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Research Article

PHARMACOGNOSTIC STUDIES OF ORGANICALLY CULTIVATED *PANACEA* HERB *CYNODON DACTYLON* (L.) PERS.

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ABSTRACT

This research paper knuckles down the organic agri practices of the *Cynodon dactylon* (L.) Pers. It is a powerhouse house of multiple macro and micro nutrients including protein, carbohydrates, carotenoids, flavonoids, phenolic compounds and vitamins. An organic cultivation practice enhances these secondary metabolites biosynthesis resulting in therapeutic potential of the crude drug. The field experimental work was conducted from Nov, 2018 up to Mar, 2019 in Department of Medicinal Plants Sciences at Dev Sanskriti Vishwavidyalaya, Haridwar (U.K), India. Cynodon herb belonging to Poaceae family was organically cultivated in our herbal field laboratory (no. 4) by planting slips line to line in experimental blocks. Physical parameters were studied including total Ash (9.9%w/w), Acid-insoluble Ash (5.8%w/w), Water-soluble Ash (2.4%w/w), Alcohol soluble extractive (39.2%w/w) and Water soluble extractive (39.8%w/w). Based upon results, it is concluded that secondary metabolites are highly biosynthesized during organic agri practices. Cynodon is credited as panacea herb due to its vital therapeutic benefits in curing multiple acute and chronic diseases or disorders including erysipelas, depigmentation, hysteroepilepsy, Irritable bowel syndrome (IBS) and menstrual irregularities.

KEYWORDS: *Panacea*, *Cynodon Dactylon* (L.) Pers, WHO-GACP, UTI, IBS, Therapeutic Index, Antioxidant.

INTRODUCTION

The herbs have been significant sources of medicines since the beginning of civilization under different systems of healing including Ayurveda, Unani, Siddha and Homoeopathy.[1] *Durva* (*Cynodon dactylon* (L.) Pers.) is credited as panacea herb due to presence of health benefiting macro and micronutrients. It is commonly known as Doob/ Durva/ Harialeel in India.[2,19] It has been tabulated as underutilized herb. Underutilized herbs are plant species that have been used for centuries for their nutraceutical and pharmaceutical purposes, but have been reduced in importance over time owing to multiple other miscellaneous factors.[1] Medicinal potential of the plant need to be explored through enticing research and development activities. WHO-GACP (Good agriculture and collection practices) and GHPP (Good harvest processing practices) followed along with organic cultivation of the herb.[4] WHO had already evaluated that quality of finished products depends upon quality of crude drugs used. For manufacturing quality products the crude drugs used should be procured from authentic sources.[5-6] Organic cultivation practices promotes biosynthesis of secondary metabolites that results in higher therapeutic index of the drug. Cynodon is a rich source of Protein, Carbohydrate, Vitamin A, Vitamin C, Phenolic compounds, Phytotoxins, Flavonoids (catechin, rutin, quercetin, myricetin), Carotenoids (beta carotene, lutein), Chlorophyll (a and b) and some alkaloids in small amounts. These antioxidants shows free radical scavenging and lipid peroxidation activities.[6,7,21] It may prove panacea herb for combating lifestyle oriented disorders and diseases such as diabetes, UTI (Urinary tract infection), irregular menses, hydrocele, alleviates early puberty hysteroepilepsy, skin afflictions, piles, IBS (Irritable Bowel Syndrome), anticancer and antiabortion. It also strengthens cardiovascular and neuromuscular system of the body.[6,8,20,21] Lifestyle based disorders and diseases are major concerns that need to be addressed for the country like us where the economy is in transition state from developing to the developed nation. Huge amount of exchequer may be saved through rational exploration of the potential of the medicinal plants through sustainable promotion of cultivation and conservation of the endangered

medicinal plants species. Approximately 5.8 million deaths in our country are the outcome of lifestyle based disorders and diseases.[6,18,19]

Details of the Plant

Hindi Name: Doob, Durva, Harialeel

Common Name: Bermuda grass

Botanical Name: *Cynodon dactylon* (L.) Pers.

Family: Poaceae

Geographical distribution

It is found from temperate to tropical climate zones of the country. It can be successfully grown up to 2500m asl. It is highly resilient herb.

Plant part used

Whole plant parts are used for curing purposes under different systems of healing including Ayurveda, Unani, Siddha and Homoeopathy. It shows antibacterial and antiviral, antiabortion, antidiarrhoeal and antiepileptic effects. It is a good haemostatic and wound healer even in diabetic persons. It cures skin infections (erysipelas and depigmentation), eye disorders, menstrual disorders and UTIs.[9,10,12,17,18]

MATERIALS AND METHODS

General experimental procedure

The experimental block was located in organic field laboratory (no. 4) in Department of Medicinal Plants Sciences at Dev Sanskriti Vishwavidyalaya, Haridwar (U.K), India. The experiment was conducted from November, 2018 to March, 2019.

Propagation was done by slips. Slips were used for propagation in the experimental block (600 X 100 cm) in first week of November. The experimental block was tilted properly and leveled.

For manuring 20kg vermicompost was added and amalgamated with soil properly. Vermicomposting is effective for maintaining soil biology simultaneously with pesticidal and insecticidal potential.

The slips were manually planted line to line in the experimental block with spacing of 10 X 10 cm. 500 slips were manually planted in the block. 50 slips were planted in each line.

Light irrigation was given just after planting. No further irrigation was given as the soil having proper moisture and rain fed irrigation is sufficient.

Weeding and Hoeing was done at proper intervals.

Figure no.1: Organic Planting Material Used for Pharmacognostic Evaluation

Harvesting and Post harvest handling

The crop was harvested by cutting 4-8cm above the soil surface in month of the march, attaining 35-45cm height. Organic produce was dried in shade and chopped to small pieces of 3-5cm for storage. The moisture content was reduced up to 10% for maintenance of the quality of the herb and stored in an air tight container.[12,14,21]

Pharmacognostic Evaluation

In pharmacognostic studies were performed including determination of ash values, water soluble extractive value, alcohol soluble extractive value, water soluble ash value and acid insoluble ash values. The herb was grounded properly and made powder (sieve # 80). These studies were performed by following standard procedures of Indian Pharmacopoeia (I.P.) and Ayurvedic Pharmacopoeia of India (A.P.I.). The following quality parameters were tested-

Determination of total ash

The ash value was determined by incinerating about 3g of the powdered air-dried material, in a previously weighed crucible at gradually increasing temperature up to 450-500℃ until it is carbon free. Cooled in desiccators and weighed. The percentage of total ash was calculated and expressed as % w/w of air dried crude drug material.

Determination of water soluble extractive value

5g accurately weighed powder was macerated in a glass-stopper conical flask by 100ml chloroform water (2.5ml chloroform and volume make up to 1000ml with distilled water) for 6h, shaking frequently and then allowed to stand further for 18h then it was filtered rapidly and 20ml of the filtrate was transferred in a tarred flat bottom evaporating dish and evaporated to dryness on a boiling water bath. Then evaporating dish was dried at 105℃ for 6 h, cooled in desiccator and weighed.

From the weight of the residue the percentage of water soluble extractive was calculated and expressed as %w/w with reference to air dried sample.

Determination of alcohol soluble extractive value

5g accurately weighed powder was macerated in a glass-stopper conical flask by 100ml alcohol of specified strength (45%, 60%, 90%) for 6h, shaking frequently and then allowed to stand further for 18h then it was filtered rapidly and 20ml of the filtrate was transferred in a tarred flat bottom evaporating dish and evaporated to dryness on a boiling water bath. Then evaporating dish was dried at 105℃ for 6h, cooled in desiccator and weighed. From the weight of the residue the percentage of alcohol soluble extractive was calculated and expressed as % w/w with reference to air dried sample.

Figure 2-3: Water soluble and alcohol soluble extractive values

Determination of water soluble ash

Boil the ash for 5 minutes with 25ml of distilled water. Collect the insoluble matter in a gooch crucible, or on an ashless filter paper (whatman 41), washed with hot water, dried on a hot plate and ignite for 15 minutes at a temperature not exceeding 450℃ Allow the residue to cool in suitable desiccators for 30 minutes and weigh without delay. Subtract the weight of the insoluble matter from the weight of the ash, the difference in weight represents the water soluble ash. The water soluble ash was calculated and expressed as % w/w with reference to air dried sample.

Determination of acid-insoluble ash

Ash of the crucible was transferred to 50ml beaker, add dropwise 25ml of dil. hydrochloric acid in to it and boiled for 5 minutes. Collect the insoluble matter in a gooch crucible, or on an ashless filter paper (whatman 41), washed with hot water, dry on a hot plate and ignite for 15 minutes at a temperature not exceeding 450℃ Allow the residue to cool in suitable desiccators for 30 minutes and weigh without delay. The acid-insoluble ash was calculated and expressed as % w/w with reference to air dried sample.[15-18, 21]

RESULTS AND DISCUSSION

Cynodon has great potential to cure various disorder and disease. *Cynodon dactylon* (L.) Pers. is predicted in wild conditions under temperate and tropical climate up to an altitude of 2500m.

The herb was organically cultivated in our organic field laboratory no. 4 and showed fair results after pharmacognostic evaluation. The evaluation of the crude drug was done in triplicate and average of the following parameters are reported below.

Table1: Result of different pharmacognsotic parameters

S.n.	Parameters	% w/w
1.	Total ash	9.9
2.	Water soluble extractive value	39.8
3.	Alcohol soluble extractive value	39.2
4.	Water soluble ash	2.4
5.	Acid insoluble ash	5.8

Minerals and secondary metabolites biosynthesis was enhanced due to organic agri practices of the herb as reflected from ash value.

The processing products from this potential underutilized medicinal plant may be worked out for lifestyle originating diseases and disorders but for better therapeutic benefits more impetus should be given on sources of the crude drugs. The researcher explored the organic agri practices and pharmacognostic studies for quality evaluation of the drug.

There is an ample scope for investigation of other members of Poaceae family for novel drug discovery and development.

CONCLUSION

Current research paper gives a direction for future investigators to carry out research on the underutilized medicinal plants through organic cultivation practices so that quality products may attained concurrently with significant contribution in nation building along with sustainable management of the resources.

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