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PHARMACOGNOSTICAL, PHYTOCHEMICAL AND PHARMACOLOGICAL STUDIES ON STEMS OF *TALINUM PORTULACIFOLIUM*

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ABSTRACT

The aim of the present study was to investigate the pharmacognostical and phytochemical characters of the medicinal plant *Talinum portulacifolium* (Portulacaceae), commonly known as waterleaf. The leaves of the shade-loving plant possess great therapeutic value in the traditional system of medicines but have not been fully exploited. Morphological details of stem parts of waterleaf were studied. The phytochemical screening were done by qualitative estimation were determined for the crude drug and waterleaf extracts. Pharmacognostic studies like fibre analysis, fluorescence analysis, Loss on drying, Extractive value, Ash value of plant etc have been conducted. And all the above result suggest the plant *Talinum portulacifolium* possesses medicinal values. And it also shows antimicrobial activity against gram positive and gram negative bacteria.

KEYWORD: *Talinum portulacifolium*, Portulaceae, Anti microbial activity.

INTRODUCTION

Waterleaf is usually propagated by seed. However, the small seeds are rather difficult to collect because the fruits readily dehisce. Seeds are broadcast, direct-seeded in rows, or sown in a seed box and transplanted. The delicate seedlings must be shaded and mulched. Waterleaf can also be propagated vegetatively. Cuttings 15-20 cm long are taken from mature stems which have been stripped of leaves. Plant densities vary from 10-25 plants/m^2 depending on harvesting method and crop duration. Waterleaf flowers early but this seems to have little negative effect on leaf production. No serious diseases or pests are known. Harvesting starts about 6-8 weeks after sowing, either by uprooting or by cutting the young

tops. 15-20 harvests (at intervals of 2 weeks) can be made, but it is usually advisable to renew the planting after about six months. Yields have been estimated at 10 kg per m^2 per year (15-20 harvests). Seed yields are low and amount to 100-300 kg/ha. Seed production in untopped plants reaches a peak about 10 weeks after sowing. Waterleaf occurs naturally on roadsides, waste places, and forest edges, from sea-level up to 1000 m. It has a C4-cycle photosynthetic pathway, resulting in a high level of dry matter production under hot tropical conditions. It possesses a remarkable degree of drought tolerance. For good production it needs a soil rich in humus or heavily manured, and adequate moisture. No substantial germplasm collections exist. A few landraces have been collected in the Philippines and are being maintained at the National Plant Genetic Resources Laboratory, Institute of Plant Breeding, Los Baños. No breeding work has been carried out. Waterleaf, with its slimy texture, is a popular vegetable in many African countries. It spreads easily and is becoming a general, though rather innocent, agricultural weed. Agronomic research and breeding work should be done on this interesting vegetable.

MATERIALS AND METHODS

Collection and Authentication of Plant material

The stems of the plant *Talinum portulacifolium* (Forssk.) collected from the village area near to Palakkad district of Kerala and botanically identified and authenticated by Dr.Prabhukumar K.M, Senior scientist, department of PS&GR Division & CMPR, Arya Vaidyasala, Kottakal. A voucher specimen of the collected sample (CMPR 10977) was deposited at centre for medicinal plants research for future reference.

PHARMACOGNOSTICAL STUDIES

Fibre analysis

The shade dried, powdered plant material was used for powder fibre analysis. The Organoleptic character were observed and to identify the different fibres length and features by using various staining reagent were used. Powder was stained with 1% phloroglucinol, concentrated hydrochloric acid and observed through microscope. All the lignified fibres stained with pink colour and measure the length of the fibre by using a stage and eyepiece in calibrated microscope.

Physio chemical analysis

Physico-chemical constants of crude drugs were evaluated using coarsely ground plant powder. Percentage values of loss on drying, alcohol soluble extractive and water soluble

extractive values were determined according to standard methods. The determinations were performed in triplicates and the result are expressed as mean ± SE. The percentage (w/w) values were calculated with reference to the air-dried drug.

Phyto Chemical Studies

Preliminary Qualitative Analysis

Preparation of extract

Maceration: The powdered drug is macerated in the 360ml of methanol and 240ml of distilled water (ratio 3:2). macerate the drug for 4 days at 30℃-32℃.

Test for alkaloids

About 2 g of the ground sample were pounded separately on a mortar. 0.2 g was boiled with 5 ml of 2% hydrochloric acid on a steam bath for 5 min. The mixture was allowed to cool and filtered and the filtrate was treated with 2 drops of the following reagents With Dragendroff's reagent a red precipitate With Mayer's reagent a creamy white coloured precipitate indicated the presence of alkaloid.

Test for saponins

The sample was boiled with 5 ml of distilled water for 5 min. Mixture was filtered while still hot and the filtrate was then used for the following tests (Trease and Evans, 1989). To 1 ml of the filtrates, 2 drops of olive oil was added, the mixture was shaken and observed for the formation of emulsion. 1 ml of the filtrate was diluted with 4 ml of distilled water. The mixture was vigorously shaken and then observed on a stand for stable froth.

Test for tannins

Sample was added 5 ml of 45% ethanol and boiled for 5 min. The mixture was cooled and filtered. 1 ml of the filtrate was added 3 drops of lead sub acetate solution. A gelatinous precipitates were observed which indicates the presence of Tannins. Another 1 ml of the filtrate was added 0.5 ml of bromine water. A pale brown precipitates were observed indicating the presence of Tannins.

Test for glycosides

The sample was mixed with 30 ml of distilled water and it was heated for 5 min on a water bath, filtered and used as follows: five mls of the filtrate was added to 0.2 ml of fehling solution A and fehling solution B until it turns alkaline and heated in a water bath for 2 min.

A lightish blue colouration was observed (instead of brick red precipitate) which indicates the absence of glycosides.

Fluoresence analysis

Many crude drug show the Fluorescence when the sample is exposed to UV radiation. Evaluation of crude drugs based on fluorescence in day light is not much used, as it is usually unreliable due to the weakness of the fluorescent effect. Fluorescent lamps are fitted with suitable filter, which eliminate visible radiation from the lamp and transmits UV radiation of definite wavelength. Several crude drugs show characteristic fluorescence useful for their evaluation.

Pharmacological Studies

Anti-Microbial Activity

Disc diffusion method

The standardized inoculums is inoculated in the plates prepared earlier (aseptically) by dipping a sterile in the inoculums removing the excess of inoculums by passing by pressing and rotating the swab firmly against the side of the culture tube above the level of the liquid and finally streaking the swab all over the surface of the medium 3 times rotating the plate through an angle of 60º C after each application. Finally pass the swab round the edge of the agar surface. Leave the inoculums to dry at room temperature with the lid closed.

Each Petri dish is divided into 4 parts, in each part sample such as *Talinum portulacifolium* extract (100µg) Standard ampicillin (10µg), are placed in the plate with the help of sterile forceps. Then Petri dishes are placed in the refrigerator at 4º C or at room temperature for 1 hour for diffusion. Incubate at 37 º C for 24 hours. Observe the zone of inhibition produced by different samples. Measure it using a scale and record the average of two diameters of each zone of inhibition.

RESULT AND DISCUSSION

Fibre analysis: Results of the analysis of various fibres are tabulated in (Table.1) with their average length and width in micrometer and determined the range of their length and width.

Table. 1: Fibre analysis data of *Talinum portulacifolium*.

Sl. No	Parameter	Milli meter	Micrograms
1	Average length	11.00	168.16
2	Average width	3.70	52.00
3	**Range**	Maximum	Minimum
	Length	357.00	57.00
	Width	71.00	28.00

Physio chemical analysis

Results of the quantitative determination of various physicochemical parameters are tabulated in (Table 2). The values obtained for *T.portulacifolium* for loss on drying at 105 °C, total ash, water and alcohol solube extractive values.

Table. 2: Physio-chemical data of *Talinum portulacifolium.*

Sl No	Parameters	Values obtained (% w/w)
1	Loss on drying	12.00± 0.014
2	**Ash value** Total ash Acid insoluble Water soluble	 40.30± 0.078 0.067 ± 0.001 7.789 ± 0.002
3	**Extractive values** Alcohol soluble Water soluble	 10.08± 0.092 18.30± 0.127

Qualitative screening of phytochemicals

The preliminary phytochemical screening with the different qualitative chemical tests revealed the presence of various secondary metabolites (Table 3). It showed positive results for alkaloids, tannins, saponins and glycoside.

Table. 3: Qualitative phytochemical data of *Talinum portulacifolium.*

Sl No	Phyto-constituent	Powder	Extract
1	Alkaloid	+ve	+ve
2	Saponin	+ve	+ve
3	Tannins	+ve	+ve
4	glycosides	+ve	+ve

Fluoresence analysis

The fluorescence characteristic of the powdered drug with different chemical reagents was studied by observing under visible light and UV Light and the data is tabulated in (Table 4.) Fluorescence is an important phenomenon exhibited by various chemical constituents present in plant material.

Table. 4: Fluoresence characteristic of powdered samples of *Talinum portulacifolium*.

Treatment	Visible light	UV light
Powder as such	Brown	Pale brown
Powder + water	Brown	Pale brown
Powder + NaOH	Brown	Pale brown
Powder + Hcl	Dark brown	Pale brown
Powder + acetic acid	Dark brown	Pale brown
Powder + Picric acid	Brownish yellow	Yellowish brown
Powder +sulphuricacid	Dark brown	Pale brown
Powder+ Nitric acid	Dark brown	Pale brown
Powder+ Iodine	Dark brown	Pale brown

ANTI-MICROBIAL ACTIVITY

Results of the anti microbial activity of *Talinum portulacifolium* are tabulated in (Table.5). And it also shows antimicrobial activity against gram positive and gram negative bacteria.

Table. 5: Anti microbial data of *Talinum portulacifolium*.

Micro-Organism	Methanol (Control)	Ampicillin10 µg (Std)	Zone of inhibition (mm)			
			E_1	E_2	E_3	E_4
Staphylococcus aureus	0	25	0	12	14	12
Escherichia coli	0	17	12	13	10	11

CONCLUSION

Since the result of the studies revealed that the stems of *Talinum portulacifolium* contains appreciable amount of alkaloids, saponins, tannins and glycosides. The phytochemical screening and physiochemical analysis provide useful information and can be add to the quality control and quality assurance. And it also shows antimicrobial activity against gram positive and gram negative bacteria and it makes a promisive alternative for the development of an indigenous antimicrobial agent.

REFERENCES

1. Swati S, Manisha V, Satish S, Sushma A. Pharmacognostical, physico and phytochemical evaluation of the leaves of Jasminum sambac Linn. (Oleaceae). Int J Pharm Pharm Sci., 2011; 3(4): 237-241.
2. Mulla SK, Swamy P. Preliminary pharmacognostical and phytochemical evaluation of Portulaca quadrifida Linn. Int J Pharmtech Res., 2010; 2(3): 1699-1702.
3. Daniel O, Meier MS, Schlatter J, Frischknecht P. Selected phenolic compounds in cultivated plants: ecologic functions, health implications and modulation by pesticides. Environ Health Perspect, 1999; 107(1): 109-114.

4. Shanthi G, Saridha D. Mariappan V. Pharmacognostical studies on Morinda tinctoria Roxb. Int J Pharm Pharm Sci., 2012; 4(2): 636-638.
5. Chase CR, Pratt RJ. Fluorescence of powdered vegetable drugs with particular reference to development of a system of identification. J Am Pharm Ass., 1949; 38: 324-333
6. Indian Pharmacopoeia, Ministry of Health and Family Welfare, Government of India, Controller of publication, New Delhi, 1996, Volume II; A53-A54.
7. Adomi PO, Umukoro GE (2010). Antibacterial activity of aqueous and ethanolic Crude extracts of the root barks of Alstonia boonei and preliminary phytochemical test of Morinda lucida. J. Med. Plants Res., 2010; 4(8): 644-648.