EXPLORATION OF ETHNOBOTANY, ANTIOXIDANT AND ANTIMICROBIAL ACTIVITY OF *ZIZIPHUS MAURITIANA* FROM DISTRICT SARGODHA, PAKISTAN.

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Abstract

Ethanobotany has great importance due to its speculative role to cognize plant-human interaction as well as for highlighting the practical applications and contextualized uses of plants. *Ziziphus mauritiana* is a common fruit tree species in area. In present study leaves and bark of medicinally important plant *Ziziphus mauritiana* which belongs to family Moraceae, were collected from three different sites for *in vitro* antioxidant and antimicrobial activity screening. Ethanopharmacological survey was carried out in many areas of District Sargodha, Punjab, Pakistan. According to the survey *Ziziphus mauritiana* can be effective in curing number of diseases. The ethanol, methanol, aqueous and choloroform solvent extract were used to screen the antimicrobial activity of plant extract against selected pathogens (*E.coli, Pseudomonas aeruginosa, Staphylococcus aureus, Streptococcus pyogenes, candida albicans*) at 200mg/ml concentration by disc diffusion method. The results of antibacterial activity were revealed that ethanolic and choloroform extracts remained more effective and exhibits good activity as compared to methanol and aqueous mediums. *Canidada albicans* did not show any activity. The antimicrobial inhibition of plant extracts were compared with standard antibiotics. Phytochemical analysis were confirmed the presence of antioxidants (Tannins, Sponins, Flavoniods, Terpeniods and Caroteniods) in bark and leaves of *Ziziphus mauritiana.*

Key words: Ethanobotany, *Ziziphus mauritiana*, antimicrobial, antioxidant, pathogens

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DOI: 10.53555/ecb/2024.13.02.25

Introduction

Medicinal plants are increasingly explored by the food industry for their health-promoting benefits (Pohl, et al., 2016). Yet, medicinal plants remain largely unexplored and underutilized despite their outstanding potential as a reservoir of bioactive compounds and innovative health promoting products (Catarina et al., 2018). Recently, different scientific effortshave unveiled some of these natural gifts' prospective commercial uses as a raw material for pharmaceutical, herbal functional beverages and other related industries (Seo et al., 2013).

Ziziphus mauritiana a member of family moraceae is spiny perennial and deciduous plant (Dubey *et al*., 2010). *Ziziphus mauritiana* a fast growingplantthat is characterized by highly fluctuating abiotic constraints. *Ziziphus mauritiana* developed adaptive responses including the synthesis of highly bioactive molecules with potent antioxidant capacity, such as phenolic compounds, terpenoids and vitamins, to counteract reactive oxygen species (ROS) production and accumulation, inhibit oxidative chain-reactions and protect cellular structures. These natural antioxidants usually display strong biological activities, like radical-scavenging, metal-chelating and enzyme-inhibiting abilities, leading to beneficial therapeutic. Traditional medicines prepared from *Ziziphus mauritiana* are used for the treatment of digestive disorders, diabetes, skin infections,urinary troubles, diarrhea, fever, bronchitis and liver complaints etc. Its fruit is used in wound healing and for the treatment of asthma, stomachic, styptic (Narendra*et al*., 2012; Guo et al., 2017).

The present study focuses on cosmopolitian pathogens i.e.*Escherichia coli*, *Pseudomonas aeruginosa*, *Staphylococcus aureus*, *Streptococcus pyogenes* and *Candida albicns*. Due to its expansion in antibiotic resistance *S. aureus* generally cause skin, surgical and trauma injuries infections, infections of urinary tract, food poisoning and gastrointestinal tract, while Infections of organs include pneumonia, osteomyelitis, endocarditis, phlebitis, mastitis and meningitis. Cardiovascular apparatus, joint prostheses, and artificial heart valves are contagions from and on indwelling medical devices (Elaloui et al., 2014; Adam et al., 2013).

The E. coli generally cause urinary tract infections, septicaemia or coleocystis. Gram-negative, non-glucose fermenter rod *Pseudomonas aeruginosa* is ubiquitous causing extensive spectrum of disease such as urinary, burn, respiratory infections, and septicemia. *P. aeruginosa* is a microorganism with high antibiotic resistance in the clinical specimens (Shama et al., 2017).

Group A gram-positive bacterial pathogen *Streptococcus pyogenes* causes extensive variety of clinical conditions. It extends from pharyngitis to necrotizing fasciitis and acute invasive infections. The reported fatality of severe *S. pyogenes* infection ranges from 10%–30%. The death toll is likely to be at least 650,000 persons per year due to these severe infections. Two major types of infections, superficial infections and systemic infections in humans are caused by *C. albicans* (Wu *et al*., 2015).

Antimicrobial, phytochemical, biochemical and clinical studies of traditional medicinal plants are the fields of research that are crucial to support our efforts in hunt of new medicines. We intended the verification of a traditional drug or the searching of a new drug at the conclusion of any ethno pharmacological study. WHO statistics shows that more than 80 percent people throughout the world rely on traditional herbal medicine for health care (Li et al., 2014). In present study Shahpur city was selected as study area. For present study traditionally important plant *Ziziphus mauritiana* a member of family moraceae selected. In study area this plant is mostly found in homes, wild grown and near hills.The plants belong to family Moraceae are considered to have a number of compounds that are medicinally beneficial (Shah*et al*., 2013).

By keeping in view the above mentioned information the present research work was undertaken with following objectives:

To study the ethnobotanical potential of *Ziziphus mauritiana* of family Moraceae, antibacterial activity of its extract against the growth of selected Gram positive bacteria (*Staphylococcus aureus*, *Streptococcus pyogengs*) gram negative bacteria, (*E.coli*,*Pseudomonas aeruginosa*) and fungi (*Candida albicans*) and their phytochemical properties.

Materials and methods

Study Area

This study was conducted in District Sargodha, Punjab, Pakistan.

Ethno medicinal Survey

In the present survey, *Ziziphus mauritiana* were collected and recorded for their use in various ailments. Herbal practitioners and local people were interviewed in order to collect information

about selected plants. The survey consist on questions about general information of plant name, part of plant uses as medicinally and method of administration. Plant part collected and preserved in herbarium.

Plant collection for antimicrobial analysis
Study area was divided into three zone domesticated, Farm grown and wild grown area.

Extract preparation
Aqueous Extraction: 20g Air-dried powder of leaves was boiled in 500 ml distilled water and evaporated till one fourth remained. Then it was filtered and centrifuged for 15 min at 5000 rpm. After filtration sample was kept at 4°C.

Organic solvent Extraction: 20g Air-dried powder of leaves was dissolved in 200ml of ethanol, methanol, chloroform and water. Mixture was kept on shaker for 24 hr at 150 rpm. After filtration mixture was evaporated for concentration. From these dried extracts other concentrations were prepared. Solution kept at 4°C.

Growth medium: Nutrient Broth/Nutrient Agar Medium (NBM/NAM) is used for the growth of bacteria andPotato Dextrose Agar Medium (PDAM) was used for the growth of fungal species.

Preparation of Reagents: Nutrient Agar (2.8%), Sabouraud Dextrose Agar (6.5%), Nutrient Broth (1.3%), Potato Dextrose Agar (3.9%) reagents was prepared for the growth of bacteria and fungal species according to standard methods.

Preparation of Test Plates for Antimicrobial Screening Tests: 15ml of the medium was poured in test plates (NA and PDA) and kept at 37°C for 24 hr.

Isolation of microorganisms: Microorganisms selected for this study were isolated from patients from Fazle Omar Hospital Rabwah. Isolated microorganisms were inoculated on nutrient plates.

Preparation of Sterile Paper Discs: Paper discs were prepared by means of hole puncher, stirilllized at 15 lbs for 15 min.

Preparation and application of disks for experiment: The test microorganisms were spread over medium. The filter paper discs were prepared in ethanol, methanol (M), Chloroform (C) and water (A) extracts. The filter paper discs are carefully placed on culture test plates are incubated at appropriate temperature for bacteria at 37 0C for 24 hour and fungi at 30°C for 48 hrs. After the required time of culture the test plates were examined for inhibitory zones are recorded. All determinants were made at least in triplicate for each of the test organisms in different extracts was also recorded.

Phytochemical analysis
Phytochemical analysis of the Plant Extract: The aqueous extracts were analyzed to detect phytochemical testsalkaloids, tannins, saponins, glycosides andflavonoids by using Allan and Harborn methods.

Photosynthetic pigments
To determine the photosynthetic pigments (chlorophyll *a*&*b*) procedures of Arnon (1949) were followed, whereas carotenoids were assessed using the techniques of Davis (1976). 0.5 gm. of the fresh leaf material was homogenized in 80% acetone by using mortar and pestle. After filtration the volume was maintained to 10 ml. The absorbance was measured at 480, 645 and 663 nm for carotenoids and chlorophyll a, b respectively with the help of spectrophotometer. Following expressions was used for the measurement of abundance of chlorophylls a, b and carotenoids.
Carotenoid (mg/mL) = (A Car/Em×100)
Where: Em ×100 =2500
A Car = [(OD 480) +0.114 (OD 663) – 0.638 (OD 645)]/2500
Chl. *a* (mg/g) = [12.7(OD663) -2.69(OD645)] x V/1000 x W
Chl. *b* (mg/g) = [22.9(OD645) - 4.68(OD663)] x V/1000 x W
Total Chl. (mg/g) = [20.2(OD 645) + 8.02 (OD663)] x V/1000 x W
For total carotenoids the following formulation was used:
Where
V=Volume of the acetone used in extract (mL),
W=Weight of fresh leaf tissue (g)

Result
Ethnomedicinal survey:
Medicinal plants have played an important role of primary health care system among the local people. They are also the health care resources among people in the Study area. Their primary cure of diseases is based upon deep observation of nature and their understanding of traditional knowledge of medical practices. *Ziziphus ziziphus mauritiana* wasselected for present study. A survey was carried out in order to conduct interview of ethnomedicinal practitioners and local peoples. The questionnaire

was consisting on ethnomedicinal uses of selected plant species along with botanical name, part used and mode of administration.

Responses of practitioners

It is quite clear from the survey that inhabitants identify this plant by local name as Ber. The information gathered from the people of study area clearly indicates that whole plant is considered ethno medicinally valuable and they use it for the treatment of digestive disorders, diabetes,urinary troubles, skin infections, fever,diarrhea, liver complaints, bronchitis, and anemia. The data recorded in table 1 indicates that it is administered orally both in the form of combination as well as singly. Moreover fruit of *Z. mauritiana* is being used by locals for wound healing while leaves have antiseptic effect.

Table 1: Folkloric uses of *Ziziphus mauritiana* by Practitioners and local people

Sr. No	Source	Local name	Habit	Part used	Uses
1	**Practitioners**			Whole plant	Liver and digestive ailments, fever,diabetes,urinary troubles, skin infections, diarrhea, bronchitis and anemia
2	**local people**	**Ber**	**Tree**	Whole plant	Fruit, wood, fodder, And also used for the amelioration of digestive disorders, kidney issues, diabetes, skin infections, wounds healing, Antiseptic

% age of responses for the use of selected plants as traditional medicines

According to table 2 It is observed that according to the 36% respondents *Ziziphus mauritiana* is best remedy in skin diseases, 26% consider it best to cure diabetes, 16 % use its powder in digestive disorders while 13% rely on it for the treatment of respiratory and 12% used it for the cure of dental problems.

Table 2: % age of responses for the use of *Ziziphus mauritiana* as traditional medicines

Diseases	***Z. mauritiana***
Diabetes	26%
Digestive disorders	16%
Skin infections	36%
Urinary troubles	1%
Respiratory problems	13%
Tooth ache	12%

Antimicrobial activity of *Ziziphus mauritiana* against *Escherichia coli*

Data given in table 3 revealed that all replicas domesticated,farm grown and wild grown of *Ziziphus mauritiana* leaves in ethanol extract showed different potential against *E. coli* with ZOI 10.71±0.33mm, 10.34±0.33mm and 10.04±0.33mm separately. All replicas of domesticated, farm grown and wild grown of *Ziziphus mauritiana* leaves in methanol extract showed different potential against *E. coli* with ZOI 9.31±0.33mm, 9.23±0.33mm and 8.33±0.33mm. All replicas of domesticated, farm grown and wild grown of *Ziziphus mauritiana* leaves in choloroform extract showed different potential against *E. coli* with ZOI 9.33±0.33mm, 9.66±0.33mm and 9.33±0.33mm. All replicas of domesticated, farm grown and wild grown of *Ziziphus mauritiana* leaves in water extract had weak antimicrobial activity against *E. coli* with ZOI 9.34±0.33mm, 9.33±0.33mm and 9.32±0.33mm. In ethanol maximum antimicrobial activity was observed (Table 3).

All replicas of domesticated, farm grown and wild grown of *Ziziphus mauritiana* bark in ethanol extract showed different potential against *E. coli* with ZOI 11.58±0.33mm, 11.63±0.33mm and 11.29±0.33mm.All replicas of domesticated, farm grown and wild grown of *Ziziphus mauritiana* bark in methanol extract showed different potential against *E. coli* with ZOI 10.56±0.33mm, 10.59±0.33mm and 10.34±0.33mm.All replicas of domesticated, farm grown and wild grown of *Ziziphus mauritiana* bark in choloroform extract showed different potential against *E. coli* with ZOI 9.66±0.33mm, 9.33±0.33mm and 9.33±0.33mm.All replicas of domesticated, farm grown and wild grown of *Ziziphus ziziphus Mauritiana* bark in water extract showed different potential against *E. coli* with ZOI 8.59±0.33mm, 8.31±0.33mm and 8.33±0.33mm (Table 3).

Table 3: Antimicrobial activity of *Ziziphus mauritiana* against *Escherichia coli*

Species	Part	Replica	Ethanol	Methanol	Chloroform	Water
Escherichia coli	Leaf	Domesticated	10.71±0.33	9.31±0.33	9.33±0.33	9.34 ±0.33
		Farm grown	10.34±0.33	9.23±0.33	9.66±0.33	9.33 ±0.33
		Wild grown	10.04±0.00	8.33±0.33	9.33±0.33	9.32 ±0.33
	Bark	Domesticated	11.58±0.33	10.56±0.33	9.66±0.33	8.59± 0.33
		Farm grown	11.63±0.33	10.59±0.33	9.33±0.33	8.31± 0.33
		Wild grown	11.29±0.33	10.34±0.33	9.33±0.33	8.33± 0.33

Antimicrobial activity of *Ziziphus mauritiana* against *Pseudomonas aeruginosa*

Ethanol leaves extract showed maximum susceptibility against *Pseudomonas aeruginosa* (11.34±0.33mm) in domesticated as compared to ZOI in other solvent like Methanol (10.63±0.33), chloroform (9.70±0.33) and water (8.76±0.33). Maximum ZOI value 11.34±0.33mm was observed in ethnol extract near hills while minimum was showed in aqueous extract (8.40±0.33mm). The ethanol extract was found more effective (ZOI=11.34±0.33mm) along wild grown than methanol, chloroform and water with ZOI values 10.34±0.33mm, 9.33±0.33mm and 8.40±0.33mm (Table 4).

wild grown antibacterial activity of bark extract in ethanol was observed maximum (11.34±0.33mm) but in case of domesticated and farm grown it was (11.06±0.33mm and 11.33±0.33mm). In methanol extract the significant value against pseudomonas was in domesticated with ZOI 11.33±0.33mm. As far as the ZOI values of farm grown and wild grown are concerned they were 10.70±0.33mm and 10.66±0.33mm ZOI. bark extract in chloroform was much less against *P. aeruginosa* i.e. the ZOI was 9.33±0.33mm in domesticated and wild grown but farm grown extract in chloroform was greater i.e ZOI was 9.34±0.33mm that showed a minor change in values (table 4). In present study the highest antimicrobial potential was measured in FARM GROWN extract in water with ZOI 9.33±0.33mm and lowest potential was in domesticated and wild grown extract with ZOI 8.58±0.33mm and 8.66±0.33mm.

Table 4: Antimicrobial activity of *Ziziphus mauritiana* against *Pseudomonas aeruginosa*

Species	Part	Replica	Ethanol	Methanol	Chloroform	Water
Pseudomonas aeruginosa	Leaf	Domesticated	11.34±0.33	10.63±0.33	9.70±0.33	8.60± 0.33
		Farm grown	11.33±0.33	10.33±0.33	9.33±0.33	8.76± 0.33
		Wild grown	10.60±0.33	10.34±0.33	9.40±0.33	8.40± 0.33
	Bark	Domesticated	11.06±0.33	11.33±0.33	10.00±0.33	8.58± 0.33
		Farm grown	11.33±0.33	10.70±0.33	9.34±0.33	9.33± 0.33
		Wild grown	11.34±0.33	10.66±0.33	9.33±0.33	8.66± 0.33

Antimicrobial activity of *Ziziphus mauritiana* against *Staphylococcus aureus*

The domesticated and hills attained extracts of *Ziziphus mauritiana* (leaves) in ethanol exhibited highest potential against *S. aureus* with 7.34±0.33mm ZOI. While wild grown extract of leaves showed lowest antibacterial activity that ZOI was 7.10±0.33mm. The antimicrobial potential of the domesticated and farm grown in methanol showed similar results with ZOI 7.33±0.33mm against *S. aureus* than wild grownthat value was lowest (7.10±0.33mm). The highest susceptibility was measured in case of domesticated and farm grown extract in water with maximum ZOI 7.65±0.33mm and Wild Grownextract showed lower potential that showed ZOI 7.33±0.33mm (Table 5).

The minimum potential was measured in domesticated extract of bark in ethanol and methanol with ZOI 7.70±0.33mm and 7.66±0.33mm in domesticated. In wild grown the maximum values were exhibited in ethanol and Methanol extract that showed 7.33mm ZOI in comparison with other solvent like ethanol, chloroform and water (7.00±0.33mm and 7.20±0.33mm) (Table 5).

Table 5: Antimicrobial activity of*Ziziphus mauritiana* against *Staphylococcus aureus*

Species	Part	Replica	Ethanol	Methanol	Chloroform	Water
Staphylococcus aureus	Leaf	Domesticated	7.34± 0.33	7.33±0.00	-	7.65±0.33
		Farm grown	7.33± 0.33	7.33±0.33	-	7.64±0.33
		Wild grown	7.10± 0.33	7.10±0.00	-	7.33±0.33
	Bark	Domesticated	7.70± 0.33	7.66 ±0.33	7.33±0.33	7.34±0.33
		Farm grown	7.33± 0.33	7.33 ±0.33	7.11±0.33	7.33±0.33
		Wild grown	7.33± 0.00	7.33 ±0.33	7.00±0.33	7.20±0.33

Antimicrobial activity of *Ziziphus mauritiana* against *Streptococcus pyogenes*

The minimum ZOI of domesticated leaves extract in methanol was 7.76±0.33mm against *S. pyogenes*. All replicas of chloroform exhibited no antimicrobial activity against S*pyogenes* (Table 6). The highest antimicrobial activity was noticed in chloroform extract of leaves along the hills (7.70±0.33 ZOI) least in ethanol and water extract with ZOI 7.00mm(Table 6).

Table 6: Antimicrobial activity of *Ziziphus mauritiana* against *Streptococcus pyogenes*

Species	Part	Replica	Ethanol	Methanol	Chloroform	water
Streptococcus pyogenes	Leaf	Domesticated	7.66±0.33	7.76±0.33	7:36±0.33	7.33±0.33
		Farm grown	8.33±0.00	7.70±0.33	7:40±0.33	7.33±0.33
		Wild grown	7.64±0.33	7.66±0.33	7:34±0.33	7.33±0.33
	Bark	Domesticated	7.30±0.33	7.34±0.33	7.70±0.33	7.00±0.33
		Farm grown	7.10±0.33	7.33±0.33	7.66±0.33	7.10±0.33
		Wild grown	7.10±0.33	7.00±0.33	7.30±0.33	7.20±0.33

Antimicrobial activity of *Ziziphus mauritiana* against *Candida albicans*

Leaf extract of ethanol showed the following results in all replicas (7.36±0.33mm, 7.34±0.33mm and 7.33±0.33mm). The highest antibacterial activity was noticed in domesticated of ethanol extract (7.36mm). No results were observed in Chloroform and water extracts. Bark extract in ethanol showed that in domesticated, farm grown and wild grown with minimum ZOI 8.21±0.33mm, 7.76±0.33mm and 7.60±0.33mm against *C. albicans.* Similarity was observed in domesticated and farm grown values of methanol and chloroform extract with maximum ZOI 7.33±0.33mm as compared to wild grown values have 7.00mm ZOI in both solvents. While in remaining solvents no antimicrobial activity was observed (Table 7).

Table 7: Antimicrobial activity of *Ziziphus mauritiana* against *Candida albicans*

Species	Part	Replica	Ethanol	Methanol	Chloroform	water
Candida albicans	Leaf	Domesticated	7.36±0.33	7.33±0.33	-	-
		Farm grown	7.34±0.33	7.00±0.00	-	-
		Wild grown	7.33±0.33	7.00±0.00	-	-
	Bark	Domesticated	8.21±0.33	7.33±0.33	7.40±0.33	-
		Farm grown	7.76±0.33	7.33±0.33	7.33±0.33	-
		Wild grown	7.60±0.33	7.00±0.33	7.11±0.33	-

Phytochemical Analysis

Qualitative analysis

Preliminary qualitative phytochemical analysis of leaf and bark of *Ziziphus mauritiana* indicates that it contain tannins, saponins, flavonoids and terpenoids, glycosides and alkaloids (Table 4).

Table 8: Phytochemical analysis of *Ziziphus mauritiana*

Plant	Plant organ	Site	Tannins	Saponins	Glycosides	Flavonoids	Terpenoids	Alkaloids	
								Meyer's test	Dragendorff's Test
Ziziphus ziziphus mauritiana	Leaf	1	+ ve	+ ve	+ ve	+ ve	+ ve	+ ve	+ ve
		2	+ ve	+ ve	+ ve	+ ve	+ ve	+ ve	+ ve
		3	+ ve	+ ve	+ ve	+ ve	+ ve	+ ve	+ ve
	Bark	1	+ ve	+ ve	+ ve	+ ve	+ ve	+ ve	+ ve
		2	+ ve	+ ve	+ ve	+ ve	+ ve	+ ve	+ ve
		3	+ ve	+ ve	+ ve	+ ve	+ ve	+ ve	+ ve

Quantitative analysis of phenolics (Domesticated, Farm grown and wild grown)

Data presented in table 8 shows that amount of phenolic in leaf extract of *ziziphus ziziphus mauritiana*is 0.050156mg/ml, 0.050344mg/ml and 0.050149mg/ml from domesticated, farm grown and wild grown respectively. and comparatively fewer amounts of phenolics were detected in bark of ziziphus ziziphus mauritiana as compared to leave extract from domesticated, farm grown and

wild grown (0.03394 mg/ml, 0.034334mg/ml and 0.03416mg/ml) (table 8).

Table 9: Amount of phenolics in *Ziziphus mauritiana* from Domesticated, farm grown and wild grown Site

Sr. No.	Plant name	Amount of phenolic (Domesticated) (mg/ ml)		Amount of phenolic (Farm Grown) (mg/ ml)		Amount of phenolic (Domesticated) (mg/ ml)	
		Leaf	Bark	Leaf	Bark	Leaf	Bark
1	*Ziziphus mauritiana*	0.050156	0.03394	0.050344	0.034334	0.050149	0.03416

Table 10: Amount of photosynthetic pigment (chlorophyll) in *Z. mauritiana* from domesticated, farm grown and wild grown site

Sr. No	Site	Plant leaf	Chl a (mg/g)	Chl b (mg/g)	Total Chl (mg/g)	Carotenoids (mg/g)
1	**Domesticated**	*Z. mauritiana*	0.0995	0.1609	0.2604	0.0003430
2	**Farm grown**	*Z. mauritiana*	0.0997	0.1611	0.2607	0.0003429
3	**Wild grown**	*Z.mauritiana*	0.0996	0.1610	0.2606	0.0003428

According to table 6 total amount of cholorophyll in the leaves of *Z. mauritiana* from site domesticated, farm grown and wild grownwere 0.2604, 0.2607 and 0.2606. The calculated amount of carotenoids from domesticated, farm grown and wild grown were 0.0003430, 0.0003429 and 0.0003428.

Discussion:

Ethno medicinal

Data collected by survey represents that *Ficus religiosa* (Whole plant) is used to cure toothache, gastric problems in study area. Previous studies correlate with data collected during this work. Bark is used as astringent and cooling. Fruit part is effective in Tuberculosis, fever, paralysis, hemorrhoids. Seeds are refrigerant, laxative (Paliwal *et al*, 2011). Patail also use the fruit extract of *Psoralea corylifolia* L. on pathogenic organisms to check the antimicrobial activity.

According to our data collected indicates that natives use *Ficus benghalensis* for the treatment ofrespiratory disorders, diabetes, certain skin diseases and leprosy. Our data is supported by literature. leaves cure treat ulcers, infusion of bark cure diarrhea, dysentery and diabetes (Mandal et al., 2010). Ficus plants are used to treat respiratory disorders and skin diseases (Shah et al, 2013)

Local people prepare tonics and decoctions from *Prosopis. juliflora*for the treatment of various health issues. These practices has also been mentioned by other researchers i.e. Traditionally it was used for the treatment of ocular problems. Wounds can be treated with the decoction obtained from leaf and seed extracts. The syrup, made from ground pods of *P. juliflora*, is used for nourishment of underweight kids or those suffering from retardation in motor development. The syrup may raise lactation as well. Tea prepared from *P. juliflora* is believed to be useful in healing of digestive disorders and skin wounds. (Tajbukhsh *et al*, 2015)

Pongamia pinnata is utilized by locals for curing tooth ache, wounds,inflammation and digestive disorders.Our study correlates with information collected by different ethno botanists (Sangwan, et al, 2010).

It is noted that natives use *Ziziphus mauritiana* to cureurinary troubles,digestive disorders, diabetes, skin infections, bronchitis , diarrhea, fever,anemiaand liver complaints. This study matches withtraditional medicines prepared from *Ziziphus mauritiana* to cure various diseases (Kang *et al*., 2016).

Antimicrobial activity of plant extracts of *Ziziphus mauritiana*

It is revealed from the data that most of the extracts inhibited the microbial growth except the chloroform leaf extract and aqueous leaf and bark extract. *Staphlococcus aureus* and *Candida albicans* showed resistance against chloroform leaf extract while *Candida albicans* remained resistant against both leaf and bark aqueous extracts. Dubey *et al.,* (2010) investigated the microbial growth inhibition potential of *Ziziphus mauritiana* methanol and aqueous extracts against *E. coli* and considerable antimicrobial activity reported. All those plant extracts that did not showed antimicrobial activity in aqueous extracts indicate that they lack water dissolving components (Muzafar *et al*., 2012). Adam 2013 also used ethanomedicines to cure different diseases from different parts of *Ziziphus mauritiana.*

From the present study it can be concluded that local people and practitioner use *Ziziphus*

mauritiana for the treatment of various ailments. The plant extract of *Ziziphus mauritiana* shows a considerable antimicrobial activity against selected pathogens. The antibacterial activity revealed that ethanolic and methanolic extracts remained more effective as compared to aqueous and choloroform.Very little activity was noticed against *Candida albicans.* Phytochemical analysis confirmed that the plant extracts of *Ziziphus mauritiana*is a rich source of bioactives.

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