Research Article

Antimicrobial activity of three medicinally important plants (*Berberis balochistanica*, *Thymus serpyllum* and *Salvia bucharica*) of Shudden, Mazhoo Tehsil Nana Sab area, District Pishin, Balochistan-Pakistan

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Abstract

The objective of this research was to investigate the antimicrobial capability of three significant plant species i.e, *Berberis balochistanica*, *Thymus serpyllum* and *Salvia bucharica*. The root of *B. balochistanica*, the whole plant of *T.serpyllum* and leaves of *S.bucharica* used for this research purposes at the area of Shudden, Mazhoo Tehsil Nana Sab area District Pishin, Balochistan. The topic area is fully rich by vegetation through the said three research species. The extracts of aforementioned parts of plants were subjected to agar well diffusion method. *T. serpyllum* plants have the high influential antimicrobial activity specially antibacterial in following bacterial strains (*Escherichia coli*, *Staphylococcus aureus*, *Staphylococcus albus*, *Bacillus subtilis* and *Slmonilatyphae*). The whole plant of *S. bucharica* also have the antibacterial activity against the different bacterial strains (*S. aureus*, *S.t yphae*, *B. subtilis*, *E.coli* and *Pseudomonas aeruginosa*). The roots of *B.balochistanica* have the antimicrobial activities especially against bacteria strains (*B. subtilis*, *P. aeruginosa*, *Striptococcus pyogenes*, *E. coli* and *S. aureus*). Resultantly, either the whole plants of *T. serpyllum* and leaves of *S. bucharica* or the roots of *B. balochistanica*, have the highly influential role against bacteria. The examination region has the bountiful number of *B. balochistanica*, *S. bucharica* and *T. seripyllum* which are never examined by analysts. The various parts of these previously mentioned plants have exceptionally substance of synthetics which resist the microorganisms particularly various kinds of microbes. Thus, it is inferred that the exploration plants may be conceivably utilized in numerous applications because of their antimicrobial properties.

Keywords: Antibacterial activities; Balochistan; Leaves; Medicinal plant; Roots; Seed; Stems

Introduction

Utilization of therapeutic spices as antiquated prescription is one of the consistently utilized practices in subcontinent. Plants have consistently been a wellspring of fix to various infections because of essence of numerous phytochemical compounds [1]. Medications that are acquired from home grown sources have a striking impact in forestalling and relieving deadly illnesses. Individuals in most created nations utilize customary medication in medical services [2]. Locally, different plants are utilized as drugs at the fundamental levels in various areas of the world. Larger part of individuals is subject to natural plants for medical services [3].

Exploration by WHO on normal natural medications like gentamycine showed such meds are not sufficient against the organisms any more. There are numerous medications that were viable once yet don't show action against unsafe bacterial strains [4]. A couple of meds may in like manner have indications that reason various anomalies in the body as aside impact. These conditions frantically constrained specialists for looking for drugs which are reasonable, ensured and naturally degradable and with least results [5].

Conventional prescription assumes a critical part in the medication of created countries. Home grown plants have been utilized for a specific period as answers for human infections in light of the fact that these are therapeutically significant [6]. *Cassia alata* (L.) is a significant therapeutic plant local to Asian nations, particularly India and Pakistan. Particular pieces of the plant were seen to show restorative properties like antimicrobial and pain relieving. The treatment of ring worm did with the assistance of leaves of this plant. It is customarily extremely helpful against skin illnesses in man and steers [7].

Populace blast expanded the need of common assets to address the issue of food, garments medication and so forth. The utilization of ethnomedicinal information

has acquired extraordinary worries in the course of recent years on account of its powerful and low or no results in contrast with allopathic medication. Other than the plants are utilized to make different life saving drugs.

Rahman *et al.* [8] announced the utilization of restorative plants through contemplating their clinical application by means of most recent techniques. Long scope of restorative plant parts is utilized as crude material for drugs. Not with standing, quantities of plants have been investigated for antibacterial action yet some neighborhood plants of certain spaces stay under the shell and stay neglected for the different antimicrobial potential that the nearby local area is happily using [9]. The developing issue of bacterial protection from the accessible anti-toxins has wanted to look for new antibacterial specialists.

Pishin is one of the huge urban communities of Balochistan. It is located in the Balochistan and adjacent to neighboring country Afghanistan. It covers a space of 7819 sq. km (3019 sq mile) with a height of 1400 m (4500 ft) to 1700 meters (5500 ft) above ocean level. Pishin is among the coldest urban communities of Balochistan. The normal precipitation is recorded 15.23 mm in winter season and snowfall is additionally recorded in December and January. The including research area is in the peripheries of Ziarat.

B. balochistanica is an endemic shrub, and includes in Berberidaceae family which is located in the region of Quetta, Ziarat and Pishin Balochistan, Pakistan. Common name of the sp is Zralga. The roots of *B. balochistanica* are used for different diseases such as fever, wound healing, Anatomical injury, Coughing, Bone diseases as well as internal infection of human being and other animals [10, 11].

T. serpyllum L. is a perennial shrub, native to regions of northern, central Europe and Asia specially Pakistan including Baluchistan area of Pishin. It is known as breckland thyme, wild thyme, or creeping thyme; however, its specific name

“*serpyllum*” is derived from the Greek word meaning “to creep,” because of wild thyme’s trailing habit. The local name of *T.serpyllum* is “Morrai” It has a long stem, which is woody at the base but with a sterile leaf rosette at the top [12]. The leaves of *T. serpyllum* are used for Respiratory disorder, Illness and Asthma [11].

S. bucharica is aromatic shrub belongs to family Lamiaceae, contain 900 species present in all over the world and it is the largest genus of family Lamiaceae [7]. *S. bucharica* is an endemic sp of Baluchistan distributed in the region of Quetta, Loralai, Pishin. Local name is “Sursandah”. It is used for lungs diseases, Heart diseases, Diarrhea, Dysmenorrheal hemorrhoids, and amenorrhea [12]. Customary medications are amount of the relative multitude of convictions, practices and information that are utilized in finding, end and anticipation of mental, physical and social awkwardness [13].

Restorative plants are utilized for microbial debasement to set up subjective items [14]. The majority of plants ere medicinal in nature in Baluchistan [15]. Baluchistan has significant verdure of medicinal plants that have remedial properties. Urbanization, Human populace, industrialization and outflow of hurtful gases is annihilating the country's regular assets. Therapeutic plants are amazing in opposing different bacterial contaminations [16].

Materials and Methods

Acquisition of plant tests

The plant tests were gathered from Shudden, Mazhoo Tehsil Nana Sab Area District Pishin. These were perceived and confirmed by Prof Dr. Saeed Ur Rehman kakar, University of Balochistan, Quetta.

Plants remove planning

The gathered plant parts were cleaved into little pieces and shade dried at 32-35⁰C. About 15 grams of each plant example was powdered with the assistance of an electric blender. Each example was extricated with methanol. Following 24 hours, the concentrates were separated through fine filtration with the assistance of Whatman

channel paper. At that point the filtrate was moved in rotational cup evaporator, until dried [17].

Test species

Different microorganisms were utilized for the investigation that incorporates organisms and number of microbes. Such as, *E. coli*, *S. aureus*, *B. subtilis*, *S. typhae*, *P. aeroginosa*, and *S. pyogenes*, every one of the bacterial strains were filled in supplement stock and hatched at 37⁰C for in any event two days [17].

Agar well dispersion strategies

Agar well dispersion strategy was utilized to investigate antimicrobial capability of *B. balochistanica*, *T. serpyllum* and *S. bucharica*. It is a typical strategy used to test the antimicrobial action of plants separates [18].

In this cycle the outside of agar plate was tested by dispersal of volume of the microbial inoculums on the absolute surface of agar. At that point, an opening was subjected with a distance across of 6 to 8 mm with a cleaned stopper drill and a concentrate arrangement of volume (20–100 µL) at picked focus was filled the well. A short time later, agar plates were hatched under proper conditions relying on the organic entity being scrutinized. The counter microbial specialist was diffused in the agar medium and hindered the development of the microorganisms [19].

Results

All the research plants *B. balochistanica*, *S. bucharica* and *T. serpyllum* have antimicrobial activity of the selected area. Different types of chemical compound are present in aforementioned plants.

The recent information unmistakably shows that *B.balochistanica* roots are similarly more successful metabolites in large quantity like as phenols, against all test plant species. *B. balochistanica* have secondary vitamins, alkaloids, carotinoides and flavonoides [20]. The leaves of *B. balochistanica* have Due to these components shows the immense effects low effect against the Bacteria as compare to roots. *B. balochistanica*h as the highest

inhibitory zone against the *S. pyogenes* which is 81 % but the lowest for *P.*

aerogenosa. Mean value is 26.6 Shown in (Table 1 & Fig. 1).

Table 1. Antibacterial activity of *B. balochistanica* roots in Methanol extract

Microbes	Inhibition zone(mm)	Inhibition %
<i>B subtilis</i>	22	58
<i>S pyogenes</i>	33	81
<i>P aeruginosa</i>	19	42
<i>E coli</i>	29	80
<i>S aureus</i>	30	72
Mean	26.6

Figure 1. Inhibition zone of *B. balochistanica*

S. bucharica plants possess antimicrobial activity. Distinctive bacterial contents containing both Gram negative and Gram positive life forms were utilized for the assessment of antibacterial movement. The outcome showed that concentrates from *S. bucharica* (leaves) had antibacterial action, in spite of the fact that they vary essentially

in their exercises against tried miniature living beings. *S. bucharica* plant has the maximum inhibition zone (45 %) against the *S. aureus* and the minimum inhibition zone (24%) against the *P. aeruginosa*. the average value is 31.4 shown in (Table 2 & Fig. 2).

Table 2. Antibacterial activity of *S bucharica* leaves in Methanol extraction

Microbs (Bacteria)	Inhibition Zone (mm)
<i>E. coli</i>	30
<i>S. aureus</i>	45
<i>S. typhi</i>	25
<i>B. subtilis</i>	33
<i>P. aeruginosa</i>	24
Mean	31.4

Figure 2. Inhibition zone of *S. bucharica*

The whole plant of *T. serpyllum* was tested against the several types of Gram +ve and Gram -ve Bacteria i.e *S. typhae*, *S. aureus*, *S. albus*, *B. subtilis* and *E.coli*. Out of these Bacteria the *E. coli* has the highest

inhibition zone and the *S. subtilis* has the lowest inhibition zone. The figure shown in the (Table 3 & Fig. 3). The mean value is 23.8% of all microbes.

Table 3. Antimicrobial activity of *T. serpyllum* (whole plant) in Methanol concentration

Microbes (Bacteria)	Inhibition zone (mm)
<i>S. typhae</i>	18
<i>S. aureus</i>	21
<i>S. albus</i>	20
<i>B. subtilis</i>	22
<i>E. coli</i>	38
Mean	23.8

Figure 3. Inhibition zone of *T. serpyllum*

Discussion

Plants contain variant contents in shape of secondary metabolites. Especially,

medicinal plants are highly rich with constituents of antimicrobial activities particularly anti bacteria. The selected area

for this research is Shudden, Mazo, Tehsil Nana Sab area, Pishin. For this aforementioned area, I selected three plants, *T. serpyllum*, *S. bucharica* and *B. balochistanica*, which are highly used for medicinal purposes. After conducting research, it found that they have highly antibacterial property.

The present data obviously shows that *B. balochistanica* roots are comparably more fruitful metabolites in huge amount like as phenols, against all test plant species [21]. *B. balochistanica* have optional vitaminns, alkaloids, carotinoides and flavonoids [22]. The leaves of *B. balochistanica* have Due to these parts shows the immense impacts low impact against the Bacteria as contrast with roots. *B. balochistanica* has the most elevated inhibitory zone against the *S. pyogenes* which is 81 % yet the least for *P. aerogenosa*.

S. bucharica possesses antimicrobial action. Unmistakable bacterial substance containing both Gram negative and Gram positive living things were used for the appraisal of antibacterial development. The result showed that concentrates from *S. bucharica* (leaves) had antibacterial activity, regardless of the way that they differ basically in their activities against attempted smaller than usual living creatures. *S. bucharica* plant has the most extreme hindrance zone against the *S. aureus* and the base restraint zone against the *P. aerogenosa* [23].

T. serpyllum grown in different geographic locations worldwide produced essential oils that exhibited antimicrobial activity against several microorganisms [24-26]. The current study shows the entire plants of *T. serpyllum* was tried against the few kinds of both Gram +ve and gram -ve *S. typhae*, *S. aureus*, *S. albus*, *B. subtilis* and *E. coli*. Out of these bacteria *E. coli* has the most elevated hindrance zone and the *S. subtilis* has the least restraint zone.

Conclusion

These plants have highly rich substances against bacteria. Either *T. serpyllum* or *B. balochistanica* and *S. bachurica* are the

plants which have significant amounts of contents against the subjected species of bacteria. *T. seriphylum* has highly antimicrobial activity against *E. coli* but lowest activity against *S. aureus*. As well as *S. bachurica* has highest function against *S. aureus* but least for *P. aeruginosa*. Among these, *B. balochistanica* is also immense impact against bacteria.

Authors' contributions

Conceived and designed the experiments: SU Rehman, Performed the experiments: M Idrees, Analyzed the data: M Idrees & MU Rehman, Contributed reagents/ materials/ analysis tools: SK Leghari, KU Rehman, AKK Achakzai, B Zareen, BS Zaman & A Malik, Wrote the paper: M Idrees & SU Rehman.

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