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RESEARCH ARTICLE

Phytochemical analysis and antimicrobial activities of *Rhus mysorensis*

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Abstract

Rhusmysorensis a bushy and thorny shrub belongs to the family Anacardiaceae commonly called as mysore sumac in English and Sita Sundari in Telugu. Sumacs grow in subtropical and temperate regions, especially in Africa and North America. In India, it is mostly found in hot dry places such as Haryana, Punjab, Rajasthan, Gujarat, Karnataka Andhra Pradesh and Telangana. The phytochemical analysis and antibacterial activity of methanol fractions of leaves, stem and root of *Rhusmysorensis* was performed and reported. The phytochemical analysis was carried out using standard methods that were reported and the antibacterial activity was carried out using agar well diffusion method. Alkaloids, carbohydrates, flavonoids, phenols, saponins, tannins, phytosterols are found to be present in all tested methanol fractions. According to the results, RMR fractions were highly active compared to the RML and RMS. Among the RMR fractions Acetone and Toluene extracts noticed significant antibacterial and antifungal activity. The highest zone of inhibitions were recorded at 100 µg/mL are 28, 27, 26, 27, 24, 25, 27, 30, 23 and 22, 26, 25, 24, 22, 21, 23, 27, 21 against bacterial strains M. *tuberculosis*, *Methicillin resistant Staphylococcus aureus*, E.*coli* respectively. *Salmonella typhi* showed resistance against all fractions tested.
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1. Introduction:-

In recent years Bio Diversity is gaining priority and public attention at the world level. Origin of humanity led to phototherapy belonging to the field of medicine. Medicinal plants are the richest bio resource for the development of traditional medicine. In accordance to the World Health Organization it has been estimated that 80% of the world's population relies on medicinal plants for their primary health care source (Winston 1999). In India more than 43% of total flowering plants are evaluated and reported their attributed medicinal properties.

Most of the synthetic drugs exhibit hazardous effects and are cost effective compared with that from natural drugs especially plant origin. Therefore, modern area of research has been shifted towards the development of ethanomedicine that provide eco friendly nature and non-hazardous and cost affordable to the human beings (Chin et al. 2006). It has been reported that the secondary metabolites of medicinal plants possess significant therapeutic applications, especially, against various human pathogens such as bacteria, fungi and viruses (Pavrez et al. 2005; Khan et al. 2003). The indiscriminate use of contemporary antibiotics led to the development of multi-drug resistant (MDR) pathogenic microorganisms that create serious problems in the treatment of various bacterial and fungal diseases.

Rhusmysorensis a bushy and thorny shrub belongs to the family Anacardiaceae commonly called as mysore sumac in English and Sita Sundari in Telugu. Sumacs grow in subtropical and temperate regions, especially in Africa and North America. In India, it is mostly found in hot dry places such as Haryana, Punjab, Rajasthan, Gujarat, Karnataka Andhra Pradesh and Telangana. This plant is extensively used in the treatment of psoriasis (Venkatasubbaiah et al. 2012; Nandagopal et al. 2015).

It has been reported that *Rhusmysorensis* alleviate the toxic effects in the liver by paracetamol that cause reduction in the elevated levels of serum glutamate pyruvate transaminase (SGPT), Serum glutamate oxaloacetate transaminase (SGOT), Serum bilirubin, serum alkaline phosphate (SALP) has been successfully alleviated and protect (Noorulla khadri Dudekula et al. 2014). The antimicrobial activity of leaf extract has been also reported (Mohammed Aman 2010). It also reported that plant extraction showed significant anti urolithiasis activity. (Sudheshna et.al 2015). *Rhusmysorensis* along with pharmaceutically acceptable excipients, was widely used for the treatment of sexually transmitted diseases particularly HSV-2 type infections (Swathi pramod joshi and Smitha shrikant Kulkarni 2013).

In the context of above mentioned medicinal properties of *Rhusmysorensis*, the present work was framed out to carry out the detection of various phytochemicals and antibacterial and antifungal activities of crude extract of this plant.

2. Materials Methods:-

2.1 Collection of plant material:-

Fresh leaves, stem and roots of *Rhusmysorensis* were collected from Shapur and Hitech City Road Hyderabad. The species was identified and authenticated at Prof. VS Raju Taxonomist, plant systemic Laboratory, Department of Botany, Kakatiya University, Warangal the herbarium Department of Botany Kakatiya University Warangal.

2.2 Extraction of plant material:-

Leaves, stem and roots (100 grams) were washed with water, dried under shade, homogenized to coarse powder. Extraction was carried out with methanol and subjected for dryness under reduced pressure by Rota vapor at 40-50 ^{0}C for 3 h. Leaf, stem, and root extracts of *Rhus mysorensis* methanol extract were denoted as RML, RMS and RMR for experimental and understanding convenience.

2.3 Phytochemical –Analysis:-

Phytochemical examinations were carried out for all the extracts as per the standard methods.

2.3.1 Detection of Alkaloids:-

The extracts were dissolved individually in dilute hydrochloric acid and filtered

a. Mayer's Test:-

Filtrates were treated with Mayer's reagent (Potassium Mercuric Iodide). Formation of reddish brown precipitate indicate the presence of alkaloids.

b. Wagner's Test:-

Filtrates were treated with Wagner's reagent (Iodine in Potassium Iodide). Formation of brown/reddish precipitate indicates the presence of alkaloids.

c. Dragendroff's Test:-

Filtrates were treated with Dragendroff's reagent (solution of Potassium Bismuth Iodide). Formation of red precipitate indicates the presence of alkaloids.

d. Hager's Test:-

Filtrates were treated with Hager's reagent (saturated picric acid solution). Presence of alkaloids confirmed by the formation of yellow coloured precipitate.

2.3.2 Detection of Carbohydrates:-
The extracts were dissolved individually in 5 ml distilled water and filtered. The filtrates were used to test for the presence of carbohydrates.

a. Molisch's Test:-
Filtrates were treated with 2 drops of alcoholic α-naphthol solution in a test tube. Formation of the violet ring at the junction indicates the presence of Carbohydrates.

b. Benedicts Test:-
Filtrates were treated with Benedict's reagent and heated gently. Orange red precipitate indicates the presence of reducing sugars.

c. Fehling's Test:-
Filtrates were hydrolysed with dil. HCl, neutralized with alkali and heated with Fehling's A & B solutions. Formation of red precipitate indicates the presence of reducing sugars.

2.3.3 Detection of Aminoacids:-
a. Xanthoproteic Test:-
The extracts were treated with few drops of conc. Nitric acid. Formation of yellow colour indicates the presence of proteins.

b. Ninhydrin Test:-
To the extract0.25%w/v ninhydrin reagent was added and boiled for few minutes. Formation of blue colour indicates the presence of amino acids.

2.3.4 Detection of Flavonoids
a. Alkaline Reagent Test:-
The extracts were treated with few drops of sodium hydroxide solution. Formation of intense yellow colour, which becomes colorless on addition of dilute acid, indicates the presence of flavonoids.

b. Lead acetate Test:-
Extracts were treated with few drops of lead acetate solution. Formation of yellow colour precipitate indicates the presence of flavonoids.

2.3.5 Detection of Phenols
Ferric Chloride Test:-
Extracts were treated with 3-4 drops of ferric chloride solution. Formation of bluish black colour indicates the presence of phenols.

2.3.6 Detection of Saponins
***a.* Froth Test:-**
Extracts were diluted with distilled water to 20ml and this was shaken in a graduated cylinder for 15 minutes. Formation of 1 cm layer of foam indicates the presence of saponins.

b. Foam Test:-
0.5 gm of extract was shaken with 2 ml of water. If foam produced persists for ten minutes it indicates the presence of saponins.

2.3.7 Detection of Tanins
***a.* Gelatin Test:-**
To the extract, 1% gelatin solution containing sodium chloride was added. Formation of white precipitate indicates the presence of tannins. Extracts of root, stem shows formation of white precipitate.

2.3.8 Detection of Phytosterols

***a.* Salkowski's Test:-**

Extracts were treated with chloroform and filtered. The filtrates were treated with few drops of Conc. Sulphuric acid, shaken and allowed to stand. Appearance of golden yellow colour indicates the presence of phytosterols.

b. Libermann Burchard's test:-

Extracts were treated with chloroform and filtered. The filtrates were treated with few drops of acetic anhydride, boiled and cooled. Conc. Sulphuric acid was added. Formation of brown ring at the junction indicates the presence of phytosterols.

2.4 Antimicrobial assay

2.4.1 Bacterial Strains:-

Gram positive Strains Methcillin- resistant *Staphylococcus aureus* (MRSA, NCTC 13616), *Bacillus subtilis* (ATCC 6633), *Bacillus cereus*, (ATCC 14579) and Gram negative strains pseudomonas *aeruginosa* (ATCC 27853), *Klebsiella pneumoniae* (ATCC 43816), *Escherichia coli* (ATCC 8739), *Proteus vulgaris* (ATCC 13315), salmonella typhi (ATCC 19430) were procured from American Type Culture Collection, USA. Methcillin- resistant *Staphylococcus aureus* was purchased from Culture Collections, UK. All bacterial strains stored at -80^{o}C were streaked on Luria-Bertani (LB) agar plates (Hi-media Laboratories, Mumbai, India) and incubated at 37^{o}C for 20 to 24 h. A few isolated colonies were selected from each plate and suspended in 5 ml of LB broth in sterile culture vessel. The vessel was plugged with cotton and incubated with gentle shaking (140 rpm) at 37^{o}C for 20 h.

2.4.2 Preparation of inoculums:-

By the standard method of inoculation (Bauer et al., 1966) an inoculating loop was touched each of four or five well isolated colonies of the same morphological type and inoculum was inoculated into 5ml of nutrient broth. The broth cultures were allowed to incubate at 37^{0}C for 24 hrs until a slight visible turbidity appeared. The turbidity of actively growing broth cultures was then adjusted with broth to obtain a half of MC Farland standard ($1x10^{8}$ to $5x10^{8}$ cfu/ml). This was used as starting inoculums for the assay.

2.4.3 Antibacterial and antifungal assays:-

The in vitro antimicrobial studies were carried out by agar well diffusion method against test organisms (Chung et al. 1990; Azoro 2002). Nutrient broth (NB) plates were swabbed with 24 h old broth culture (100 ml) of test bacteria. Using the sterile cork borer, wells (6 mm) were made into each petriplate. Various concentrations of RML, RMS and RMR extract fractions dissolved in DMSO (50, 75, 100 mg/well) were added into the wells by using sterile pipettes. The standard antibiotics, Chloramphenicol, for antibacterial activity and Ketoconazole, for antifungal activity (as positive control) were simultaneously tested against the pathogens. DMSO used as a negative control. The plates were incubated at 37 ^{0}C for 24 h for bacteria and at 28 ^{0}C for 48 h for fungi. After appropriate incubation, the diameter of zone of inhibition of each well was measured. Duplicates were maintained and the average values were calculated for eventual antibacterial activity.

2.5 Minimum inhibitory concentration assay:-

Broth dilution test was used to determine Minimum Inhibitory Concentration (MIC) of the chloroform, acetone and Toluene fractions of *Rhusmysorensis* leaf, stem and root methanol extract (Janovska et al. 2003). Freshly prepared nutrient broth was used as diluents. The 24 h old culture of the test bacteria and fungi were diluted 100 fold in nutrient broth (100 ml bacterial cultures in 10 ml NB). Increasing concentrations of the test samples (1.25, 2.5, 5, 10, 20, 40 ml of stock solution contains 6.25, 12.5, 25, 50, 100, 200 mg of the fractions) were added to the test tubes containing the bacterial and fungal cultures. All the tubes were incubated at 37 ^{0}C for 24 h for bacteria and at 28 ^{0}C for 48 h for fungi. The tubes were examined for visible turbidity and using NB as control. Control without test samples and with solvent was assayed simultaneously. The lowest concentration that inhibited visible growth of the tested organisms was recorded as MIC.

2.6 Statistical Analysis:-

Values of zone of inhibitions and standard were expressed as the mean ± SEM. Differences between mean values are calculated by using one way ANOVA followed by Dunnett's 't' test. Statistical significance was considered at < 0.05.

3.0 Results and Discussion:-

3.1 Phyto chemical analysis:-

Table 1 represents the Phyto chemical analysis of RML, RMS and RMR fractions. The results noticed that the tested fractions possess different types of secondary metabolites such as alkaloids, carbohydrates, flavonoids, phenols, saponins, tannins, phytosterols.

3.1 Antibacterial and antifungal activity:-

In the current study, RML, RMS and RMR fractions are determined for their efficacy of antibacterial potentials against various human pathogenic bacteria: five Gram-positive bacteria and five Gram-negative bacteria (See the list of bacterial stains used in the study). The activity was found to be concentration dependent manner and evaluated by measuring the zone of inhibition (mm). The plant extracts which are of highly active, were further screened for their minimum inhibitory concentrations (MIC) (see table 8). According to the results, RMR fractions were highly active compared to the RML and RMS (Table 2, 3 and 4). Among the RMR fractions Acetone and Toluene extracts noticed significant antibacterial and antifungal activity. The highest zone of inhibitions were recorded at 100 µg/mL are 28, 27, 26, 27, 24, 25, 27, 30, 23 and 22, 26, 25, 24, 22, 21, 23, 27, 21 against bacterial strains M. *tuberculosis*, *Methicillin resistant Staphylococcus aureus*, E.*coli* respectively. *Salmonella typhi* showed resistance against all fractions tested. On the other hand, RMS and RML fractions showed moderate and least activity on all tested organisms. The antifungal activity of the extracts was also found in a concentration dependent manner. Among RML, RMS and RMR, RMR significantly inhibited the growth of fungal strains tested. The highest zones of inhibitions 26, 19, 24, 16 mm are noticed by toluene fractions and acetone against *Aspergillus niger* and *Candida albicans* respectively.

The results are compared with known standards Chloramphenicol, for antibacterial activity and Ketoconazole, for antifungal activity. Among, Gram positive and negative stains, found more susceptible towards RMR extract comparing to RML and RMS extracts.

Plant are in continue to act as viable source of naturally derived drugs which were evaluated for their attributed anti-bacterial potentials and to ascertain the efficiency towards development of ethanomedicine for the treatment of various bacterial diseases. Now-a-days, owing to bio-integrity, presently scientists are showing their desired interest on medicinal plants for the discovery of therapeutically valuable plant derived drugs with curative properties (Taylor et al., 1996). Plant-based medicaments have been basis and alternative for many modern and contemporary pharmaceutical drugs that we use today.

Table 1 : Phytochemical analysis of *Rhusmysorensis* extracts

	RML					RMS					RMR				
	hex,	Eth,	Chl ,	Ace,	Tol	hex,	Eth,	Chl ,	Ace,	Tol	hex,	Eth,	Chl ,	Ace,	Tol
Phytochemical															
Alkaloids	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Carbohydrates	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Aminoacids	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Flavonoids	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Phenols	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Sapnins	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Tanins	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Phytoseriols	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+

hex-n-hexane, Eth-Ethyl acetate, Chl-Chlorform, Ace-Acetone, Tol-Toluene

Table 2 : Antibacterial activity of *Rhusmysorensis* Leaf fractions

	Zone of Inhibition (mm)										
	RML fractions										
	n-hexane		Ethyl acetate		Chloroform		Acetone		Toluene		Chloromophenicol
(µg/mL)	**75**	**100**	**75**	**100**	**75**	**100**	**75**	**100**	**75**	**100**	**100**
Test organisms											
Gram positive											
M. *tuberculosis*	05±0.2	09±0.1	09±0.3	13±0.3	12±0.2	15±0.1	16±0.1	18±0.2 [c]	20±0.1	22±0.2 [b]	29±0.2
M. *luteus*	03±0.2	07±0.2	07±0.3	11±0.3	0 9±0.1	13±0.1	14±0.2	18±0.2	16±0.1	20±0.2 [b]	27±0.1
MRSA	04±0.2	08±0.2	08±0.3	12±0.2	10±0.1	14±0.2	15±0.2	18±0.2 [c]	17±0.1	20±0.3 [b]	30±0.1
B. *subtilis*	04±0.2	07±0.1	06±0.1	10±0.2	11±0.1	13±0.2	14±0.2	17±0.1 [c]	15±0.2	19±0.2 [b]	28±0.3
B. *cereus*	03±0.1	06±0.2	06±0.1	09±0.3	07±0.2	11±0.1	12±0.2	15±0.3 [c]	14±0.2	17±0.1 [b]	26±0.1
Gram negative											
P. *aurgenosa*	02±0.1	06±0.2	09±0.2	12±0.1	11±0.1	14±0.2	14±0.2	17±0.1 [c]	16±0.1	19±0.1 [b]	27±0.1
K. *pneumonia*	06±0.1	10±0.1	11±0.1	14±0.2	15±0.1	18±0.1	17±0.1	20±0.2 [c]	19±0.1	21±0.1 [b]	28±0.1
E. *coli*	09±0.2	13±0.2	12±0.1	15±0.2	14±0.1	17±0.1	16±0.1	20±0.1 [c]	19±0.1	23±0.1 [b]	31±0.1
P. *vaulgaris*	06±0.1	09±0.1	0 8±0.2	11±0.1	12±0.2	15±0.1	16±0.2	19±0.1 [c]	18±0.1	22±0.2 [b]	27±0.1
S. *typhi*	--	--	--	--	--	--	--	--	--	--	--

Data is analyzed by one way ANOVA followed by Dunnett's 't' test and expressed as mean _ SEM from six observations; [b]indicates P < 0.01, & [c] indicates P < 0.05. MRSA-Methicillin Resistant Staphylococcus *aureus*,

Table 3: Antibacterial activity of *Rhusmysorensis* Stem fractions

	Zone of Inhibition (mm)										
	RMS fractions										
	n-hexane		Ethyl acetate		Chloroform		Acetone		Toluene	Chloromophenicol	
(µg/mL)	**75**	**100**	**75**	**100**	**75**	**100**	**75**	**100**	**75**	**100**	**100**
Test organisms											
Gram positive											
M. *tuberculosis*	10±0.2	13±0.1	13±0.3	15±0.3	16±0.2	19±0.1	17±0.1	21±0.2[c]	22±0.1	25±0.2[b]	29±0.2
M. *luteus*	04±0.2	07±0.2	10±0.3	13±0.3	12±0.1	15±0.1	16±0.2	19±0.2 [c]	18±0.1	21±0.2[b]	27±0.1
MRSA	11±0.2	14±0.2	14±0.3	17±0.2	17±0.1	20±0.2	18±0.2	21±0.2 [c]	23±0.1	25±0.3[b]	30±0.1
B. *subtilis*	08±0.2	11±0.1	12±0.1	14±0.2	13±0.1	17±0.2	15±0.2	19±0.1 [c]	18±0.2	22±0.2[b]	28±0.3
B. *cereus*	04±0.1	07±0.2	09±0.1	12±0.3	12±0.2	14±0.1	16±0.2	17±0.3 [c]	18±0.2	20±0.1[b]	26±0.1
Gram negative											
P. *aurgenosa*	09±0.1	12±0.2	13±0.2	15±0.1	14±0.1	17±0.2	18±0.2	21±0.1 [c]	21±0.1	23±0.1[b]	27±0.1
K. *pneumonia*	08±0.1	11±0.1	13±0.1	14±0.2	15±0.1	17±0.1	18±0.1	19±0.2 [c]	20±0.1	22±0.1[b]	28±0.1
E. *coli*	11±0.2	14±0.2	15±0.1	17±0.2	17±0.1	20±0.1	19±0.1	23±0.1 [c]	22±0.1	25±0.1[b]	31±0.1
P. *vaulgaris*	04±0.1	08±0.1	09±0.2	12±0.1	13±0.2	15±0.1	16±0.2	20±0.1 [c]	19±0.1	22±0.2[b]	27±0.1
S. *typhi*	--	--	--	--	--	--	--	--	--	--	--

Data is analyzed by one way ANOVA followed by Dunnett's 't' test and expressed as mean _ SEM from six observations; [b]indicates $P < 0.01$, & [c] indicates $P < 0.05$. MRSA-Methicillin Resistant Staphylococcus *aureus*,

Table 4: Antibacterial activity of *Rhusmysorensis* Root fractions

	Zone of Inhibition (mm)										
	RMR fractions										
	n-hexane		Ethyl acetate		Chloroform		Acetone		Toluene		Chloromophenicol
(µg/mL)	**75**	**100**	**75**	**100**	**75**	**100**	**75**	**100**	**75**	**100**	**100**
Test organisms											
Gram positive											
M. *tuberculosis*	08±0.2	11±0.1	13±0.3	15±0.3	19±0.2	21±0.1	20 ±0.1	22±0.2[b]	25±0.1	27±0.2[a]	29±0.2
M. *luteus*	09±0.2	12±0.2	15±0.3	17±0.3	20±0.1	22±0.1	24±0.2	26±0.2[b]	25±0.1	26±0.2[a]	27±0.1
MRSA	07±0.2	10±0.2	12±0.3	16±0.2	19±0.1	21±0.2	23±0.2	25±0.2[b]	27±0.1	28±0.3[a]	30±0.1
B. *subtilis*	06±0.2	09±0.1	11±0.1	15±0.2	15±0.1	18±0.2	21±0.2	24±0.1[b]	26±0.2	27±0.2[a]	28±0.3
B. *cereus*	07±0.1	12±0.2	12±0.1	16±0.3	15±0.2	19±0.1	18±0.2	22±0.3[b]	21±0.2	24±0.1[a]	26±0.1
Gram negative											
P. *aurgenosa*	08±0.1	11±0.2	12±0.2	16±0.1	17±0.1	19±0.2	17±0.2	21±0.1[c]	24±0.1	25±0.1[a]	27±0.1
K. *pneumonia*	05±0.1	09±0.1	11±0.1	14±0.2	13±0.1	17±0.1	20±0.1	23±0.2[c]	26±0.1	27±0.1[a]	28±0.1
E. *coli*	11±0.2	14±0.2	17±0.1	19±0.2	20±0.1	23±0.1	25±0.1	27±0.1[c]	29±0.1	30±0.1[a]	31±0.1
P. *vaulgaris*	10±0.1	13±0.1	12±0.2	16±0.1	16±0.2	19±0.1	17±0.2	21±0.1[c]	20±0.1	23±0.2[a]	27±0.1
S. *typhi*	--	--	--	--	--	--	--	--	--	--	--

Data is analyzed by one way ANOVA followed by Dunnett's 't' test and expressed as mean _ SEM from six observations;[a] indicates $P < 0.001$, [b] indicates $P < 0.01$ & [c]indicates $P < 0.05$

Table 5: Antifungal activity of *Rhusmysorensis* Leaf fractions

Zone of Inhibition (mm)											
RML fractions											
	n-hexane		Ethyl acetate		Chloroform		Acetone		Toluene		KT
(µg/mL)	**75**	**100**	**75**	**100**	**75**	**100**	**75**	**100**	**75**	**100**	**100**
Test organisms											
Aspergillus niger	06±0.2	08±0.1	09±0.3	11±0.3	12±0.2	13±0.1	14±0.1	15±0.2[c]	17±0.1[b]	19±0.2[a]	29±0.2
Candida albicans	03±0.2	04 ±0.2	06±0.3	08±0.3	10±0.1	12±0.1	14±0.2	16±0.1[c]	17±0.1[b]	19±0.2[a]	27±0.1

Data is analyzed by one way ANOVA followed by Dunnett's 't' test and expressed as mean _ SEM from six observations; [a]indicates P < 0.001, [b]indicates P < 0.01, & [c] indicates P < 0.05. MRSA-Methicillin Resistant Staphylococcus *aureus*,

Table 6: Antifungal activity of *Rhusmysorensis* Stem fractions

Zone of Inhibition (mm)											
RMS fractions											
	n-hexane		Ethyl acetate		Chloroform		Acetone		Toluene		KT
(µg/mL)	**75**	**100**	**75**	**100**	**75**	**100**	**75**	**100**	**75**	**100**	**100**
Test organisms											
Aspergillus niger	03±0.2	04±0.1	05±0.3	06±0.3	08±0.2	11±0.1	14±0.1	16±0.2[c]	18±0.1[b]	20±0.2[a]	29±0.2
Candida albicans	01±0.2	02±0.2	03±0.3	05±0.3	07±0.1	10±0.1	12±0.2	14±0.2[c]	17±0.1[b]	20±0.2[a]	27±0.1

Data is analyzed by one way ANOVA followed by Dunnett's 't' test and expressed as mean _ SEM from six observations;[a] indicates P < 0.001, [b] indicates P < 0.01 & [c]indicates P <0.05

Table 7: Antifungal activity of *Rhusmysorensis* Root fractions

Zone of Inhibition (mm)											
	RMR fractions										
	n-hexane		Ethyl acetate		Chloroform		Acetone		Toluene		KT
(µg/mL)	**75**	**100**	**75**	**100**	**75**	**100**	**75**	**100**	**75**	**100**	**100**
Test organisms											
Aspergillus niger	02±0.2	03±0.1	05±0.3	08±0.3	10±0.2	13±0.1	16±0.1	19±0.2[c]	22±0.1[b]	26±0.2[a]	29±0.2
Candida albicans	03±0.2	04 ±0.2	05±0.3	06±0.3	08±0.1	11±0.1	14±0.2	16±0.2[c]	20±0.1[b]	24±0.2[a]	27±0.1

Data is analyzed by one way ANOVA followed by Dunnett's 't' test and expressed as mean _ SEM from six observations; [a] indicates P < 0.001, [b] indicates P < 0.01 & [c] indicates P <0.05

Table 8: Minimum inhibitory concentrations of *Rhusmysorensis* fractions

	RML			RMS			RMR		
	Chloroform	Acetone	Toluene	Chloroform	Acetone	Toluene	Chloroform	Acetone	Toluene
Test organisms									
Gram positive									
M. *tuberculosis*	22.1	16.5	12.8	33.9	35.6	33.8	18.6	12.0	10.3
M. *luteus*	>30	25.3	20.8	>15	13.5	15.0	<10	12.6	<10
MRSA	>40	31.2	38.3	31.5	28.7	30.1	23.5	22.0	26.1
B. *subtilis*	30.6	27.0	29.1	28.2	25.3	27.0	<20	<20	24.6
B. *cereus*	>60	>50	>60	>40	>40	>50	12.2	17.8	<20
Gram negative									
P. *aurgenosa*	40.1	37.2	32.6	25.0	22.1	24.1	13.2	16.1	<20
K. *pneumonia*	>80	75.6	>70	>60	55.2	50.0	>40	42.5	38.2
E. *coli*	27.8	30.6	35.2	20.2	25.9	24.0	20.9	22.3	20.7
P. *vaulgaris*	>80	>75	>60	<50	<40	<40	40.8	45.6	42.0
S. *typhi*	--	--	--	--	--	--	--	--	--
Aspergillus niger	>60	>70	>65	<55	<50	<55	62.1	>60	65.8
Candida albicans	78.4	69.3	>60	<70	66.9	74.2	52.8	63.0	60.0

4.0 Conclusion:-

In conclusion, we demonstrate that *Rhusmysorensis* root extracts more active than stem and leaf extracts. The *Rhusmysorensis* root extract act as efficient anti-bacterial agents against various human pathogenic organisms. Further studies are underway for the identification of these responsible agents for the activity.

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