Data Article

Data of antibacterial activity of plant leaves crude extract on bacterial isolates of wound infections

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Abstract

Wound infections are caused by various pathogenic microbes such as S. aureus, Non-coagulase Streptococcus, Enterococci, E. coli, Pseudomonas aeruginosa, Klebsiella pneumoniae, Enterobacter, Streptococci, Candida and Acinetobacter. 10–33% of septic wounds infections were seen in India. Multi-drug resistant bacterial infections are increased by day by day and these organisms showed resistant to most available antibiotics. Drug resistance is a common and natural mechanism in microorganisms, because of unbearable use of antibiotics. In this data provides the use of natural plant leaf extracts as alternatives to the multi-drug resistant bacteria. The present article contains the data on the antimicrobial activity of methanol extracts of plant leaves comprising of 11 natural plant species which are widely used as folk medicine. The leaf extracts were used against multi drug resistant bacterial isolates of septic wound infections which were evaluated by the Kirby-beur disk diffusion method. This data showed that among 11 plant methanol leaf extracts; Punica granatum and Syzigium cumini have the potential antibacterial activity against the predominant bacterial isolates of septic wounds that are MDR-P. aeruginosa, S. aureus, K. pneumoniae and E. coli.

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The Data represented in this article showed the potential inhibitory effect of methanol leaf extracts of Acalipha alinifolia (AA), Delonix elata (DE), Digera muricata (DM), Hygrophilia auriculata (HA), Jatropha gasipifed (JG), Maeua oblongifolia (MO), Pterocarpus santalinus (PS), Punica granatum (PG), Syzygium cumini (SC), Gyrocaspus americana (GA), Euphorbia heterophilla (EH) on the bacterial isolates of septic wound infections. The selected natural plants extract has the antibacterial activities and are tabulated in Table 1.

The drug resistant natures of bacteria were evaluated by using antibiotic susceptibility test of eleven antibiotics belonging to the family of six classes. The inhibitor zone around the antibiotic disc on Muller-Hinton agar media were represented in Fig. 1. Diameters of zone of inhibition of various concentrations of antibiotics (10–40 μg/mL) were represented in Fig. 2. The antibiotics Ciprofloxaxin and Gentamycin showed the perfect lysis of MDR-bacterial isolates of septic wounds. The bacteria from each species which showed the drug resistant were selected to analyze the antibacterial activity of methanol extraction of leaf extracts. The selected natural plants extract has the antibacterial activities and are tabulated in Table 1.

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1. Data

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Table 1
Uses of the selected plant species in local folk medicine.

| S.No. | Scientific name         | Common medical uses                                                                 |
|-------|-------------------------|--------------------------------------------------------------------------------------|
| 1     | Acalipha alinifolia     | Anti-bacterial, antifungal, and anthelmintic properties                                |
|       |                         | asthma, pneumonia, scabies and skin diseases                                          |
| 2     | Delonix elata           | The leaf extracts are anti-inflammatory agents                                         |
| 3     | Digera muricata         | Antibacterial, antifungal, diuretic, laxative, Free radical scavenger activity,        |
|       |                         | anthelmintic.                                                                          |
| 4     | Hygrophilia auriculata  | Medicinal usage in Indian Ayurveda                                                     |
| 5     | Jatropha gasipifed      | Produces biodiesel from oils of Jatropha                                               |
| 6     | Mauea oblongifolia      | The roots of this plant possess alternative, tonic and medicinal properties            |
| 7     | Pterocarpus santalinus  | Antipyretic, anti-inflammatory, anthelmintic, tonic, hemorrhage, dysentery, aphrodisiac, |
|       |                         | anti-hyperglycemic and diaphoretic.                                                    |
| 8     | Syzygium cumini         | Ayurveda, Unani and Chinese medicine for digestive ailments.                           |
| 9     | Gyrocaspus americana    | Unknown Medicinal values                                                                |
| 10    | Punica granatum         | unproven anti-disease benefits                                                         |
| 11    | Euphorbia heterophilla  | The latex exuded of this plant used for dermatitis                                      |

Fig. 1. Antibiotic susceptibility pattern of MDR-bacterial isolates of septic wound infections. The bacterial lawn showed the zone of inhibition around the disc (40 µg/mL) of the used antibiotics on the bacterial isolates of septic wound infections. Where A. P. aeruginosa, B. S. aureus, C. K. Pneumoniae and D. E. coli on the MH agar media. Bacteria showed the highly sensitive towards to Gentamycin (GM), Ciprofloxacin (CF), and Vancomycin (VM), moderately sensitive to Streptomycin, Tetracycline, Kanamycin and resistant to remaining antibiotics used in this data.
2. Experimental design, materials and methods

2.1. Antibiotic susceptibility test (AST)

The predominant bacterial isolates from septic wound patients were tested for antibiotic susceptibility pattern by eleven different antibiotics. The used antibiotics are benzyl penicillin, amoxicillin, ampicillin, kanamycin, tobramycin, gentamycin, streptomycin, cefotaxime, vancomycin, tetracycline and ciprofloxacin. Antimicrobial susceptibility pattern was detected by performing on Mueller-Hinton agar by the standard method [1] following Kirby-Bauer disk diffusion method. After incubation period, diameter of the zone of inhibition around the discs were measured using Fig. 2. Zone of inhibition showed by eleven antibiotics against bacterial isolates of septic wound infections. The zones of inhibition of antibiotics on the bacteria at different concentrations (10, 20, 30 and 40 μg/mL). GM: Gentamycin, AMP: Ampicillin, AM: Amoxillin, CT: Cefotaxime, BP: Benzyl Penicillin, CF: Ciprofloxacin, TC: Tetracycline, SM: Streptomycin, VM: Vancomycin, KM: Kanamycin, TM: Tobramycin. Where A. P. aeruginosa, B. S. aureus, K. pneumoniae and D. E. Coli. 40 μg/mL concentration of Amoxicillin, Ampicillin and Benzyl penicillin forms the wide zone of inhibition than the remaining antibiotics used in this data.

Table 2
Effect of methanol plant extracts on the MDR-bacterial isolates.

| Bacterial isolates | Leaf extracts of medicinal plants |
|--------------------|-----------------------------------|
|                    | PG | SC | DE | DM | EH | GA | MO | PS | AA | HA | JG |
| S. aureus          | +  | +  | -  | -  | -  | -  | -  | -  | -  | -  | -  |
| P. aeruginosa      | +  | +  | -  | -  | -  | -  | -  | -  | -  | -  | -  |
| K. pneumoniae      | +  | +  | -  | -  | -  | -  | -  | -  | -  | -  | -  |
| E. coli            | +  | +  | -  | -  | -  | -  | -  | -  | -  | -  | -  |

Keys: (+) inhibition zone, (−) no inhibition zone, Punica granatum (PG), Syzygium cumini (SC), Delonix elata (DE), Digera muricata (DM), Jatropha gossipifera (JG), Moeua oblongifolia (MO), Pterocarpus santalimus (PS), Gyrocaspus americana (GA), Acalipha alinifolia (AA), Hygrophila auriculata (HA)/Euphorbia heterophylla (EH). Punica granatum (PG), Syzygium cumini showed the lytic activity and forms the zone around the disc against the MDR-bacteria of septic wound infections.
2. Collection of medicinal plants

The medicinal plant samples were collected from Yogi Vemana University garden, Kadapa district, Andhra Pradesh. The plants such as Acalipha alinifolia (AA), Delonix elata (DE), Digera muricata (DM), Hygrophilia auriculata (HA), Jatropha gasipifed (JG), Maeva oblongifolia (MO), Pterocarpus santalinus (PS), Punica granatum (PG), Syzygium cumini (SC), Gyrocaspus americana (GA), Euphorbia heterophilla (EH). These leaf extracts were used to test antibacterial efficiency on the predominant bacterial isolates of septic wound patients which are P. aeruginosa, S. aureus, E. coli and K. pneumoniae which were previously described in Pallavali et al. [3]. Most of these plants were used as traditional and folk medicinal practices.

2.3. Medicinal plant leaf extraction and antibiotic susceptibility pattern

Air dried powder (100 g) of the selected medicinal plant leaves were mixed with 500 mL of 80% methanol and were kept at room temperature for 36 hours. The mixture was then filtered through Whatmann No.1 filter paper and the filtrate were evaporated to dryness by leaving it inside the oven at constant temperature of 50 °C for 3–4 days. The residues obtained were stored at 4 °C until testing. Four different concentrations 10, 20, 30 and 40 (μg/mL) in 20% dimethyl sulfoxide (DMSO) were prepared and used for determination of antimicrobial susceptibility patterns by using Kirby-Bauer disk diffusion method [4] and plant extract sensitive plates were showed in Fig. 3. The methanol leaf extracts of Punica granatum, Syzygium cumini showed the antimicrobial activity against multi drug resistant- P. aeruginosa, S. aureus, K. pneumoniae and E. coli the predominant isolates of septic wound infections.

Acknowledgments

Mrs. Pallavali Roja Rani acknowledges the fellowship (UGC-JRF&UGC-SRF) received from University Grant Commission (UGC), and the authors are grateful to Yogi Vemana University for providing facilities.
Transparency document

Transparency document associated with this article can be found in the online version at https://doi.org/10.1016/j.dib.2019.103896.

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