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PRELIMINARY SCREENING OF BIOLOGICALLY ACTIVE CONSTITUENTS OF SALT MARSH PLANTS FROM VEDARANYAM CANNAL OF TAMIL NADU

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ABSTRACT

The aim of this study was to evaluate the *in vitro* phytochemical, antibacterial and antihaemolytic activities of aqueous and solvent extracts of leaves and shoot of two halophytic species of *Sesuvium portulacastrum* and *Suaeda monoica* collected from Vedaranyam cannal, Tamil Nadu, India. Phytochemical screening of the extracts of both halophytic species showed the presence of major classes of phytochemicals such as protein, tannin, glycosides, terpenoids, flavonoid, carbohydrates, steroids and alkaloids. Leaf extracts of both species provide effective activity against *Escherichia coli, Bacillus* and *Serratia.* This study reveals the efficacy of the anti haemolytic activity and it would definitely have wide scope in future. The findings of the present study will stimulate further research in the field of phytochemistry and clinical applications of *Sesuvium portulacastrum* and *Suaeda monoica*.

KEYWORDS: halophytes, *Sesuvium portulacastrum*, *Suaeda monoica*, phytochemical screening, antimicrobial, antihaemolytic activity.

INRTODUCTION

Plants have been valuable and indispensable sources of natural products for the health of human beings and they have a great potential for producing new drugs (Nascimento et al., 2008; Littleton et al., 2005). Even today people who live near to the forests use plant products to cure chronic diseases. Tropical and subtropical areas of the world are bestowed with abundant flora and herbs which have untapped properties, such as antimicrobial, antiviral and antifungal. According to the World Health Organization, plants are a source of compounds that have the ability to combat disease, antimicrobial, antiviral and antifungal activities (Gazim et al., 2008). In addition, medicinal plants have been used for centuries as remedies for human ailments and diseases because they contain components of therapeutic (Panda et al., 2009) also they are less toxic to humans and environmental friendly due to fewer pollutants produced in production and have minimal health hazards (Opra et al., 2008). However, halophytes are the specialized group of plants adopted for high saline conditions which include mangroves, sea grass, and blue green algae. They are also proven to have rich source of structurally diverse bioactive potential.

The word “Halo” means saline and “Phyte” means plant in origin. Halophytes represent salt-tolerant Species that thrive in the inhospitable habitats of inland and coastal salt marshes, dunes, beaches, deserts and salt flats. They are adapted to survive under extreme conditions, represented by temperature, (freezing to very hot) salinity (hypo- to hyper-saline) and moisture (drought to water-logging) (Anbarasi et al., 2015).

Halophytes are rich in proteins, oils and fats that are suitable for human consumption. Marine halophytes provide good source of medicinal as well as natural heath products or compounds by synthesis or secretion. These groups of plants provides large amount of antioxidants, phenol compounds, enzymes, biomolecules like carbohydrate content and some other biochemical compounds like free amino acids, phytochemical set in terms of reducing the saline stress.

Suaeda monoica annual herb belongs to Chenopodiaceae family and adapted to saline soil and lives in salt marshes. It is distributed throughout the East West coast mangroves in India viz., Sunderbans in West Bengal state, Bitharkanika and Mahnadhi in Orissa state, Coringa, Godavari and Krishna in Andra Pradesh state, Pichavaram, Karangadu and Muthupet in Tamil Nadu state. This family includes about 1300 species world wide range from annual herbs to trees. *S. monoica* is smaller in size, leaves simple, succulent, linear, young twigs are slender ribbed. Locally it is called as Vellaikirai or Nilavumari. The leaves have been used as

edible green leaves. It is a folklore medicinal plant used mainly against rheumatism, paralysis, asthma and snake-bites, skin disease, ulcer for local coastal people (Kathiresan et al., 1997; Ramanathan, 2000). Traditionally, the leaf from *S. monoica* is known to use as a medicine for hepatitis (Bandaranayake, 1998) and scientifically it is reported to be used as ointment for wounds and possess antiviral activity due to the presence of triterpenoids and sterols (Ghosh et al., 1985; Subramanyam et al., 1992).

Sesuvium portulacastrum (L) belongs to Aizoaceae is a sprawling perennial herb that grows in coastal areas throughout the world which is native to Africa, Asia, Australia, North America and South America and has naturalized in many places. It is commonly known as shoreline purslane or sea purslane. Sea purslane is a fleshy, perennial, herbaceous creeper that spreads and creeps along the ground by rooting from its joints to form mats or ground covers. Leaves are narrow, simple opposite resemble the shape of a spoon or paddle. They are ½" to 2" inches long with a fleshy texture and smooth surfaces. Leaf color is green with some occasional red and leaf bases are winged. These are pink or purple in colour. The plant bears small ovoid, 3/8" capsule (fruit) with numerous, shiny, black seeds. It is used a remedy for fever, kidney disorders scurvy and in the treatment of various infections and scurvy. The secondary metabolites from these plant species have been believed to have great potential substitutes for some synthetic raw materials in food, perfumery, cosmetics and pharmaceutical industries. Traditional healers in Zimbabwe and South africa use the plant to treat various infections and kidney disorders. The plant extract showed antibacterial and anticandidal activities and moderate antifungal activity. As well-known criteria of mangrove and mangrove associate plants are proved to have rich of high value secondary metabolites viz, saponins, alkaloids, polyphenols which possess antibacterial, antifungal, antiplasmodial and hepatoprotective activities (Gnanadesigan et al., 2011).

This study focus on screening for phytochemical constituents, antibacterial and anti haemolytic activity of two salt marsh plants of *Suaeda monoica* and *sesuvium portulacastrum*.

MATERIALS AND METHODS

Collection of plant materials

Salt marsh plant of *Suaeda monoica* and *Sesuvium portulacastrum* (Fig 1a, 1b) were collected from Vedaranyam cannal, Tamil Nadu, India (Latitude 10.37171, longitude 79.851112). Leaves and shoots were separated from both plants and further used to study the therapeutic values of the plants.

Preparation of extracts

For determining the presence of phytochemicals, antibacterial activity and anti haemolytic activity, separated leaf and shoot samples of both plants were weighed. Separated samples were uniformly shade dried and it was powdered by using a blender and sieved in to coarse powder. It was extracted with three different solvents such as ethanol, methanol and aqueous (1:10). The mixture was kept in rotary shaker and mixed daily for regular infusion for 4days. The extract was filtered using whatmann filter paper no.1. The filtered extract was stored in refrigerator for future analysis.

Phytochemical analysis

Ethanol, methanol and aqueous extracts of above selected halophytic species (shoot and leaf) were screened for various phytochemical constituents using standard methods (Sofowora, 1993) as described in Table 1.

Quantitative analysis

Determination of flavonoids content

An aliquot of 0.5ml of sample (1mg/ml) was mixed with 0.1ml of 10% aluminum chloride and 0.1ml of potassium acetate (1M). In this mixture, 4.3ml of 80% methanol was added to make 5ml volume. This mixture was vortexed and the absorbance was measured spectrophotometrically at 415nm. The value of optical density was used to calculate the total flavonoid content present in the different extract sample (Eom et al., 2007).

Determination of carbohydrate content

The carbohydrate content was determined by following anthrone method. Aliquots of 0.2 to 1ml of working standard solutions were taken in five different test tubes and water was added to bring the volume 1ml. Then 4ml of anthrone reagent was added in all tubes and then contents were mixed well and test tubes were covered and kept in water bath for 10 min then cooled. The same procedure was followed for different extracts of plant samples. Finally optical density was noted at 620nm. By using plotted standard graph, the concentration of the carbohydrate content in different extracts was calculated (Hedge, 1962).

Determination of protein content

Total protein content was estimated with alkaline copper reagent described by Lowry's method. About 0.5 ml of sample was taken. The volumes in all the tubes were made up to 1.0 ml with distilled water. 5.0 ml of alkaline copper reagent was added to all the tubes. Mixed and allowed to stand for 10 minutes. Then 0.5 ml of Folin-Ciocalteau reagent was added and then incubated at room temperature for 30 minutes in a dark. After 30 minutes, the blue colour developed was read at 660nm against blank. A standard graph was drawn using Bovine Serum Albumin (BSA) and amount of protein in the sample of different extracts was calculated.

Determination of ascorbic acid content (DNPH method)

About 1.0 ml of sample was taken and made up the volume in each tube to 3.0 ml by adding distilled water. 1.0 ml of dinitro phenyl hydrazine reagent was added

followed by 1 or 2 drops of thiourea into each tube. A blank was set as above but with water in place of ascorbic acid solution. Contents were mixed thoroughly and incubated at 37ºC for 3 hours. After incubation the tubes were kept in the ice bath. Dissolved the orange red osazone crystals formed by adding 7.0ml of 80% sulphuric acid drop wise while the tubes were still in the water bath. The tubes in the ice bath were removed and allowed to stand for 30 minutes at room temperature and the absorbance was measured at 540nm. A graph was plotted by taking the concentration of ascorbic acid on x-axis and calorimeter reading on y-axis. From the graph the concentration of ascorbic acid in different sample extracts was calculated (Kapur et al., 2012).

Anti bacterial activity

The organism tested were *Escherichia coli*, *Bacillus*, *Serratia* inoculated from pure culture. All selected test organisms was being prepared by sub culturing them overnight in an incubator. The selected microbes were inoculated using swab method.

The different leaf and shoot extract of *Suaeda monoica* and *Sesuvium portulacastrum* was used throughout the study. The different extracts were tested against different bacterial pathogens such as *Bacillus subtilis, Escherichia coli* and *Serratia* for their antimicrobial activity. It was demonstrated by disc diffusion assay (0.1cm disc). After incubation the diameter to the inhibition zone of each well was measured in centimetres. Antibiotic disc of tetracyclin was used as a positive control (Umamaheswara et al., 2014).

Anti haemolytic activity

Blood sample was collected in EDTA tubes and the blood samples were centrifuged at 1500 rpm for 10 mins. The Plasma discarded (supernatant). RBC (pellet) washed with saline (0.9 % NaCl) for 3 times and it was diluted with phosphate buffer. Sample (extract) was dissolved in 1 ml of saline (0.9 % NaCl). 2.0 ml of RBC suspension was added to the sample (extract). The total volume was made up to 5.0 ml with saline (0.9 % NaCl). Then incubated at 37°C for 5 mins. After incubation 0.5 ml of hydrogen peroxide was added. Incubated for 1 hour. The mixture was centrifuged at 1500 rpm for 10 mins. Reading was taken at 540nm and the absorbance was noted (Dinesh et al., 2016).

$$\% \text{ of inhibition} = \frac{\text{Abs control} - \text{Abs sample}}{\text{Abs control}} \times 100$$

RESULTS

Phytochemical analysis of leaf extracts of *suaeda monoica*

This present study results revealed the presence of phytochemicals such as tannins, steroids, glycosides, proteins and carbohydrates in all three extracts, whereas terpenoids was present in methanolic and aqueous extract. Saponins and anthraquinones were absent in all the extracts. Results were showed in Table 2a.

Phytochemical analysis of shoot extracts of *suaeda monoica*

Steroids, glycosides, proteins and carbohydrates were present in all three extracts, whereas terpenoids present in ethanolic and aqueous extract. Alkaloids, flavonoids and tannins were present only in the ethanolic, methanolic and aqueous extract respectively. Anthraquinones and sapponins were absent in all the extracts. Results were showed in Table 2b.

Phytochemical analysis of leaf extracts of *sesuvium portulacastrum*

Steroids, glycosides, proteins, carbohydrates were present in methanolic, ethanolic and aqueous extracts. Flavonoids are present in methanol and aqueous extract. Terponoids were present in ethanolic and methanolic extract. Saponins were present only in aqueous extract. Tannins and alkaloids were present only in ethanolic extract. Anthraquinones and saponins were absent in all the extracts. Results were showed in Table 2c.

Phytochemical analysis of shoot extracts of *sesuvium portulacastrum*

Steroids, proteins, carbohydrates, glycosides were present in methanolic, ethanolic and aqueous extracts. Flavonoids were present only in methanolic extract. Terpenoids and alkaloids were present only in ethanolic extract. Anthraquinones, tannins and saponins were absent in all the extracts. Results were showed in Table 2d.

Flavonoid content

The present result showed leaf and shoot of two halophytic species (*S.monoica and S.portulacastrum*) extracted with different solvents recorded different concentration of flavonoids (Table 3). Leaf aqueous extract and shoot methanolic extract of *Sesuvium portulacastrum* showed the highest flavonoid content of 9.2 mg/ml and 9.8 mg/ml respectively. Whereas in *suaeda monoica* leaf and shoot methanolic extract showed 7.8 mg/ml and 8.6 mg/ml respectively.

Carbohydrate content

When compare to other two extracts ethanolic extracts of *Sesuvium portulacastrum* leaf and shoot showed highest carbohydrate content of 11 mg/ml and 10 mg/ml respectively. Leaf and shoot ethanolic extracts of *suaeda monoica* carbohydrate concentration recorded as 6 mg/ml and 4 mg/ml respectively given in Table 4.

Protein content

The present study results revealed that leaf and shoot of two halophytic plants (*S.monoica and S.portulacastrum*) extracted with different solvents recorded different concentration of protein (Table 5). Etanolic extracts of leaf and shoot of *Sesuvium portulacastrum* recorded highest protein concentration of 33.6 mg/ml and 29.6

mg/ml respectively. Whereas leaf and shoot of *suaeda monoica* extracted using ethanol showed more carbohydrate concentration of 32 mg/ml and 24.8 mg/ml respectively than methanol and aqueous extracts.

Ascorbic acid content

The present study showed leaf and shoot of two halophytic plants (*S.monoica and S.portulacastrum*) extracted with different solvents recorded different concentration of ascorbic acid. Leaf and shoot of *Sesuvium portulacastrum* extracted using aqueous recorded the highest ascorbic acid concentration of 0.92 mg/ml and 0.86 mg/ml respectively. Leaf and shoot of *suaeda monoica* extracted with methanol showed ascorbic acid concentration of 0.78 mg/ml and 0.7 mg/ml respectively (Table 6).

Anti-bacterial activity

Leaf and shoot of two halophytic species (*S.monoica and S.portulacastrum*) showed different antibacterial activity in different extracts against three bacterial strains (Table 7). The crude extracts of leaf and shoot of both species inhibited the growth of *Escherichia coli, Bacillus* and S*erratia*. The inhibition zone showed different results by using different plant species and different extracts against all used microorganism. Leaf aqueous extracts of *S.portulacastrum* gave the highest antibacterial activity against *Serratia* (1.5) and ethanol extract of both leaf and shoot *S.portulacastrum* showed similar activity to tetracycline (1.2). Result of the present study suggest that ethanol and aqueous extracts was being used as better solvents for the extraction of antibacterial substances for halophytic plants of *S.monoica and S.portulacastrum* when compared to other solvents.

Anti-haemolytic activity

Antihaemolytic assay was done in both *S.monoica* and *S.portulacastrum* against human erythrocyte. Antihaemolytic activity was found in both the sample. Aqueous extract of *S.portulacastrum* showed 93.57% with HRBC. This result revealed that leaf aqueous extracts of *S.portulacastrum* showed closely similar antheamolytic activity to aspirin drug (Table 8).

Fig. 1(a): *Sesuvium portulacastrum*. **Fig. 1(b): *Suaeda monoica.***

Table 1: Phytochemical analysis.

S. no.	Phytoconstituents	Test	Observation
1.	**Tannins** (Brayer's Test)	2ml extract + 2ml H2SO4 + 2-3 drops of FeCl3 (5%)	Green precipitate
2.	**Flavonoids**	1ml extract + 1ml 10% NaOH	Yellow coloration
3.	**Terpenoids**	2ml extract + 2ml acetic acid + 2-3 drops of conc. H2SO4	Deep red coloration
4.	**Saponins** (Foam Test)	5ml extract + 5ml H2O + heat	Froth appears
5.	**Steroids** (Salkowski Test)	2ml extract + 2ml Chloroform + 2ml H2SO4 (conc.)	Reddish brown ring at the junction
7.	**Carbohydrates** (Molisch's Test)	2ml extract + 2 drops Ethanolic α- naphthol (20%) +2ml H2SO4 (conc.)	Reddish violet ring at the junction
8.	**Glycosides** (Liebermann's Test)	0.5ml extract + 1ml Glacial acetic acid+ 1 ml of H2SO4 (conc.)	Reddish brown ring at the junction
9.	**Alkaloids (**Mayer's test)	2ml extract + few drops of Mayer's reagent	Green colour or white precipitate
10.	**Proteins** (Xanthoproteic Test)	1ml extract + 1ml Nitric acid	Yellow colour
11.	**Anthraquinones** (Borntrager's Test)	3ml extract + 2 ml HCL+ 5ml NH3	Bluish violet colour

Table 2a: phytochemical constituents of the leaf of *Suaeda monoica.*

S. no.	Phytochemicals	Ethanol	Methanol	Aqueous
1	Tannins	+	+	+
2	Flavonoids	-	+	-
3	Terpenoids	+	-	+
4	Steroids	+	+	+
5	Saponins	-	-	-
6	Alkaloids	+	-	-
7	Glycosides	+	+	+
8	Carbohydrate	+	+	+
9	Protein	+	+	+
10	Anthraquinone	-	-	-

Table 2.b: Phytochemical constituents of the shoot of *Suaeda monoica.*

S. no.	Phytochemicals	Ethanol	Methanol	Aqueous
1	Tannins	-	-	+
2	Flavonoids	-	+	-
3	Terpenoids	+	-	+
4	Steroids	+	+	+
5	Saponins	-	-	-
6	Alkaloids	+	-	-
7	Glycosides	+	+	+
8	Carbohydrate	+	+	+
9	Protein	+	+	+
10	Anthraquinone	-	-	-

Table 2.c: phytochemical constituents of the leaf of *Sesuvium portulacastrum*.

S. no.	Phytochemicals	Ethanol	Methanol	Aqueous
1	Tannins	+	-	-
2	Flavonoids	-	+	+
3	Terpenoids	+	+	-
4	Steroids	+	+	+
5	Saponins	-	-	-
6	Alkaloids	+	-	-
7	Glycosides	+	+	+
8	Carbohydrate	+	+	+
9	Protein	+	+	+
10	Antraquinone	-	-	-

Table 3: Total flavonoids content of different extracts of *Suaeda monoica* and *Sesuvium portulacastrum*.

OD At 415nm	Suaeda monoica			Sesuvium portulacastrum		
	Ethanol	Methanol	Aqueous	Ethanol	Methanol	Aqueous
Leaf	3.6mg/ml	**7.8mg/ml**	6.8mg/ml	3.6mg/ml	4.8mg/ml	**9.2mg/ml**
Shoot	5.6mg/ml	4.8mg/ml	**8.6mg/ml**	4.0mg/ml	**9.8mg/ml**	7.6mg/ml

Table 4: Total carbohydrate content of different extracts of *Suaeda monoica* and *Sesuvium portulacastrum*.

OD At 620nm	*Suaeda monoica*			*Sesuvium portulacastrum*		
	Ethanol	Methanol	Aqueous	Ethanol	Methanol	Aqueous
Leaf	5.4mg/ml	5.4mg/ml	**6 mg/ml**	**11mg/ml**	11 mg/ml	11 mg/ml
Shoot	4 mg/ml	4 mg/ml	**4 mg/ml**	**10mg/ml**	7 mg/ml	4.2 mg/ml

Table 5: Total protein content of different extracts of *Suaeda monoica* and *Sesuvium portulacastrum*.

OD At 660 nm	*Suaeda monoica*			*Sesuvium portulacastrum*		
	Ethanol	Methanol	Aqueous	Ethanol	Methanol	Aqueous
Leaf	**32mg/ml**	22.4mg/ml	12mg/ml	**33.6mg/ml**	25.6mg/ml	19.2mg/ml
Shoot	**24.8mg/ml**	11.2mg/ml	15.2mg/ml	**29.6mg/ml**	16.8mg/ml	16 mg/ml

Table 6: Total ascorbate content of different extracts of *Suaeda monoica* and *Sesuvium portulacastrum*.

OD At 540nm	*Suaeda monoica*			*Sesuvium portulacastrum*		
	Ethanol	**Methanol**	**Aqueous**	**Ethanol**	**Methanol**	**Aqueous**
Leaf	0.42mg/ml	**0.78mg/ml**	0.58mg/ml	0.66mg/ml	0.46mg/ml	**0.92mg/ml**
Shoot	0.26mg/ml	**0.7mg/ml**	0.54mg/ml	0.64mg/ml	0.42mg/ml	**0.86mg/ml**

Table 7: Zone of inhibition for different extracts of *S.monoica and S.portulacastrum against Escherichia coli, Bacillus, Serratia.*

Name of the organism	Extract	Name of the plant	Leaf	Shoot	Control
Escherichia coli	Methanol	SP	1.5	0.6	3
		SM	0.6	0.6	
	Ethanol	SP	1.1	0.8	3
		SM	0.8	0.6	
	Aqueous	SP	1.0	0.8	3
		SM	1.0	0.8	
Bacillus	Methanol	SP	1.0	1.0	2.5
		SM	0.8	1.0	
	Ethanol	SP	1.2	1.5	2.5
		SM	0.6	1.5	
	Aqueous	SP	1.5	1.0	2.5
		SM	0.8	0.6	
Serratia	Methanol	SP	1.0	0.6	1.2
		SM	1.0	0.6	
	Ethanol	SP	**1.2**	**1.2**	1.2
		SM	0.8	0.6	
	Aqueous	SP	**1.5**	1.0	1.2
		SM	1.0	0.8	

Table 8: Anti haemolytic activity of different extracts of *Suaeda monoica* and *Sesuvium portulacastrum*.

S. no.	Plant name	Plant extract	OD value	Percentage (%)
1	***Suaeda monoica***	Methanol	0.74	51.84
		Ethanol	0.57	39.62
		Aqueous	0.92	64.80
2	***Sesuvium portulacastrum***	Methanol	1.26	89.26
		Ethanol	0.98	69.62
		Aqueous	1.32	**93.57**
3	**Control**	Water	1.30	_
		Saline	1.39	_
4	**Standard**	Aspirin	1.36	**96.45**

DISCUSSION

Several mangroves and halophytes are extensively used in traditional medicine, only some of them were tested for biological activities (Funnel et al., 2004). The antimicrobial activity exhibited by the mangrove plant parts could be due to the presence of phytochemicals like alkaloids, tannins, flavonoids and sugars present in the plant extract. The variation of antimicrobial activity of present study might be due to the presence of antimicrobial substances.

Primary and secondary metabolites are very much important for the regular mechanism/survival of the species and also it can be used as therapeutic agents. Potential antimicrobial agents from mangroove species due to the presence of phytoconstituents (Jayanta et al., 2009). Similarly in present study the phytoconstituents of *S.monoica* and *S.portulacastrum* were qualitatively analyzed and the results were depicted in the Table 2a-2d. This study results indicates that leaves of both species possess some important primary and secondary metabolites viz., protein, tannin, glycosides, terpenoids, flavonoid, carbohydrates, steroids, alkaloidic compounds. Similar results were observed in *Suaeda monoica* and *Sesuvium portulacastrum* from palayakayal mangrove forest of Tamilnadu. Anthraquinone and Saponin are absent in both the species (Lakshmanan et al., 2013).

Flavonoids are associated with antioxidant, fever-reducing (antipyretic), pain-relieving (analgesic) and spasm-inhibiting (spasmolytic) activities. The decoction of the leaves is used in the treatment of fevers (Chopra et al., 1986). Phytochemical analysis of *S. maritima* indicates the presence of tannins and flavanoids (Deepa et al., 2013). Similarly this study results also have shown

the accumulation of flavonoids in *S. monoica* and *S. portulacastrum.*

Total content of ascorbic acid determined in leaf and shoot of *S. monoica* and *S. Portulacastrum* is presented in table 6 and the data revealed that both plants contained considerable amount of ascorbic acid. However, high amount of ascorbic acid was found in aqueous leaf extract of *S. Portulacastrum (*0.92mg/ml).

Anti-microbial activity of salt marsh differs with the solvent extracts and against the pathogen; it may be due to the habitat and the season of the salt marsh collection (Majak et al., 1980). The present investigations provide the effective activity against *Escherichia coli, Bacillus, Serratia.* Leaf aqueous extracts of *S.portulacastrum* showed the highest antibacterial activity against *Serratia* (1.5) and ethanol extract of both leaf and shoot of *S.portulacastrum* showed similar activity to tetracycline (1.2). It is also quite evident to Castro et al., (2008) report. Sheela and Kannan (2003) were reported that the antimicrobial activities of plants may vary from species to species. Kumar et al., (2009) reported that the antimicrobial compounds from marine halophytes (*Salicornia brachiata*, *Suaeda maritima* and *Sesuvium portulacastrum*) revealed that antimicrobial activity were due to the presence of bioactive components. Ethanolic extracts of nine medicinal plants showed significant antibacterial activity against the human pathogens than the other extracts (Nair et al., 2007). Boopathy (2003) studied the biology and antimicrobial activities of salt marsh and coastal plants. He examined the ethanolic extracts of *Suaeda monoica* and *Suaeda maritima* salt marsh plant showed effective antimicrobial activities towards dreadful pathogens.

The protective effect of *S.monoica* and *S.portulacastrum* different extracts of leaves was investigated for the inhibition of haemolysis by using HRBC and the results were shown in table 8. However, the highest inhibition of haemolysis was seen in leaf aqueous extract of *S. Portulacastrum* as 93.45%. These result findings observed to be very similar to the standard haemolytic drug aspirin. Therefore, this species can be used as a potential source of anti haemolytic drug.

Qualitative analysis of *S. monoica* and *S. portulacastrum* leaves and shoot showed that the presence of biologically important phytoconstituents viz., Protein, Tannin, Glycosides, Terpenoids, Flavonoid, carbohydrates, steroids, Alkaloids. Leaf extracts of S. monoica and S. portulacastrum provide the effective activity against *Escherichia coli, Bacillus, Serratia.* This research work has revealed the potential of two salt marsh plant species could be useful in the area of life sciences. Further research work is need to determine the biological active molecules from *S. monoica* and *S. maritima* this would be the basic platform to be executed in various applications of life sciences.

CONCLUSION

This present study provides valuable information regarding the potential of halophytes as natural sources for phytochemical constituents, antimicrobial and antihaemolytic activities. Development of value-added products from these underutilized species will also promote their farming in coastal habitats, which has not been seriously explored earlier due to the lack of knowledge about their commercial importance. Qualitative and quantitative analysis of *S. monoica* and *S. portulacastrum* leaves and shoot showed that the presence of biologically important phytoconstituents viz., Protein, Tannin, Glycosides, Terpenoids, Flavonoid, Carbohydrates, Steroids, Alkaloids. Leaf extracts of *S. monoica* and *S. portulacastrum* provide the effective activity against *Escherichia coli, Bacillus* and *Serratia.* This research work has revealed the potential of two salt marsh plant species could be useful in the area of life sciences. Further research work is needed to determine the biological active molecules from *S.monoica* and *S.portulacastrum* this would be the basic platform to be executed in various applications of life sciences.

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