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ORIGINAL ARTICLE

Appraisal of Pharmacognostic Evaluator Parameters & In-Vitro Antioxidant Perspective of Adulsa (*Justicia adhatoda* L.)

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ABSTRACT
The endeavour of the current research work was to investigate the diverse pharmacognostic parameters and to estimate the antioxidant potential of the herb Justicia adhatoda L. by the DPPH process. Aqueous, ethanol, petroleum ether and chloroform extracts of the leaves were prepared and subjected to phytochemical screening which revealed the existence of carbohydrates, proteins, steroids, terpenoids, glycosides, flavonoids, and lipids, tannins and phenolic compounds. The antioxidant potential of the leaves extracts was also determined by the DPPH process using ascorbic acid as standard. The results obtained in this study support the use of Justicia adhatoda L. in herbal medicine and it can be used as a potent antioxidant in the treatment of many diseases resulting from more reactive oxygen species (ROS) presence.
KEY WORDS: *Herbal medicine, Justicia adhatoda L., Antioxidant, DPPH.*

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INTRODUCTION

Lately, characteristic items are turning into a vital piece of the human medical services framework, because there is a now mainstream worry over the harmfulness and symptoms of present-day drugs. There is moreover an affirmation that typical prescriptions are safer and allopathic meds are consistently deficient in a couple of sicknesses. Therapeutic plants existed even before the person showed up on the earth. Man's presence on this planet has been made conceivable simply because of the imperative pretended by the plant realm is continuing his life. Since the dawn of human progress, notwithstanding food crops, man developed spices for his restorative needs[1].

Over the latest couple of decades, there has been an exponential advancement in the field of local medicine. It is getting advocated in creating and created nations inferable from its normal starting point and lesser symptoms. More than 700 mono and polyherbal courses of action as decoction, tincture, tablets, and compartments from more than 100 plants are in clinical use [2].

Justicia adhatoda L. is a helpful plant having a spot with the family Acanthaceae found in south Asia and Indo-China area used as medication. It is customarily known as Arusa, baansa, adulsa in Hindi, Malabar nut in English. Different strategies of *Justicia adhatoda* L. remove from characteristic thing press to dried typical thing pieces have been utilized overall around the world, especially for various ailments of the respiratory lot in the two youths and grown-ups besides, it has been spoken to show various exercises, for instance draining stores, antagonistic to bacterial, anticholinesterase, wound patching, hypoglycaemic, abortifacient/oxytocic, antitussive, stomach related, cardioprotective, hostile to searing, hepatoprotective and against ulcer.

The plant is used as a component of different acclaimed subtleties fusing hack syrups used in a blend in with ginger and tulsi where it applies its movement as an expectorant and antispasmodic. Bisolvon, a stamped prescription containing vasaka as the fixing is used to clear the flight courses by decreasing the natural liquid outflows and opening the air entries. There are diverse local definitions, viz. Kada, Fermiforte, Spirote is available for the treatment of various kinds of respiratory issues [3].

Result of *Justicia adhatoda L* contains terpenoids, steroids, heart glycosides, anthraquinone glycosides, saponins, flavonoids, tannins, and phenolic compound, alkaloids. Free revolutionaries assume a significant function being developed of tissue job and obsessive occasions in living organisms [4, 5]. Some confirmations clarify that expanded take-up of foods grown from the ground decrease the danger of cancer [6, 7]. This is credited by cancer prevention agents present in products of the soil [8-12].
The current examination was done to assess the cell reinforcement adequacy of watery, ethanol, petroleum ether, and chloroform concentrate of *Justicia adhatoda L.* which helps in the advancement of new, novel medications.

MATERIAL AND METHODS

Chemicals and solvents

Solvents, synthetic compounds, and reagents of systematic evaluation or most ideal evaluation provided by Sun Pharmaceuticals, Himedia Laboratories Pvt, Ltd., S.D. Fine Chemicals Ltd. India.

Collection of plant sample:

Root/rhizomes of *Justicia adhatoda* L. have secured from the Local market Jaipur. The test was conceal dried at room temperature and powdered precisely and went through a sifter # 40.

Preliminary phytochemical investigation:

Extraction

The air-dried pieces of the plants were powdered and removed with 95% ethanol, chloroform, pet ether (400-600), and watery dissolvable frameworks by hot permeation strategy by utilizing Soxhlet contraption gathering at a controlled temperature. After complete extraction, marc was pressed to assemble the micelle, mixed in with the substance of RBF, isolated and thought to get the concentrate. The concealing and consistency of the concentrate were noted. This concentrate was moreover presented to phytochemical examination [13].

Determination of physical constants

Starter extraction of individual plant material (*Justica adhatoda* L.) is completed with 95% ethanol utilizing a soxhlet extractor and afterward thought. The concentrate got is oppressed for fundamental physicochemical examination, for example, misfortune on drying (LOD), debris esteems (Total debris esteem, Water solvent debris esteem, Acid insoluble debris esteem), extractive qualities (Alcohol dissolvable extractive worth, Water dissolvable extractive worth) [14-19].

Fluorescence analysis of drug

Numerous rough medications show the fluorescence when the example is presented to UV radiation. Assessment of unrefined medications dependent on fluorescence in light isn't abundantly utilized, as it is generally temperamental because of the shortcoming of the fluorescent impact. Fluorescence lights are fitted with sensible channels, which take out indisputable radiation from the light and communicate UV radiation of positive recurrence. A couple of crude drugs show brand name fluorescence accommodating for their assessment[20].

Qualitative chemical tests

Synthetic tests are led on the concentrate of the plant test and furthermore of the powdered type of the plant tests utilizing standard techniques.

Tests for Carbohydrates: The test arrangement was set up and exposed to the Molish's test, Fehling's test, Benedict's test, Barfoed's test, Cobalt-chloride test, Tests for Non-Reducing Sugars, The tannic basic analysis for starch tests.

Tests for Proteins: The test arrangement was set up and exposed to the Biuret test, Million's test, Xanthoprotein test (For protein-containing tyrosine or tryptophan), Precipitation tests.

Tests for Steroids: The test arrangement was set up and exposed to the Salkowski response, Libermann-Burchard test, Libermann's tests.

Tests for Amino Acids: The test arrangement was set up and exposed to the Ninhydrin test, Test for Tyrosine, Test for tryptophan.

Tests for Glycosides: The test arrangement was set up and exposed to the Baljet's test, Bromine water test, Legal's test (For cardenoloids), Test for deoxysugars (KellarKillani test), Libermann's test for Cardiac Glycosides. The Borntrager's test, Modified Borntrager's test for anthraquinone glycosides. The Grignard's test for Cyanogenetic glycosides. The Foam test, Foaming list, Haemolytic test for Saponin Glycosides. Test arrangement when made soluble watched for blue or green fluorescence for Coumarin Glycosides.

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Tests for Alkaloids: The test arrangement was set up and exposed to the Dragendorff's test, Mayer's test, Hager's test, Wagner's test.
Tests for Flavonoids: The test arrangement was set up and exposed to the Shinoda test and Ferric chloride test.
Test for Vitamins: The test arrangement was set up and exposed to the Test for Vitamin A and Vitamin D.
Test for Saponins: The test arrangement was set up and exposed to the Foam test, Haemolysis test, Test for steroidal saponins, Test for triterpenoid and saponins.
Test for Tannins and phenol mixes: The test arrangement was set up and exposed to the 5% $FeCl_3$ arrangement, Lead acetic acid derivation arrangement, Bromine water test, Acetic corrosive arrangement, Dilute iodine arrangement tests [21].

Antioxidant activity by DPPH method

All the concentrates were tried for cell reinforcement action by DPPH extremist rummaging strategy. Sequential weakening were performed with the stock arrangement (10 mg/ml) of all concentrates of the plant (*Justicia adhatoda L*). Weakened arrangements (2 ml each) were blended in with DPPH (2 ml) and permitted to respond. The UV absorbance was recorded at 517 nm and the RC_{50} esteem was determined in µg/ml for each concentration. Ascorbic corrosive was utilized as a standard cell reinforcement drug.
The level of DPPH searching action was dictated by; $A= (A_0- Ae) x100/ A_0$
Where A speaks to a rate decrease of the DPPH, A_0 is an underlying or clear arrangement absorbance and Ae is absorbance esteem for test fixation without DPPH arrangement.
This action additionally communicated as the hindrance fixation at half ($EC_{50}/IC_{50}/RC_{50}$). The RC_{50}/EC_{50} esteem, characterized as the measure of the example adequate to evoke half decrease of the underlying DPPH focus, was determined from the straight relapse of plots of convergence of test mixes (µg/mL) against the mean level of cell reinforcement action got from the three duplicate tests. The free revolutionary rummaging action of ascorbic corrosive (Vit C) was likewise estimated under a similar condition to fill in as certain control [22-24].

RESULTS

Table 1: Physical characteristics of *Justicia adhatoda* L.:

S. No.	Parameter	*Justicia adhatoda* L.
1.	Loss on Drying	9.7% w/v
2.	Ash Value Total Ash Acid insoluble ash	 6.3 % w/w 4.0 % w/w
3.	Extractive Values Aqueous Alcohol	 5.2 % 7.1 %
4.	Fluorescence Analysis	Blue fluorescence

Table 2: Summary of solvent used for extraction & % yield:

S.No.	Drug	Weight of drug taken	Solvent	Volume of solvent taken	% yields after extraction
1.	*Justicia adhatoda* L.	900 grams	Petroleum ether	2.5 lit.	07.50
2.		900 grams	Chloroform	2.5 lit.	11.75
3.		900 grams	Ethanol	2.5 lit.	06.75
4.		900 grams	Aqueous	2.5 lit.	13.75

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Table 3: Phytochemical qualitative assessment of *Justicia adhatoda* L.:

S. No.	Test	Pet. Ether Extract	Chloroform Extract	Alcohol Extract	Aqueous Extract
I	Test for Carbohydrate				
A	Molish Test	-	-	-	+
B	Test for reducing sugars				
a	Fehling Test	-	-	+	-
b	Benedict test	-	+	+	+
C	Test for Monosaccharide				
a	Barfoeds Test	-	-	+	-
D	Test For Hexose Sugars				
a	Cobalts Chloride test	-	-	+	+
E	Test for Non- Reducing Sugars	-	-	+	+
F	Test for Non- Reducing polysaccharide				
a	Iodine test	-	-	+	-
b	Tannic acid test	-	-	+	-
II	Test for Proteins				
A	Biuret test	+	-	+	+
B	Millon's test	+	-	+	-
C	Xanthoprotein	+	+	+	+
D	Test for proteins containing Sulphur	-	-	-	-
E	Precipitation test	+	+	+	+
III	Test for Amino Acid				
A	Ninhydrin test	+	+	+	+
B	Test for tyrosin	+	-	+	+
C	Test for tryptophan	+	-	+	+
D	Test for cysteine	+	+	+	+
IV	Test for Steroids				
A	Liebermann-Buchard	+	+	-	+
B	Liebermann reaction	+	+	-	+
V	Test for Terpenoids				
A	Liebermann-Buchard	+	+	-	+
B	Liebermann reaction	+	+	-	+
VI	Test for Glycosides				
A	Test for Cardiac Glycoside				
a	Baljet test	+	+	+	+
b	Legal's test	-	-	+	+
c	Test for deoxy sugar (Keller killani test)	-	-	+	-
d	Liebermann's test (Bufadienolides)	+	+	+	+
B	Test for Anthraquinone glycoside	+	-	+	+
C	Test for Saponin Glycoside	-	-	+	-
D	Test for Coumarin Glycoside	-	+	+	-
VII	Test For Flavonoids				
A	Ferric chloride test	-	+	+	-
B	Shinoda test	+	+	+	+
C	Alkaline reagents	-	-	+	-
D	Lead acetate test	+	+	+	+
VIII	Test for alkaloids	+	+	+	+
IX	Test for Tannins & Phenolic cpd.	+	+	+	+
X	Test For Lipids	-	-	+	-

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Antioxidant activity of *Justicia adhatoda* L.

Against oxidant, movement is continued all the parts of the plant concentrate to survey their viability in tissue recuperating.

The cell fortification activity of antioxidative operators has been credited to various frameworks, for instance, the expectation of chain initiation, an authority of progress metal molecule catalyst, the decay of peroxides, and shirking of continued with hydrogen obstruction, reductive cutoff, and extremist scrounging. The most extreme assimilation of a stable DPPH revolutionary in ethanol is at 517nm. The decline in absorbance of DPPH revolutionary brought about by enemies of oxidants is because of the response between enemies of oxidants atoms and extremists. Consequently, DPPH is typically utilized as a substance to assess hostile to oxidant movement.

The outcomes as summed up in Table 3.4 additionally shows all the concentrates of *Justica adhatoda* L. displayed level of cancer prevention agent movement.

Table 4: In-vitro antioxidant activity of *Justicia adhatoda* L. by DPPH method:

S.No.	Drug	Extract	RC_{50} value (μg/ml)
1.	*Justica adhatoda* L.	Petroleum ether	092.56
2.		Chloroform	061.35
3.		Alcohol	102.39
4.		Aqueous	088.56
5.	Ascorbic acid	-	040.12

DISCUSSION

Justicia adhatoda L. is a helpful plant from the Family Acanthaceae, utilized as an Indian customary remedial specialist. Considering the phytochemical examination or subjective assessment of *Justicia adhatoda* L. the distinctive physical boundaries were assessed. The current assessments were directed to survey the 9.7 %w/v misfortune on drying, debris esteems (6.3%w/w all out debris, and 4.0%w/w corrosive insoluble debris), extractive qualities (Aqueous 5.2%, Alcohol 7.1%). The Fluorescence Analysis has given blue-hued fluorescence which was seen under the UV radiation light to acquire insights regarding the *Justicia adhatoda* L. [25-26].

Consequently, synthetic tests were performed on 4 different concentrates of the *Justicia adhatoda* L. to gauge the presence of various phytoconstituents as watery concentrate shows, it contains starches (Reducing sugars, Monosaccharides, Non-Reducing Sugars), proteins, amino acids(tyrosine, tryptophan, and cysteine), alkaloids, glycosides (cardiovascular glycoside, saponins glycoside, Coumarin glycosides, anthraquinones glycoside), flavonoids alkaloids, sterols, triterpenoids and lipids, tannins and phenolic mixes [27].

The cell reinforcement potential was resolved the DPPH strategy taking ascorbic corrosive as standard. All the four concentrates of the *Justicia adhatoda* L. have indicated cell reinforcement adequacy in contrast with the standard medication (Ascorbic corrosive). The standard ascorbic corrosive has given the RC_{50} esteem for the DPPH strategy was 040.12 μg/ml. The RC_{50} assessment of the solution ousts was seen as chloroform 061.35μg/ml, watery 088.56μg/ml, liquor 102.39μg/ml, and Petroleum ether 092.56μg/ml, which shows the essential capacity of *Justica adhatoda* L. as a cell fortress genius [28].

CONCLUSION

The concentrates of *Justicia adhatoda* L. after fixation is first oppressed for starter physical and phytochemical examination to survey the nature of plant material and comprehend the idea of dynamic constituent's present. After primer examinations, all the 4 concentrates were oppressed for cancer prevention agent action by DPPH strategy to manage us in the determination of the concentrate part which will most likely have the ideal movement. Along these lines, *Justicia adhatoda* L. can be utilized as a possible hotspot for the improvement of a cell reinforcement specialist.

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CONFLICT OF INTEREST

We wish to confirm that there are no known conflicts of interest associated with this publication and there has been no significant financial support for this work that could have influenced its outcome.

REFERENCES

1. Kokate CK, Purohit AP, Gokhale SB. (1996). Text Book of Pharmacognosy, Nirali Prakashan, Pune.; 4th ed; pp. 35-44.
2. Ram VJ. (2001). Herbal Preparations as source of hepatoprotective agents. Drug News Prospect.; 14(6):353-63.
3. Kulkarni GT. (2005). Herbal formulation development. Abstract GL12, National seminar on emerging trends in Ethnopharmacology, bagalkot. 12th - 13th Nov.
4. Kehrer JP. (1993). Free radicals as mediators of tissue injury and disease. Crit. Rev. Toxicol.; 23: 21-48.
5. Halliwel B, Gutteridge JMC. (1999). Free radicals in biology and medicine, Oxford University Press, Oxford, 3rd ed. pp. 78-87.
6. Goodwin JS, Brodwick, M. (1995). Diet, aging and cancer. Clin. Geriatr. Med.; 11: 577-589.
7. Steinmetz KA, Potter JD. (1996).Vegetables, fruit and cancer prevention: a review. J. Am. Diet Assoc.; 96:1027-1039
8. Stahelin HB, Gey KF, Eichholzer M, Ludin E. (1991). Plasma antioxidant vitamins and subsequent cancer mortality in the 12-year follow-up of the prospective basel study. Am. J. Epidemiol.; 133: 766-775.
9. Steinberg D. (1991). Antioxidants and atherosclerosis: a current assessment. Circulation. 84:1420-1425.
10. Willett WC. (1994). Micronutrients and cancer risk. Am. J. Clin. Nutr. 59: 265-269.
11. Asli S, Alaattin S. (2007). Antioxidant and chemoprotective properties of *Momordica charantia* L. (bitter melon) fruit extract. African Journal of Biotechnology. 6 (3): 273-277.
12. Vijay K Patel, Chirag Kpatel, Harsha U Patel, CN Patel. 2010. Vitamins, Minerals and Carotenoids as a Antioxidants. Asian J. Research Chem. 3(2): April- June; Page 255-260.
13. Chatterjee A, Basak B, Saha M, Dutta U, Mukhopadhyay C, Banerji J, Konda Y, Harigaya Y. 2000. Structure and stereochemistry of nardostachysin, a new terpenoid ester constituent of the rhizomes of *Nardostachys jatamansi*. J Nat Prod. 63(11):1531-1533.
14. Prabhu V, Karanth KS, Rao A. (1994). Effects of *Nardostachys jatamansi* on biogenicamines and inhibitory amino acids in the rat brain. Planta Med. 60(2):114-117.
15. Dixit VP, Jain P, Joshi SC. (1988). Hypolipidaemic effects of Curcuma longa L and *Nardostachys jatamansi* DC in triton-induced hyperlipidaemic rats. Indian J Physiol Pharmacol. 32(4): 299-304.
16. Sarbhoy AK, Varshney JL, Maheshwari ML, Saxena DB. (1978). Efficacy of some essential oils and their constituents on few ubiquitous molds. Zentralbl Bakteriol Naturwiss. 133(7):723-725.
17. Rucker G, Tautges J, Sieck A, Wenzl H, Graf E. (1978). Isolation and pharmacodynamic activity of the sesquiterpene valeranone from Nardostachys jatamansi DC. Arzneimittel for schung. 28(1):7-13.
18. Rao EV, Raju NR. (1984). Two flavonoids from Tephrosia purpurea. Phytochemistry. 23(10): 2339-2342.
19. James A. (1983). Handbook of Energy Crops. Unpublished. [available online] http://www.hort.purdue. edu/newcrop/duke_energy Date of visit: 15-10-19.
20. Ahmad VU, Ali Z. (1999). Flavonoids of Tephrosia purpurea. Fitoterapia. 70(4): 443-445.
21. Saxena VK, Choubey A. (1997). A novel neoflavonoid glycoside from *Tephrosia purpurea* stem. Fitoterapia. 68(4): 359-360.
22. Choudhary GP. (2007). In vitro antioxidant studies of the ethanolic extract of *Tephrosia purpurea* L. Ancient Science of Life. 27: 26.
23. Ashok D, Narayana TV, Mazumder UK, Gupta M. (2012). Exploration of Diuretic Potential and Electrolyte Excretion of *Tephrosia purpurea* (Fabaceae) in Rats. Journal of Dietary Supplements. 9: 9-18.
24. Rangama BNLD, Abayasekara CL, Panagoda GJ, Senanayake MRDM. (2009). Antimicrobial activity of *Tephrosia purpurea* (Linn.) Pers. and *Mimusopselengi* (Linn.) against some clinical bacterial isolates. J.Natn.Sci.Foundation Sri Lanka. 37: 139-145.
25. Ankush Garg, Radhika Maheshwari, Pooja Chawla, Shubhini A. Saraf. (2010). Free Radical Scavenging Activity of Novel 5-Substituted Arylidene-3-Substituted-Benzyl-Thiazolidine-2, 4-Diones. Asian J. Research Chem. 3(3): July- Sept.Page 528-530.
26. Kalpana Divekar, Jani Hardik, S. Brahmani Priyadarshini. (2011). Synthesis and Biological Evaluation of Some Novel Pyrimidine Derivatives. Asian J. Research Chem. 4(1): January; Page 64-67.
27. Sachin Malik, Ashish Choudhary. (2011). Anti-Oxidant Activity of Novel 5-Substituted Arylidene-3-Substituted-Benzyl-Thiazolidine-2, 4-Diones. Asian J. Research Chem. 4(1): January; Page 120-122.
28. Sonali Munne, D.V. Parwate, V.N. Ingle, D.S. Panchbhai, V.S. Nagpurkar. (2011). Free Radical Scavenging Activity of Gamma Irradiated and Unirradiated *Citrus medica* Empty Juice Sacs. Asian J. Research Chem. 4(6): June, Page 957-959.

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