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ANTIMICROBIAL PROPERTIES OF DIFFERENT SOLVENTS EXTRACT OF *RUMEX VESICARIUS LINN*. ON SOME SELECTED BACTERIAL AND FUNGAL ISOLATES

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ABSTRACT: The Antimicrobial (antifungal and antibacterial) properties of the different solvents extracts (benzene, pet ether, acetone, chloroform, methanol and aqueous) of *Rumex vesicarius Linn* plant plants, on four bacterial (*Bacillus subtilis*, *Escherichia coli*, *Pseudomonas aeruginosa* and *Staphylococcus aureus*) and four fungal isolates (*Aspergillus niger*, *Tricoderma reesei*, *Penicillium funiculosum* and *Fusarium oxysporum)* were investigated by well diffusion assay. The minimum inhibitory concentration (MIC) of these solvents extracts evaluated at different concentration (3.25 mg/ml, 6.25 mg/ml, 12.5 mg/ml, 25 mg/ml and 50 mg/ml) for the tested organisms. The widest spectrum of antimicrobial activity was recorded for pet ether extract of leaf against *P. funiculosum (30±1.2mm)*, *F. oxysporum* (22±0.8mm), *E. coli*(20±0.9mm) and *P. Aeruginosa* (10±0.7mm). This was followed by the benzene extract of leaf, which inhibits *P. funiculosume t4l(20±0.8mm)*, *F. oxysporum* (18±0.4mm), *E.coli*(10±0.7mm). Acetone extract of flower work against *P. funiculosum (30±1.4mm)*, *A. niger*, (12±0.7mm), *E. coli*(20±0.6mm) and *S.aureus* (18±0.8mm). The inhibitory effect of chloroform extract of flower against *A.niger*, (18±0.3mm) and *F. oxysporum* (16±0.3mm). The antimicrobial activity of methanolic and aqueous extract of plant against the organisum was minimal as compared to others.

INTRODUCTION: Diseases caused by micro-organisms remain one of the major threats to human health. Although a number of natural-synthetic antimicrobial agents have been isolated and developed to kill pathogenic microorganisms effectively, global antimicrobial resistance is an increasing public health problem. Medicinal plants represent a rich source of antimicrobial agents. Various specific plants have continued to be an important therapeutic aid for alleviating the ailments of humankind. Therefore, novel antimicrobial agents from different biological sources are continuously sought [1].

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It was observed by the researchers that many plant species tested against bacteria, fungi and viral activities, the extracts of these plants were inhibitory against the growth of the microorganisms [2]. A more detailed study on the antimicrobial activities of compounds from extracts has revealed that the extracts obtained from the plants were shown to possess inhibitory effects against *S. auerus*, *E. coli* and *P. aeruginosa* [3].

All over the world, there has been heightened interest in discovering new, safe and therapeutically useful remedies from plants [4]. Antibiotics or antimicrobial compounds such as saponins, glycosides, flavonoids, alkaloids, and tannins are well distributed in plants, but they are not well established due to lack of knowledge on the isolation of the important constituents and the techniques needed in such researches especially in underdeveloped and developing countries [5].

Rumex vesicarius L. is a wild edible plant, belongs to family Polygonaceae, used as a sorrel and collected in spring time and eaten fresh, or cooked. *Rumex vesicarius* L. has many important medicinal uses such as treatment of tumors, hepatic diseases, bad digestion, constipation, calcules, heart troubles, pains, diseases of the spleen, hiccough, flatulence, asthma, bronchitis, dyspepsia, piles, scabies, leucoderma, toothache and nausea. The plant also used as cooling, laxative, stomachic, tonic, analgesic, appetizer, diuretic, astringent, purgative, antispasmodic and antibacterial agents [6].

Considering the vast potentiality of plants as sources for antimicrobial drugs with reference to antibacterial and antifungal agents, a systematic investigation was undertaken to screen the local flora for antibacterial and antifungal activity from *Rumex vesicarius Linn.*

MATERIALS AND METHODS:

Collection and Identification of Plant Material: Fresh plant free from disease was collected from the hills of Jaipur. *Rumex vesicarius* (voucher no. is RUBL 21074) was authenticated by Herbarium, Department of Botany, Rajasthan University, Jaipur, Rajasthan, India. The plant parts were washed thoroughly 2-3 times with running water and once with sterile distilled water. Leaf, stem and flower material was then air-dried on sterile blotter under shade.

Solvent Extraction: Thoroughly washed plant material were dried in shade for five days and then powdered with the help of mechanical blender. Shade-dried powder was filled in the thimble and extracted successively with petroleum ether in Soxhlet extractor for 48h. The solvent extract was filtered through a Whatman No.1 filter paper. The filtrate was evaporated to dryness under reduced pressure using rotary evaporator. The remaining residue of the plant material was extracted with benzeze, chloroform, acetone, methanol, and water sequentially in a similar manner. and preserved at 5°C in airtight bottle until further use. [7]

Growth and Maintenance of Test Microorganism for Antimicrobial Studies: Bacterial cultures of *Bacillus subtilis* (*B. subtilis*), *Escherichia coli* (*E. coli*), *Pseudomonas aeruginosa* (*P. aeruginosa*) and *Staphylococcus aureus* (*S. aureus*) and fungal cultures of *Aspergillus niger* (*A. niger*), *Tricoderma reesei* (*T. reesei*), *Penicillium funiculosum* (*P. funiculosum)* and *Fusarium oxysporum* (*F. oxysporum*), were obtained from SMS Medical College, Jaipur, Rajasthan, India, used for antimicrobial test organisms. The bacteria were maintained on nutrient broth (NB) at 37°C and fungus were maintained on Potato dextrose agar (PDA) at 28°C.

Antibacterial Activity of Plant Extracts: The antibacterial potentiality was carried out using standard microbial techniques- the Agar Well Diffusion method [5]. The culture for the medium was prepared by nutrient agar in distilled water, and sterilized by autoclaving above 121^{o}C for 15 min at 15 psi. Sterilized Petri dishes containing the nutrient agar were inoculated with the microorganisms under investigation with spreader and allowed to stand for 30 min. Agar wells of 6mm were made on the agar using cork borers. Two different concentrations of the extracts, 25mg/ml and 50mg/ml were prepared in 20% dimethylsuphoxide (DMSO) and seeded into the wells and incubated at 37^{o}C for 24 h.

Antimicrobial activity of the extract was determined by measuring their zone of inhibition (in mm). The zone of inhibition was calculated by measuring the diameter of the inhibition (mm). The readings were taken in three different directions on all 3 replicates and the average value was tabulated. Streptomycin (1mg/ml) was used as the positive control whereas solvent served as the negative control [7].

Antifungal Activity of Plant Extracts: The antifungal activity was screened by modified agar well diffusion method. Potato dextrose agar (PDA) was used for fungal cultures. The culture medium was inoculated with the fungal strains (7 days old) separately suspended in Saline Solution. Agar wells of 6mm were made on the agar using cork borers. Two different concentrations of the extracts, 25mg/ml and 50mg/ml were prepared in 2% dimethylsuphoxide (DMSO) and seeded into the wells and incubated at 37^{o}C for 72 h. Activity of the extract was determined by measuring their

zone of inhibition (in mm). Ketokerazole (1mg/ml) was used as the positive control whereas solvent served as the negative control [8, 9].

Minimum Inhibitory Concentration:

The minimum inhibitory concentration of the extracts was investigated by diluting a given volume of the extract to various concentrations according to Macro-broth dilution technique [10]. One millilitre of distilled water was measured into three different appropriately labeled test tubes. This was followed by double dilution of the plant extracts to obtain dilutions such as 3.25 mg/ml, 6.5 mg/ml, 12.5 mg/ml, 25 mg/ml and 50 mg/ml. Six wells were made on the agar surface with a sterile cork borer (6mm) and the wells were appropriately labeled.

The concentrations were used to fill up the wells using Pasteur pipette. This was followed by the incubation of the plates at 37^0 C for 24 hours. [11, 12]. The minimum dilution of plant extract that inhibits the growth of the organism was taken as Minimum Inhibitory Concentration. [4, 8].

RESULT: The results of antimicrobial sensitivity of various solvent extracts of *Rumex vesicarius L.* by well diffusion method are in depicted below **Table 1-6**. The results reveal that some extracts are potent antimicrobials against the pathogenic organisms studied. The antimicrobial activity was screened from the zone of inhibition. The diameter of inhibition zones for each of the samples were compared with positive control. In negative control has not shown any inhibitory effect.

Different solvents were used for the extraction of bioactive compounds from plant parts i.e. flower, leaf and stem to studied the antimicrobial sensitivity assay.

In antifungal assay flower extracts (**Table 1**) of benzene (50mg/ml), acetone (25mg/ml), pet ether (25mg/ml), chloroform (50mg/ml) and methanol (50mg/ml) show maximum inhibition against *P. funiculosum* (20mm), *P. funiculosum* (30mm), *A.niger* (22mm), *A.niger* (18mm) and *P.funiculosum* (14mm) respectively. Leaf extract (**Table 2**) of benzene (50mg/ml), acetone (50mg/ml), pet ether (50mg/ml) and aqueous(50mg/ml) exhibit highest activity against *P. funiculosum* (20mm), *A.niger* (12mm), *P. funiculosum* (30mm) and *F.oxysporum* (14mm) respectively. Stem extract (**Table 3**) of benzene (50mg/ml), acetone (25mg/ml), pet ether (25mg/ml), chloroform (50mg/ml) and aqueous (25mg/ml) possess highest inhibition against *F.oxysporum* (20mm) *P.funiculosum* (20mm), *F.oxysporum* (10mm), *F.oxysporum* (14mm) and *F.oxysporum* (14mm) respectively.

TABLE 1: ANTIBIOGRAM OF FLOWER PART EXTRACT OF *R.VESICARIUS* IN DIFFERENT SOLVENTS AT DIFFERENT CONCENTRATION (25, 50) mg/ml AGAINST SOME FUNGI.

Solvent and Conc. (mg/ml)	*T. reseei*	*F.oxysporum*		*A.niger*		*P.funiculosa*	
	IZ	IZ	AI	IZ	AI	IZ	AI
Benzene : 25mg: 50mg	NA	NA	-	NA	-	10±0.2	0.625
Standard: Ketoconazol	NA	NA	-	NA	-	20±0.6	1.25
	NA	NA	-	NA	-	NA	-
Acetone : 25mg: 50mg	NA	NA	-	12±0.7	0.75	30±1.4	1.66
Standard: Ketoconazol	NA	NA	-	12±0.5	0.75	14±0.6	0.77
	14±0.4	NA	-	16	-	18	-
Pet ether : 25mg: 50mg	NA	NA	-	22±1.4	1.375	NA	-
Standard :Ketoconazol	NA	NA	-	10±0.2	0.625	NA	-
	NA	15	-	16	-	18	-
Chloroform: 25mg: 50mg	NA	16±0.3	1	16±0.8		NA	-
Standard: Ketoconazol	NA	12±.7	0.75	18±0.3		NA	-
	14	16		NA	-	12	
Methanol : 25mg: 50mg	NA	NA	-	NA	-	NA	-
Standard: Ketoconazol	NA	NA	-	NA	-	14±0.6	0.7
	16	16		16		20	
Aqueous : 25mg: 50mg	NA	NA	-	NA	-	8±0.6	0.53
Standard: Ketoconazol	NA	NA	-	NA	-	6±0.4	0.4
	12	15		14		15	

Values are mean inhibition zone (mm) ± S.D of three replicates, NA: No Activity

TABLE 2: ANTIBIOGRAM OF LEAF PART EXTRACT OF *R.VESICARIUS* IN DIFFERENT SOLVENTS AT DIFFERENT CONCENTRATION (25, 50) mg/ml AGAINST SOME FUNGI

Solvent and Conc. (mg/ml)	*T. reseei*	*F.oxysporum*		*A.niger*		*P.funiculosa*	
	IZ	IZ	AI	IZ	AI	IZ	AI
Benzene : 25mg : 50mg	NA	18±0.4	1.2	NA	-	16±0.6	1
Standard: Ketoconazol	NA	NA	-	8±0.2		20±0.8	1.25
	NA	NA	-	NA	-	NA	-
Acetone : 25mg: 50mg	NA	8±0.8	-	NA	-	NA	-
Standard: Ketoconazol	NA	NA	-	12±0.9	0.75	NA	-
	14±0.4	NA	-	16	-	18	-
Pet ether : 25mg: 50mg	NA	NA	-	NA	-	NA	-
Standard :Ketoconazol	NA	22±0.8	1.46	14±0.2	0.875	30±1.2	1.66
	NA	15	-	16	-	18	-
Chloroform: 25mg: 50mg	NA	NA	-	NA	-	NA	-
Standard: Ketoconazol	NA	NA	-	NA	-	NA	-
	14	16		NA	-	12	
Methanol : 25mg : 50mg	NA	NA	-	NA	-	NA	-
Standard: Ketoconazol	NA	NA	-	NA	-	NA	-
	16	16		16		20	
Aqueous : 25mg : 50mg	NA	12±0.5	0.8	NA	-	NA	-
Standard: Ketoconazol	NA	14±0.1	0.93	NA	-	6±0.4	0.4
	12	15		14		15	

Values are mean inhibition zone (mm) ± S.D of three replicates, NA: No Activity

TABLE 3: ANTIBIOGRAM OF STEM PART EXTRACT OF *R.VESICARIUS* IN DIFFERENT SOLVENTS AT DIFFERENT CONCENTRATION (25, 50) mg/ml AGAINST SOME FUNGI

Solvent and Conc. (mg/ml)	*T. reseei*	*F.oxysporum*		*A.niger*		*P.funiculosa*	
	IZ	IZ	AI	IZ	AI	IZ	AI
Benzene : 25mg : 50mg	NA	16±0.6	1.06	NA	-	NA	-
Standard: Ketoconazol	NA	20±1.1	1.33	NA	-	NA	-
	NA	NA	-	NA	-	NA	-
Acetone : 25mg: 50mg	NA	NA	-	12±0.4	0.75	20±1.2	1.11
Standard: Ketoconazol	NA	NA	-	16±1.2	1	18±0.8	1
	14±0.4	NA	-	16	-	18	-
Pet ether : 25mg: 50mg	NA	NA	-	NA	-	NA	-
Standard :Ketoconazol	NA	NA	-	NA	-	NA	-
	NA	15	-	16	-	18	-
Chloroform: 25mg : 50mg	NA	10±0.2	0.625	14±0.6		NA	-
Standard: Ketoconazol	NA	14±0.1	0.875	12±0.5		NA	-
	14	16		NA	-	12	
Methanol : 25mg: 50mg	NA	NA	-	NA	-	NA	-
Standard: Ketoconazol	NA	NA	-	NA	-	NA	-
	16	16		16		20	
Aqueous : 25mg: 50mg	NA	14±0.5	0.93	NA	-	8±0.2	0.53
Standard: Ketoconazol	NA	NA	-	NA	-	NA	-
	12	15		14		15	

Values are mean inhibition zone (mm) ± S.D of three replicates, NA: No Activity

In the result of antibacterial assay, different solvents extracts exhibit less significant antibacterial activity as compared with antifungal activity. Flower extract (**Table 4**) of acetone (50mg/ml) exhibit antibacterial sensitivity against *E.coli* (20mm) and *S.aureus* (18mm). Leaf extract (**Table 5**) of benzene (50mg/ml) and pet ether (25mg/ml) show sensitivity against *E.coli* (10mm) and *E.coli* (20mm). Stem extract (**Table 6**) of acetone (25mg/ml and 50mg/ml) have activity against *B.subtilis* (10mm) and *S. Aureus* (10mm). Pet ether extract (25mg/ml) show against *P. Aeruginosa (20mm).* Rest of solvent extract and bacteria did not show significant activity.

TABLE 4: ANTIBIOGRAM OF FLOWER PART EXTRACT OF *R.VESICARIUS* IN DIFFERENT SOLVENTS AT DIFFERENT CONCENTRATION (25, 50) mg/ml AGAINST SOME BACTERIA

Solvent and Conc. (mg/ml)	*E. coli*		*B. subtilis*		*P. aeruginosa*		*S. aureus*	
	IZ	AI	IZ	AI	IZ	AI	IZ	AI
Benzene : 25mg: 50mg	NA	-	NA	-	NA	-	NA	-
Standard: Streptomycin	NA	-	NA	-	NA	-	NA	-
	12	-	NA	-	14	-	NA	-
Acetone : 25mg: 50mg	16±0.7	1.33	NA	-	NA	-	12±0.7	0.75
Standard: Streptomycin	20±0.6	1.66	10±0.8	0.714	NA	-	18±0.8	1.125
	12±1.1	-	14±0.2	-	NA		16±0.4	-
Pet ether : 25mg: 50mg	NA	-	NA	-	NA	-	NA	-
Standard : Streptomycin	NA	-	NA	-	NA	-	NA	-
	28		18		14		20	
Chloroform: 25mg: 50mg	NA	-	NA	-	NA	-	NA	-
Standard: Streptomycin	NA	-	NA	-	NA	-	NA	-
	15		18		NA	-	13	
Methanol : 25mg: 50mg	8±0.4		NA	-	NA	-	NA	-
Standard: Streptomycin	NA	-	NA	-	NA	-	NA	-
	NA	-	22		NA	-	NA	-
Aqueous : 25mg: 50mg	NA	-	6±0.4	0.33	NA	-	NA	-
Standard: Streptomycin	NA	-	NA	-	NA	-	NA	-
	NA	-	18		14		NA	-

Values are mean inhibition zone (mm) ± S.D of three replicates, NA: No Activity

TABLE 5: ANTIBIOGRAM OF LEAF PART EXTRACT OF *R.VESICARIUS* IN DIFFERENT SOLVENTS AT DIFFERENT CONCENTRATION (25, 50) mg/ml AGAINST SOME BACTERIA

Solvent and Conc. (mg/ml)	*E. coli*		*B. subtilis*		*P. aeruginosa*		*S. aureus*	
	IZ	AI	IZ	AI	IZ	AI	IZ	AI
Benzene : 25mg: 50mg	NA	-	NA	-	NA	-	8±0.4	-
Standard: Streptomycin	10±0.7	0.833	NA		8±0.2	0.571	8±0.2	-
	12	-	NA	-	14	-	NA	-
Acetone : 25mg: 50mg	NA	-	NA	-	NA	-	8±0.9	0.5
Standard: Streptomycin	NA	-	NA	-	NA	-	NA	-
	12±1.1	-	14±0.2	-	NA		16±0.4	-
Pet ether : 25mg: 50mg	20±0.9	0.714	NA	-	NA	-	NA	-
Standard : Streptomycin	NA	-	NA	-	10±0.7	0.714		
	28		18		14		20	
Chloroform: 25mg: 50mg	NA	-	8±0.4	0.44	NA	-	NA	-
Standard: Streptomycin	NA	-	NA	-	NA	-	NA	-
	15		18		NA	-	13	
Methanol : 25mg: 50mg	NA	-	NA	-	NA	-	NA	-
Standard: Streptomycin	NA	-	NA	-	NA	-	NA	-
	NA	-	22		NA	-	NA	-
Aqueous : 25mg: 50mg	NA	-	NA	-	NA	-	NA	-
Standard: Streptomycin	NA	-	NA	-	NA	-	NA	-
	NA	-	18		14		NA	-

Values are mean inhibition zone (mm) ± S.D of three replicates, NA: No Activity

The minimum inhibitory concentration (MIC) of the different solvent extracts of plant parts (flower, stem, leaf) on each of the tested organisms at different concentration (3.25 mg/ml, 6.25 mg/ml, 12.5 mg/ml, 25 mg/ml and 50 mg/ml) are presented in **Tables 7-8**. Here we show only those extracts which exhibited some inhibitory activity. *P. funiculosum* was sensitivity to flower extract of benzene, pet ether, methanol at concentration of 6.25mg/ml and acetone at concentration of

12.5mg/ml. It inhibited by stem extract of acetone and aqueous at concentration of 6.25mg/ml and leaf extract of pet ether at 25mg/ml and aqueous at 6.25mg/ml (**Table 8).** *F.oxysporum* inhibited by Flower extract of aqueous and chloroform at concentration of 12.5mg/ml, stem extract of chloroform and pet ether at concentration of 12.5mg/ml, benzene at 6.25mg/ml and leaf extract of benzene and pet ether at concentration of 12.5mg/ml and 6.25mg/ml respectively (**Table 8**). *A.niger* was sensitive to flower extract of pet ether, acetone and chloroform at concentration of 6.25mg/ml,12.5mg/ml and 6.25mg/ml respectively. Stem extract of acetone and chloroform inhibited *A.niger* at 6.25mg/ml (**Table 8**).

TABLE 6: ANTIBIOGRAM OF STEM PART EXTRACT OF *R.VESICARIUS* IN DIFFERENT SOLVENTS AT DIFFERENT CONCENTRATION (25, 50) mg/ml AGAINST SOME BACTERIA

Solvent and Conc. (mg/ml)	*E. coli*		*B. subtilis*		*P. aeruginosa*		*S. aureus*	
	IZ	AI	IZ	AI	IZ	AI	IZ	AI
Benzene : 25mg: 50mg	NA	-	NA	-	NA	-	NA	-
Standard: Streptomycin	NA	-	NA	-	NA	-	8±0.2	-
	12	-	NA	-	14	-	NA	-
Acetone : 25mg: 50mg	NA	-	NA	0.714	NA	-	NA	-
Standard: Streptomycin	NA	-	NA	-	NA	-	10±0.7	0.625
	12±11	-	14±0.2	-	NA		16±0.4	-
Pet ether : 25mg: 50mg	10±0.3	0.357	NA	-	20±0.6	1.42	NA	-
Standard : Streptomycin	NA	-	NA	-	NA	-	NA	-
	28		18		14		20	
Chloroform: 25mg: 50mg	NA	-	NA	-	NA	-	NA	-
Standard: Streptomycin	NA	-	NA	-	NA	-	NA	-
	15		18		NA	-	13	
Methanol : 25mg: 50mg	NA	-	NA	-	NA	-	NA	-
Standard: Streptomycin	NA	-	NA	-	NA	-	NA	-
	NA	-	22		NA	-	NA	-
Aqueous : 25mg: 50mg	NA	-	NA	-	NA	-	NA	-
Standard: Streptomycin	NA	-	NA	-	NA	-	NA	-
	NA	-	18		14		NA	-

Values are mean inhibition zone (mm) ± S.D of three replicates, NA: No Activity

TABLE 7: MINIMUM INHIBITOY CONCENTRATION (MIC) OF *R.VESICARIUS* AGAINST TESTED BACTERIA

Test organisms	Plant Part	Types of extracts	Concentration of R.*vesicarius* extract (mg/ml)					
			3.13	6.25	12.5	25	50	MIC
E.coli	*Flower*	Acetone	NA	NA	NA	+	+	25
	Stem	Pet. Ether	NA	NA	NA	+	+	25
		Aqueous	NA	NA	NA	+	+	25
	Leaf	Benzene	NA	NA	+	+	+	12.5
		Pet. Ether	NA	+	+	+	+	6.25
B.subtilis	*Flower*	Acetone	NA	NA	+	+	+	12.5
	Stem	Aqueous	NA	+	+	+	+	6.25
	Leaf	Chloroform	NA	+	+	+	+	6.25
		Aqueous	NA	+	+	+	+	6.25
P. aeruginosa	*Stem*	Pet. Ether	NA	NA	+	+	+	12.5
	Leaf	Benzene	NA	+	+	+	+	6.25
S.aureus	*Flower*	Acetone	NA	+	+	+	+	6.25
	Stem	Acetone	NA	+	+	+	+	6.25
	Leaf	Benzene	NA	NA	+	+	+	12.5
		Acetone	NA	+	+	+	+	6.25

NA means No activity and (+) indicates inhibitory activity

TABLE 8: MINIMUM INHIBITOY CONCENTRATION (MIC) OF *R.VESICARIUS* AGAINST TESTED FUNGI

Test organisms	Plant Part	Types of extracts	Concentration of *R.vesicarius* extract (mg/ml)					
			3.13	6.25	12.5	25	50	MIC
P. funiculosa	*Flower*	Benzene	NA	+	+	+	+	6.25
		Acetone	NA	NA	+	+	+	12.5
		Pet. Ether	NA	+	+	+	+	6.25
		Methanol	NA	+	+	+	+	6.25
	Stem	Acetone	NA	+	+	+	+	6.25
		Aqueous	NA	+	+	+	+	6.25
	Leaf	Pet. Ether	NA	NA	NA	+	+	25
		Aqueous	NA	+	+	+	+	6.25
F. oxysporum.	*Flower*	Aqueous	NA	NA	+	+	+	12.5
		Chloroform	NA	NA	+	+	+	12.5
	Stem	Chloroform	NA	NA	+	+	+	12.5
		Pet. Ether	NA	NA	+	+	+	12.5
		Benzene	NA	+	+	+	+	6.25
	Leaf	Benzene	NA	NA	+	+	+	12.5
		Pet. Ether	NA	+	+	+	+	6.25
A.niger	*Flower*	Pet. Ether	NA	+	+	+	+	6.25
		Acetone	NA	NA	+	+	+	12.5
		Chloroform	NA	+	+	+	+	6.25
	Stem	Acetone	NA	+	+	+	+	6.25
		Chloroform	NA	+	+	+	+	6.25

NA means No activity and (+) indicates inhibitory activity

DISCUSSION: These results of antibacterial activity studies were contradictory to findings of [6,13], who found that, aqueous, methanol and petroleum ether extracts of *Rumex vesicarius* L. leaves have variable effects against both gram-positive bacteria (*Staphylococcus aureus* and *Bacillus subtilis*) and gram-negative bacteria (*Escherichia coli* and *Pseudomonas aeruginosa*), while Elegami [14] found that, chloroformic extract of *Rumex vesicarius* L. (whole plant parts) has its effect against *Bacillus subtilis,* but it has no effect against *Escherichia coli* and *Staphylococcus aureus*, while in our results, the acetone extract of flower plant parts has affected them and pet ether extract of leaf also inhibited *Escherichia coli,* this may be related to variation on the concentration used (in our studies), or may be due to other factors such as, locality of the plant, weather of place. Several previous experiments on different plant parts of different species of *Rumex* confirm that, they were potent antibacterial agents against both gram-positive and gram-negative bacteria [15-18].

In the present study *P. funiculosum* and *F. oxysporum* were found to be the most sensitive fungal strains. The basis of varying degree of sensitivity of test organisms of fungi may be due to the intrinsic tolerance of microorganisms and the nature and combinations of phytocompounds present in the different extract. Acetone extract of flower and pet ether extract of leaf showed highest antifungal property against *P.funiculosum.* Pet ether extract of leaf and Benzene extract of stem effective against *F.oxysporum. A.niger* was inhibited by Pet ether and Chloroform extract of flower whereas *T.reesei* did not show activity against any extract. We found most of the methanolic extracts did not show significant antifungal activity.

Study of the minimum inhibitory concentration (MIC) of the plant extracts on the tested organisms have revealed that the extracts possess antimicrobial activity at the various concentrations but highest at 50 mg/ml. The inhibitory effects of the extracts on the tested organisms increase with increase in the concentrations. The non-inhibitory effect of all extracts at 3.25 mg/ml on the four bacterial and fungal pathogens implies that they cannot serve as good antimicrobial at that concentration in the treatment of diseases associated with the tested organisms.

Study of the present work indicate that the plant part assayed possess antifungal and antibacterial properties. This explains the use of this plant in folk medicine for the treatment of various diseases whose symptoms might involve fungal or bacterial infections and underline the importance of the ethnobotanical approach for the selection of plant in the discovery of new bioactive compounds. Further phytochemical research is needed to identify the active principles responsible for the antifungal and antibacterial effects of this medicinal plant.

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CONFLICT OF INTEREST: None

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