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Isolation, Characterization, Pharmacological and Corrosion inhibition Studies of Flavonoids obtained from *Nerium oleander* and *Tecoma stans*

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Abstract: Air dried flowers of *Nerium oleander* and *Tecoma stans* have been investigated for their polyphenolics. The pigments have been found to myricetin and rutin respectively which were characterized by chromatography and spectral studies. These pigments were screened for their antibacterial and antifungal activity against different organisms. It was ascertained that the ethyl acetate fractions of flowers of both the plants are highly sensitive to staphylococcus aurcus, staphylococcus albus and klebsiella sp and moderately sensitive to pseudomonas and protecs sp. They were also found to be active antifungal agents against Candida albicans, Aspergillus niger. The extracts were also tried as corrosion inhibitors on mild steel and aluminium in 2M HCl at 30 ± 1^{o}C. It was found that the percentage of inhibition increases with the increase in volume / concentration of the extracts.
Keywords: Pharmacological studies, corrosion studies, Flavonoids, *Nerium oleander, Tecoma Stans.*

Introduction and Experimental

The Flavonoids, one of the most numerous and wide spread groups of natural secondary constituents, important to man not only because they contribute to plant color but also many members are physiologically active (1). Flavonoids form the largest single family of naturally occurring oxygen containing heterocyclic compounds. They commonly occur as flavonoid O-glycosides in which one or more of the flavonoid hydroxyl group is bound to sugar or sugars by an acid labile hemiacetal bound. Although hydroxyl groups in any position on the flavonoid nucleus may be glycosylated, hydroxyls in certain sites only have a much higher proneness for glycosylation than in others(2).

The biological functions of flavonoids came to light when it was discovered that the crude preparation of ascorbic acid obtained from natural sources was more effective than pure vitamin-C in alleviating the capillary action and in treating the scorbutics. Terpenoid / flavonoid mixtures appear to function as a UV screen, for heat reduction, as antimicrobial agents or as insect-feeding deterrents. It has been reported that many flavonoid possess antibiotic affect on Escherichia coli, Lactobacillus casei, Salmonella typhosa and Staphylococcus aureus. Moreover these compounds are biologically active at concentration that approximately to naturally occurring levels in the plant (3). Flavonoids are reported to show anti-cancer activity. Quercetin and glycosides have been found to inhibit human brain tumour. Quercetin-penta methyl ether and rutin have been effective as inhibitors of benzopyrene - induced pulmonary adenoma in mice. It is believed that flavonoids may induce in these cases benzopyrene - hydroxylase which may detoxify the carcinogen. Antiulcer activity of flavonoids has also been studied. It has been established that flavonoids could prevent the increase in capillary permeability induced in histamine, bradykinin and prostaglandins. Pre-administration of flavonoids could help reduce permeability produced by heat, X-ray or UV radiation. Clinical trails have established the beneficial role of flavonoids in vascular resistance.Lockett has suggested the flavonoids may enhance the synthesis of collagen

which is known to be part of the supporting structure of the capillary wall. It is also known those phenolic compounds are responsible for cathartic and photodynamic activities. There has been current medical interest in anthocyanins, following the recognition that the pigment extracts are more effective than O-(β-hydroxyethyl) rutin in decreasing capillary permeability and fragility and also in their anti-inflammatory and anti-oedematous functions. Chalcones and its analogues especially with hydroxyl substituents have been reported to possess anthelmintic properties. The Anti-viral effects of many types of flavonoids have been demonstrated. Herpes virus hominis could be inhibited in human cell line (He La cells) by Quercetin. An extract of the plant *Crataegus monogana* which contains the number of flavonoids has been used in Germany for curing cardiac ailments. Anti-tumour properties have been observed in certain flavonoids. Some flavonoids have entered modern therapy as they have been found to have activity against hyper tension, rheumatism and arthritis (4).

It has been proved that 7-hydroxy flavones depressed the development of scorbutic symptoms in guinea pigs provitamin-p factors which include 7-hydroxyflavone, 5, 7-dihydroxyflavone and their acid derivatives have been found useful as therapeutic agents, administered orally or parentally in the treatment of vascular diseases and as general or local anti-inflammatory agents. It has been proved that flavonol-3-glycoside inhibited the growth of wheat coleoptiles sections and that of the roots of tomato and cress salad seedlings. The growth of willo soots *Salix Purpurea* was temporarily decreased when flavonol 3-glucoside was introduced into the plant.

Flavonoids possess physiological effects in animals as well as in human. The silkworm has discriminating receptor cell for flavonoids, Quercetin 3-rhamnoside stimulate silkworm feeding while quercetin 3-glucoside is inactive. It has been proved that anthocyanins inhibit the larval growth in insects. The brain edema due to the increased permeability of blood-brain barrier in rats could develop due to a diet deficient in flavonoids. It was reported that treatment with flavonoids could overcome the above problems.

In view of their structural variability, wide-spread distribution, physiological stability as well as easy and rapid methods of identification, flavonoids occupy a pre-eminent position as the most favored among all the secondary plant constituents as taxonomic markers. The special characteristics like strength and color which distinguish black tea from green tea (*Manuka* or *Camellia*) are due to enzymatic oxidation of polyphenols. Identification of plant species on the basis of its flavonoid chemistry has made. The relation between the tendril coiling of the tea plant and the flavonoid content has been established.

Antimicrobial activity of flavonoids:

Many plants and their isolates have been screened for their possible antimicrobial activity. Anthocyanins, dihydrochalcones, flavones, isoflavones and flavonoids have been reported to possess antimicrobial activity (4). The size of the inoculants, the nature of the culture medium, the concentration of the test compound, the pH of the medium, the temperature and time of incubation are the factors which are involved in testing the antimicrobial activity of a compound.

The important methods employed for antimicrobial sensitivity of a drug compound are

1. Disc diffusion technique
2. Serial dilution technique
3. Ditch plate technique.

The principle involved in the disc diffusion technique is to prepare a concentration gradient of the drug in a nutrient medium and observe the growth of the bacteria that is seeded in the medium after an incubation period. The clear zone of growth inhibition around the disc is the result of two processes, diffusion of the drug and growth of the bacteria. As the antimicrobe diffuses through the agar medium from the edge of the disc, its concentration progressively diminishes to a point where it is no longer inhibitory for the organism. The size of zone of inhibition is determined by concentration of antimicrobe present in them are and susceptibility of the test isolate. Therefore, the diameter of the inhibition zone denotes the relative susceptibility of the test organisms to a particular antimicrobe (5). Table 1 reveals the classification of various antimicrobes on the basis of the measured value of complete inhibition diameter of the circle in nm.

Table 1. Classification of various antimicrobes based on the measured value of complete inhibition diameter for their susceptibility

Inhibition zone diameter	Type of antimicrobe
>13 mm	Susceptible
8-13 mm	Intermediate
<8 mm	Resistance

The term 'susceptible' implies that an infection caused by the strain may be expected to respond favorably to the indicated antimicrobial agent for the type of infection and pathogen. 'Resistance' strains are not inhibited completely by therapeutic concentration. 'Intermediate' implies that strains may respond to unusually high concentration of the agent, resulting from high dosage (5).

Recently it is reported that the flavonoids extracted from certain plants are found to have profound corrosion inhibition activity to certain metals like iron, aluminum, and some alloys like steel etc., The present work aims at the study of the flavonoids obtained from the two flowers Nerium Oleander and *Tecoma Stans*, which are easily available in the southern region of India. The recent trend is towards environment-friendly inhibitors. Most of the natural products are non toxic, biodegradable and readily available in plenty. Various parts-seeds, fruit, leaves, flowers etc have been published on the use of natural products as corrosion inhibitors. Tannins are being used for the protection of steel against corrosion in cooling water systems and in paints (wash primers). The former application is rendered possible by the formation of surface complexes with iron. Since they are ecologically harmless, natural tannins are often used in corrosion-preventing primers for surface treatments of steel. Tannins are poly phenols capable of complexing iron by forming a chelate.

Corrosion studies

The corrosion of mild steel was studied in stagnant 5% H_2SO_4 solution at room temperature with and without different concentration of 5% H_2SO_4 extract of *Foenum Graecum* dry seed powder by polarization studies. It was observed that the inhibition efficiency increases with the increase in the concentration of the additives. Synergetic effect of iodide ion was also studied. Prabhavathy has used the extract of the plants *Calotrpis Procera* (CP) and *Diospyros Mesipiliformis* (DM) to control corrosion of mild steel in 0.1 N HCl solutions, by adopting weight loss measurements and polarization studies (6). The extracts were prepared using organic solvents. Most Diospyros species contain betalinic acid. The inhibitive effect of DM on the metal surface is confirmed by polarization studies. The extracts of these materials contain many organic compounds, e.g. organic and amino acids, alkaloids, pigments proteins and tannins. Most of these constituents are known to have inhibitive action.

The kinetics and mechanism of corrosion of mild steel in HCl containing caffeine (C) Strychnine (S) and quinine (Q) have been studied by weight loss and polarization studies. The corrosion rate is decreased considerably in the presence of traces of these compounds. At the concentration of maximum inhibition, the corrosion inhibition increased in the order of Q>S>C.

The inhibition efficiency (IE) of various concentration of a caffine-Zn^{2+} system in controlling corrosion of mild steel in an aqueous solution containing 60 ppm of chloride was evaluated by weight loss study. The formulation consisting of 50 ppm of caffeine and 50 ppm of Zn^{2+} showed 91% IE 43. A synergistic effect was seen between caffeine and Zn^{2+}. The influence of sodium sulphite, sodium dodecyl sulphate, pH and period of immersion on the IE of the caffeiene-Zn^{2+} system has been evaluated. The transport of inhibitors towards the metal surface plays a major role in controlling corrosion of mild steel. Formation of micelles by surfactants changes the IE. The caffeine-Zn^{2+} system have better IE in acidic medium than in basic medium. The IE decreased as the period of immersion increased. The protective film was analyzed by FTIR spectroscopy. The film consisted complex and zinc hydroxide. The film was found to be UV fluorescent (7).

Nitrogen containing inhibitors of metal corrosion based on sugarcane have been studied. Natural honey has been used as corrosion inhibitor for metals such as copper and alloys in neutral aqueous solution. *Serratia Marceslens* and *xanthomon* as Maltophilia have been used to prevent corrosion of mild steel. Corrosion inhibition studies of some plant extracts on aluminum in acidic medium have been investigated. The corrosion inhibition of aluminium in HCl in the presence of *Carica papaya* (CP) and *Azadirachta indica* (AI) at 303-313 K was studied using weight loss, thermometric and hydrogen evolution techniques. Several researchers are trying to make use of make use of natural products as corrosion inhibitors. Plant scientists have already established the active principles present in plant materials. The active principles form protective film on the metal surface by coordinating with the metal ion through O, S and N atoms of the functional groups present in the active principles. When the active principles are extracted with acids or organic solvents or with water, usually a mixture of inhibitors present in the plant extract may show synergistic effect.

Description of flowers used in the present study

(i)*Nerium oleander*

Tamil name : *Arali*

Family : Apocynaceae

The plant prefers medium (loamy) and heavy (clay) soils. Requires well drained soil and can grow in heavy clay soil. The plant prefers acid, neutral and basic soils and can grow in heavy clay soil. It cannot grow in the shade. The plant can tolerate maritime exposure. The leaves and the flowers *Nerium oleander* are cardio tonic, diaphoretic, and diuretic, emetic

expectorant and sternutatory. A decoction of the leaves is applied externally in the treatment of scabies and to reduce swellings. This is a very poisonous plant, containing a powerful cardiac toxin and should only be used with extreme caution. The root is powerfully resolving. Because of its poisonous nature it is only used externally. Oil prepared from the root bark is used in the treatment of leprosy and diseases of scaly nature. The plant is used as a rat poison, a parasitic idée and an insecticide (8).

(ii)Tecoma Stans

Tamil name : *Manjalarali*
Family : Mignoniaceae

These plants are large shrubs or small trees. Leaves are odd, pinnate, leaflets are 3 or 4 pairs; sessile, serrate, flowers are yellow in terminal panides capsules and compressed. It is a native plant of South America and it is grown in the gardens. Its roots can be used as diuretic, febrifuge and tonic. It is also used as an ornamental plant in our country. It is carried out with a view to isolate and characterizes their flavonoid constituents using Paper Chromatography and UV studies. It also aims at the antibacterial activities and the corrosion inhibition action of the flavonoids on mild steel and aluminium in 2M HCl as the study of corrosion inhibition of mild steel and aluminium is a subject of pronounced technological significance.

Experimental

Extraction method

Fresh flowers of ***Nerium oleander*** and ***Tecoma Stans*** were collected from Thiruverambur, Trichy during January and they were extracted with 80% alcohol under reflux. The concentrates were successively fractionated with petroleum ether 60-80c (3×150 ml) peroxide free Et2O (3×250 ml) and ethyl acetate (4 250 ml). The petrol fraction and other fraction did not yield any isolable solid, using this extract, the following characterization was done.

Characterization

I) Color of the extract

The color of the extract after filtration was noted visually. Density was measured by specific gravity method. pH was determined by the glass electrode.

Preparation of Buffer solution

The pH 4.0 buffer powder (capsule, nice laboratory, Cochin,) was dissolved in 100 ml distilled water to give a solution having pH 4.0 at 20^{o}C.

2. Identification of the Flavonoids.

a. Fluorescence test and Ammonia vapor test.

A long wavelength ultra violet lamp equipped with two 1.5 watt Black-ray tubes and covered with a glass plate is used for viewing the developed chromatograms. The developed chromatogram was shown to the mouth of the ammonia solution bottle and then viewed under UV light (8).

b. Paper chromatogram.

A strip of Whatmann No. filter paper, about 25-30 cm long and 1.5 cm wide was marked lightly with a pencil line about 5 cm from one end. The plant extract was spotted from a capillary pipette on to a spot marked in the middle if the pencil line. The solvent was allowed to evaporate. The paper was allowed to hang in the gas jar with the upper end held in the glass trough. The solvent BAW (n-Butanol, Acetic acid, Water in the ratio 4:1:5) was introduced to saturate the air in the gas jar. The paper was introduced in to the glass trough and the gas jar closed. The solvent moves by capillary action in to the paper and development proceeds. After the front of the solvent had moved to upper edge of the paper, the gas jar was opened, the paper removed, and position of the front marked. The R_f value was found.

c. Ultraviolet spectroscopy.

The spot was cut, dissolved in methanol and after the evaporation of the solvent and the residue obtained was dissolved in spectral grade methanol & UV spectrum of the product recorded in methanol and sodium methoxide.

3. Weight loss method

The mild steel coupons were weighed and placed vertically in 60 ml of aerated, unstirred 2M HCl with and without the inhibitor for four hours. The coupons were removed from the solution and they were cleaned by brushing under running tap water to remove the corrosion products, dried and reweighed to determine the weight loss. The inhibitors used were the natural plant extracts. The percentage inhibition efficiency (% I) was calculated using the following equation

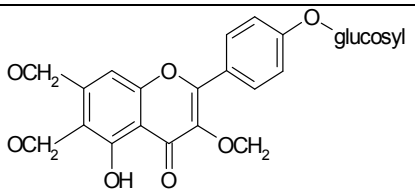
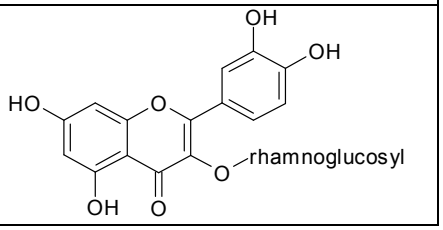
$$\% I = Wo - W_i / Wo \times 100$$

Where Wo and Wi are the weight losses in uninhibited and inhibited corroding solutions respectively.

Table 2. Physico-chemical characteristics of plant extracts

S. No	Plant Extract	Color	Density (g/ml)	pH	Fluorescence test	Rf value	Name of The Compound	λ_{max}(nm)	
								λ_{max}(nm)MeOH	$\lambda_{max}(nm)_{NaOMe}$
1.	*Nerium Oleander*	Yellowish brown	0.0860	6.11	Yellow	43	Myricetin	253sh,273,330	246sh,290, 371sh
2.	*Tecoma Stans*	Brown	0.9110	5.27	Yellow	53	Rutin	259,266sh, 299sh,359	272,327,410

Table 3. Structure of flavonoid compounds extracted

S.No	Plant Extract	Name of the Flavonoid Compound	Structure
1.	*Nerium Oleander*	Myricetin	
2.	*Tecoma Stans*	Rutin	

4. Antimicrobial Activity

Screening of Antibacterial activity

Materials required

Staphylococcus aureus, Pseudomonas aeruginosa, Proteus sp, Klebsilla sp, Streptococcus faecalis, Staphylococcus albus, Candida albicans.

- Nutrient broth, Nutrient agar media (Hi media).
- Petridish, Autoclave, Incubator, Zone reader.
- Plant extracts.
- Ciprofloxacin (50 mg/ml)

Preparation of inoculums

The pure cultures of the bacterial strains which were preserved in the refrigerator were sub cultured into nutrient broth and incubated at 37°C for 18 hours. During this incubation period fresh cells will multiply and all the cells will be in the active phase (log phase). The inoculation was standardized by comparing with meccperland solution. The culture containing 1×10^8 cells/ml was taken for inoculation for testing antibacterial activity. All the ingredients were dissolved in distilled water; pH was adjusted to 7.6 transferred to a suitable container and autoclaved at 121°Cfor 25 minutes. After sterilization was over the medium was stored at 50°C temperature until used .

Methodology

All the ingredients were accurately weighed and dissolved in distilled water, the pH was adjusted to 7.6 and this was transferred to a suitable container and autoclaved at 121°C for 15 minutes. The cooled medium (at 50°C) was poured in large petridish (70 mm in diameter) to a uniform depth of 4 mm and then allowed to solidify at room temperature.

The plates were inoculated within 15 minutes after preparing the inoculums. To keep the discs at equal interval (there by the merging of zones of inhibition can be avoided) the plates were divided into section according to the number of standard and sample solutions to be used, excess fluid was removed by rotating the swabs with firm pressure against paper of 6 mm in diameter containing 200ml of the plant extract was placed on the sterile molten agar by using sterile forceps with gentle pressure. It was pressed over the agar to adhere on the inoculated agar surface. A standard disc containing Ciprofloxacin 50 µg was also placed over the inoculated Muller Histon agar for comparing the efficiency of plant extract. Then the plates were incubated at 37°C in an incubator for 18 to 24 hours.

Screening of antifungal activity
For screening antifungal activity (the medium was different from bacteria), the pH was adjusted to 5.2-5.6 (acidic range) and antibiotics were added to prevent the bacterial conformation (8-11).

Preparation of Sabouraud Dextrose Beorh (SDB)
This was suitable for the growth of Candida albicans, Aspergillus and other species of the yeast like fungi. All the ingredients such as Dextrose (40g), Peptone (10g) were dissolved in distilled water (1000 ml (q.s)) with gentle heating with continuous stirring. Then they were inoculated at 121°C for 10 minutes.

Preparation of savouraud dextrose agar (SDA)
This was the most useful selective medium of the culture of myutotic agents particularly the filamentous moulds, with the addition of antibodies (chloramphenicol or cycloheximide or a combination of penicillin and streptomycin) growth of bacterial contaminants can be prevented.

Table 3. Effect of Nerium Oleander extract on the rate of corrosion of mild steel in 2M HCl at 30 ± 1°C

Various Measures of Extract + HCl (ml)	Weight of the Plates (g)		Difference (g)	% I
	Initial	Final		
0	2.851	2.701	0.150	-
2	2.858	2.829	0.029	80.66
4	2.842	2.814	0.028	81.33
6	2.998	2.976	0.022	85.33
8	2.809	2.809	0.021	86.00

Table 4. Effect of Tecoma Stans extract on the rate of corrosion of mild steel in 2M HCl at 30 ± 1°C

Various Measures of Extract + HCl (ml)	Weight of the Plates (g)		Difference (g)	% I
	Initial	Final		
0	2.851	2.701	0.150	-
2	2.829	2.709	0.038	74.66
4	2.814	2.788	0.026	82.66
6	2.976	2.954	0.022	85.33
8	2.801	2.783	0.018	88.00

Table 5. Effect of Nerium Oleander extract on the rate of corrosion of Aluminium in 2M HCl at 30 ± 1°C

Various Measures of Extract + HCl ml	Weight of the Plates, g			Difference, g	%I
	Initial		Final		
0	2.926	1.825	1.825	1.101	-
2	2.968	2.016	2.016	0.952	13.53
4	2.040	1.091	1.091	0.944	13.81
6	2.790	1.974	1.974	0.816	25.81
8	0.981	0.457	0.457	0.524	52.41

Table 6. Effect of Tecoma Stans extract on the rate of corrosion of Aluminium in 2M HCl at 30 ± 1°C

Various Measures of Extract + HCl (ml)	Weight of the Plates (g)		Difference (g)	% I
	Initial	Final		
0	2.926	1.825	1.101	-
2	1.732	0.903	0.829	24.70
4	2.610	1.769	0.841	23.67
6	1.011	0.452	0.559	49.23
8	1.548	1.040	0.508	53.86

Table 7. Antibacterial activity study of the plant extracts

S. No	Plant extract	Antibacterial activity				
		Staphylococcus aureus	Staphylococcus albus	Klebsilla sp.	Pseudomonas aeruginosa	Proteus sp
1	*Nerium Oleander*	82.14	78.91	80.05	65.24	63.40
2	*Tecoma Stans*	80.50	79.54	79.06	64.35	65.08

Table 8. Antifungal activity study of the plant extracts

S. No	Plant extract	Anti-fungal activity	
		Aspergillus niger	Candida albicans,
1	*Nerium Oleander*	90.87	88.76
2	*Tecoma Stans*	89.89	89.87

Results and discussion

Table 2 displays the important characteristics of the extracts obtained from the plants under study such as the color, density, pH, color under fluorescence test, R_f values obtained from paper chromatographic technique, the name of the flavonoid compounds and their UV-Visible spectral characteristics (λ_{max}(nm) in MeOH and NaOMe). From the chromatographic and spectral characteristics, the flavonoid compounds obtained from Nerium *oleander* and *Tecoma Stans* were found to be Myricetin and Rutin.

The kinetics and mechanism of corrosion of mild steel in 2M HCl at 30 ± 1°C containing the extracts of *Nerium oleander* and *Tecoma Stans* were studied by weight loss and polarization studies. The results are presented in tables 3 and 4. The corrosion rate is decreased considerably or the % inhibition (I %) of corrosion increases in the presence of traces of compounds obtained from both the plants (Fig. 1 and 2). The % inhibition efficiency (I %) of various concentration of a myricetin - Fe^{2+} and rutin - Fe^{2+}system in controlling corrosion of mild steel in an aqueous solution containing the extract of *Nerium oleander* and *Tecoma Stans* was evaluated by weight loss study (12). A synergistic effect was seen between myricetin / rutin and Fe^{2+}. The transport of inhibitors towards the metal surface plays a major role in controlling corrosion of mild steel. Formation of micelles by surfactants changes the % inhibition. The % inhibition decreased as the period of immersion increased. This may be due to the fact that a kind of protective is formed over the surface of base metal. The protective film was analyzed by UV spectroscopy. The film consisted complex and iron hydroxide. The film was found to be UV fluorescent.

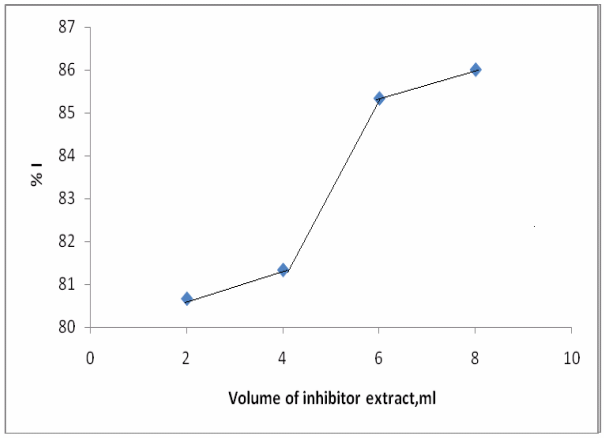


Fig.1 % corrosion inhibition of the extract of *Nerium Oleander* on Mild steel in 2M HCl at 30 ± 1°C

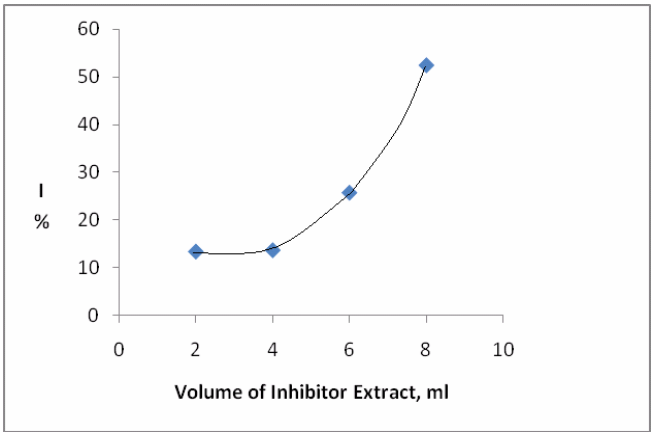


Fig.3 % corrosion inhibition of the extract of *Nerium Oleander* on Aluminium in 2M HCl at 30 ± 1°C

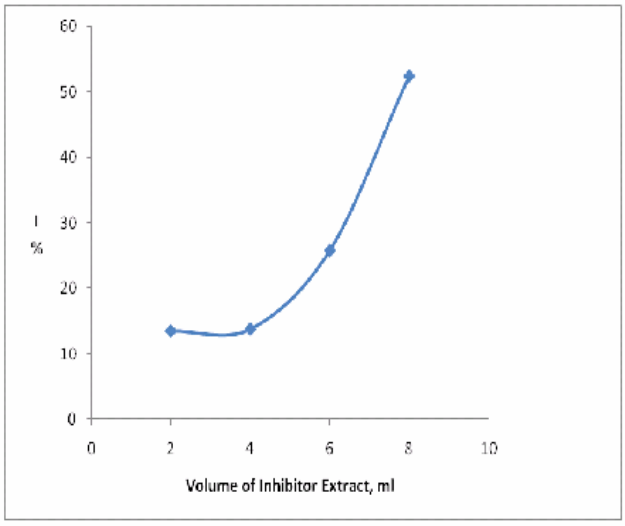


Fig.2 % corrosion inhibition of the extract of *Tecoma Stans* on Mild steel in 2M HCl at 30 ± 1°C

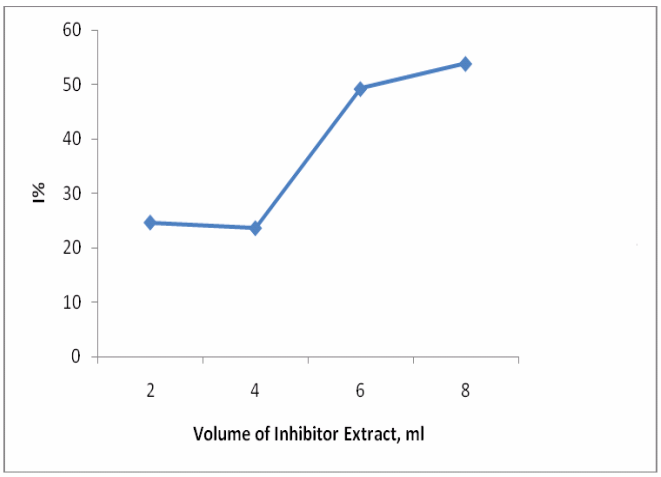


Fig.4 % corrosion inhibition of the extract of *Tecoma Stans* on Aluminium in 2M HCl at 30 ± 1°C

Corrosion inhibition studies on aluminum in acidic medium (2M HCl) at 30 ± 1°C were also investigated by weight loss and polarization studies. The results are presented in tables 5 and 6. The corrosion rate is decreased considerably or the % inhibition (I %) of corrosion increases in the presence of traces of compounds obtained from both the plants (Fig. 3 and 4). This is attributed to the fact that the active principal constituents of the natural products form protective film on the metal surface by coordinating with the metal ion through O, S and N atoms of the functional groups present in the active principle constituents. When the active principal constituents are extracted with acids or organic solvents or with water, usually a mixture of inhibitors present in the plant extract may show synergistic effect. From the close examination of I% of tables 3, 4, 5 and 6, it is concluded that the extracts obtained from the two

flowers *Nerium Oleander* and *Tecoma Stans* almost inhibit the corrosion of mild steel and Aluminium to the same extent. Hence, it is concluded that these plant extracts can be used as a corrosion inhibitor for mild steel and Aluminium in 2M HCl.

The plant extracts were also screened for their antibacterial and antifungal activity against different organisms like staphylococcus aurcus, staphylococcus albus and klebsilla sp pseudomonas and protecs sp (Tables 7 and 8). From the results of *in vitro* antimicrobial studies certain bacteria and fungi, it is revealed that both the flowers are highly sensitive antibacterial agents to staphylococcus aurcus, staphylococcus albus and klebsilla sp and moderately sensitive to pseudomonas and protecs sp. Antifungal studies reveal that the extracts of both the plants are highly active against Candida albicans, Aspergillus niger.

Conclusion

Isolation, characterization and identification were carried out using the extract of the two flowers of *Nerium Oleander* and *Tecoma Stans* with the help of R_f values obtained in paper chromatographic studies and UV spectral data. The R_f value of *Nerium Oleander* and *Tecoma Stans* are 43 and 53 in n-Butanol: Acetic acid: Water (BAW) 4:1:5. Thus the flavonoids present were found to be myricetin and rutin respectively. The λ_{max} values of the UV spectral data of the plant extracts also reveal the presence of myricetin and rutin in *Nerium Oleander* and *Tecoma Stans* respectively. The extracts were tried as corrosion inhibitors on Mild steel and Aluminium metal in 2M HCl. It is inferred that the percentage of inhibition increases with increase in the volume / concentration of the extracts. The plant extracts were also screened for their antibacterial and antifungal activity against different organisms. From the results of in vitro antimicrobial studies, it is revealed that both the flowers are highly sensitive antibacterial agents to staphylococcus aurcus, staphylococcus albus and klebsilla sp and moderately sensitive to pseudomonas and protecs sp. Antifungal studies reveal that the extracts of both the plants are highly active against Candida albicans, Aspergillus niger. This piece of work also opens ways for further research activities.

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