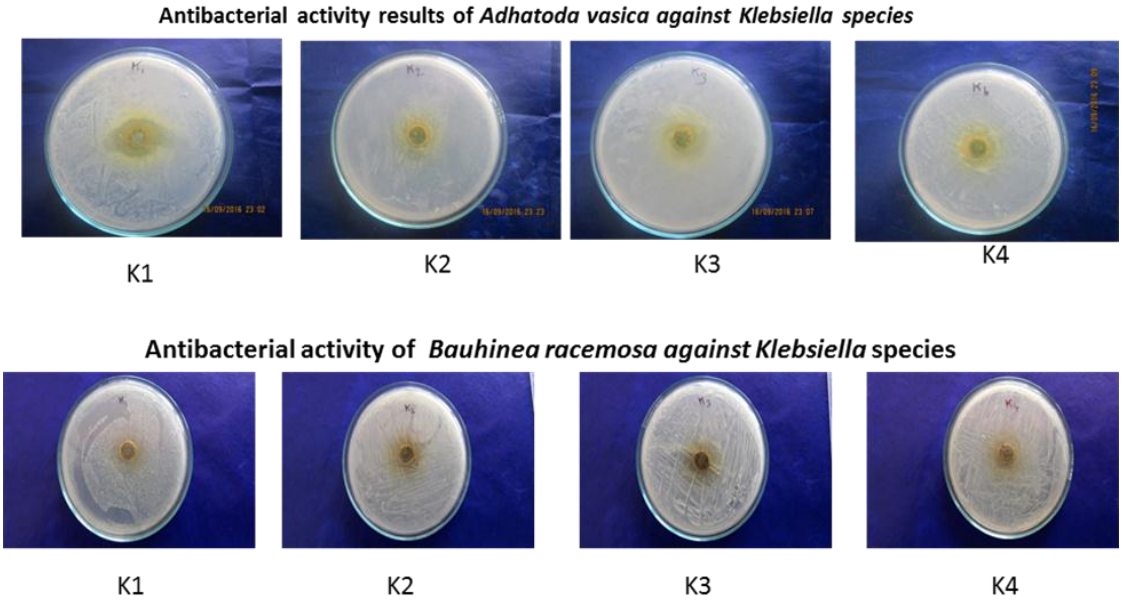
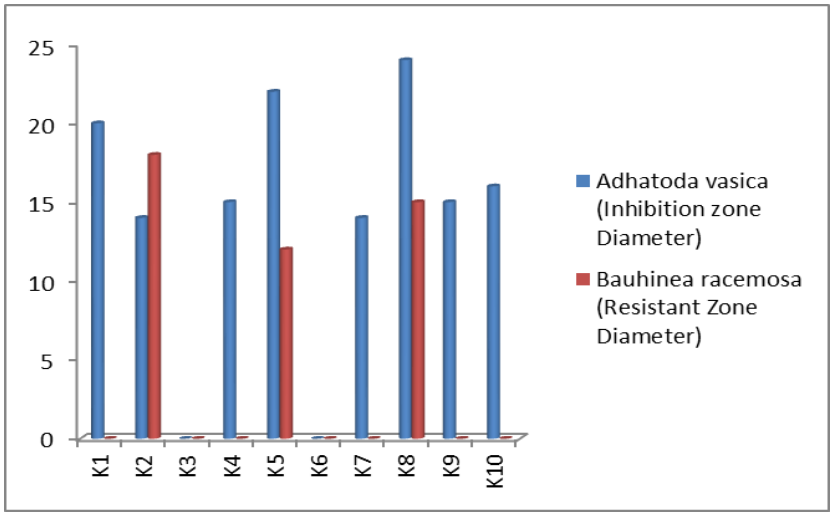


Fig.2.



Plants Extracts activity against *Klebsiella Species.*

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CONCLUSION

Adhatoda vasica recently used for treatment against cold cough, asthma and anti inflammatory action against skin disorder but our conclusion was that *Adhatoda vasica* shows good antibacterial activity against multi drug resistant *Klebsiella species* (highest inhibition zone diameter 28mm against K1 species).

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