www.rjlbpcs.com

Life Science Informatics Publications



Life Science Informatics Publications

Research Journal of Life Sciences, Bioinformatics, Pharmaceutical and Chemical Sciences

Journal Home page http://www.rjlbpcs.com/



Original Research Article

DOI: 10.26479/2019.0502.60

PHYTOCHEMICAL STUDY OF *TINOSPORA CORDIFOLIA* GROWN ON THREE DIFFERENT SOIL CONDITIONS

Zeba Ali Shervani*, P. K. Mishra

Department of Botany, Vinoba Bhave University, Hazaribag, India.

ABSTRACT: Soil condition and other Ecological factors have Profound impact on growth and development on plants. It is also important to see whether variations in these conditions affect Phytochemical as well. *Tinospora cordifolia* (Willd.) Miers ex Hook. F.& Thoms. is an important medicinal plant and it plays important role in treatment of different diseases. The present investigation was taken up to see whether the soil condition changes quantity and quality of various phytochemicals. The result clearly exhibited that quantitative variation in Phytochemicals happens where the soil chemistry changes. No qualitative changes were noticed.

KEYWORDS: Tinospora cordifolia; Phytochemicals; Quantitative changes; Soil chemistry.

Corresponding Author: Dr. Zeba Ali Shervani* Ph.D.

Department of Botany, Vinoba Bhave University, Hazaribag, India.

1.INTRODUCTION

Plants have been played an important role for fight against various types of diseases. In recent past discovery of antibiotics and steroids completely revolutionalized treatment of diseases. However, very soon people started experiencing side effect on their two wonder drugs. In addition to that it was also experience that pathogenic microbes become resistant to specific Antibiotic, In this scenario once again people are reverting towards plants based medicine and *Tinospora cordifolia* is one such plant which has got enormous potentiality so far its diseases fighting capacity is concerned. This plants belongs to menispermaceae and generally it is climbing and twinning in habit. Leaves are alternate and flowers are very small in size. The plant is rich source of alkaloids and terpenes [1] This plant is antiallergic, anti-inflammatory, immunosuppressive, immunomodulator, anticancer, hypoglycemia, and anthelmintic. In addition to that it is also said to be antibacterial and antioxidant [2], [3], [4], [5], [6] *Tinospora cordifolia* grows luxuriantly in various soil conditions. The present

Shervani & Mishra RJLBPCS 2019 www.rjlbpcs.com Life Science Informatics Publications study was undertaken to see whether there is any change in quantity as well as quality of various phytochemicals because of variation in soil characteristics.

2. MATERIALS AND METHODS

Plant parts were collected from three different sites. Soil of those three sites were also collected to analyse its phytochemical characteristics. Soil temperature, pH, salinity, water holding capacity, conductivity, potassium, sodium and calcium etc were analysed following standard techniques suggested by APHA (2017). For phytochemical analysis plant parts were dried under shed and crushed. Plant extract was obtained with the help of soxhlet and using different solvent like hexane, ethyl acetate and methanol. The final extract was concentrated and dried. The extract was subjected to analysis for various phytochemicals.

Qualitative analysis of phytochemical constituents present in Tinospora cordifolia

Detection of total alkaloids

Plant extract was dissolved in mild HCl, filtered and the filterate was tested for alkaloids. The alkaloids test was performed by various test like Mayer's test, Wagner's test, Dragendorff's test, Hager's test.

Detection of flavonoids

The extract was treated with few drops of sodium hydroxide solution. It initially produce a deep yellow colour which become colourless when dilute acid is added to it, this colour change represents presence of flavonoid.

Detection of glycosides

Plant extracts were hydrolysed with dilute hydrochloric acid and then was tested for glycocides by different test like modified Borntrager's test and legal's test.

Detection of phenol

Plans extract were treated with a few drops of ferric chloride solution. Bluish colour formation indicates the presence of phenols.

Detection of saponin

For the saponin identification the Froth test was done. Plant extract were diluted with distilled water to 20 ml and were shaken for 10-15 min. Formation of foam of height of 1 cm represents the presence of saponin.

Quantitative analysis of phytochemical present in Tinospora cordifolia

Determination of phenol

The plant extract was boiled with 50 ml of $(CH_3CH_2)_2O$ for 10-15 min. Boiled sample was then taken into 50 ml flask and 10 ml of distilled water was added to it. After the addition of distilled water, 1 ml of ammonium hydroxide solution and 5 ml of concentrated $CH_3(CH_2)CH_2OH$ was added to the solution .The plant sample was left for 30 min for the colour development and then measured at 505 nm wavelength with the help of spectrophotometer.

Determination of saponin

10 gm of each samples were put into a flask and 1 ml of 20% C_2H_5OH was added to the samples. The plant samples was heated over a hot water bath for 3-4 hr at about 50 ^{0}C . The solution was then filtered and the residue was reextracted in other 200 ml of 20% ethyl alcohol. The combined samples are reduced to 40 ml over a water bath at 90 0 C. It was then transferred into 250 ml another funnel and 20 ml of n-C₄H₉OH extracts was added and the combined n-C₄H₉OH extract was washed with 10 ml of 5% sodium chloride (NaCl). The left solution was then heated in water bath after evaporation was done, the plant samples were dried in the oven to a constant weight .

Determination of flavonoids

5 gm of plant extract was mixed with 50 ml of 80% aqueous methanol. The solution was then filtered with filter paper and the filtered is transferred into a water bath and the solution was evaporated and dried. The sample is then weighed.

Determination of cardiac glycosides

1 ml of concentrated H₂SO₄ was taken and 10 ml of aqueous extract from each plant sample was added to Fecl₃.And then the mixture was added to 1ml of conc H₂SO₄. Appearance of brown ring indicates the presence of Cardiac glycosides.

Determination of alkaloids

5 gm of Plant extract was taken and 200 ml of 10% CH₃CO₂H in C₂H₅OH was added to it. The solution /mixture was then filtered and the extract was allowed to become concentrated in water bath until it reached to the ¹/₄ of its original volume.

Concentrated NH₄OH was added until the precipitation was complete. The solution was allowed to settle and the precipitated was collected and was washed with dilute NH₄OH and was then filtered. The residue was alkaloid.

3. RESULTS AND DISCUSSION

Table 1. Quantitative analysis of phytochemicals presents in *Tinospora cordifolia*.

Location	Total	Total	Total Cardiac	Total	Total
	phenol %	Flavonoid %	Glycosides %	Saponin %	Alkaloid %
Sample I (Pugmil)	0.74±0.05	0.13±0.02	0.09±0.012	2.59±0.06	1.9±0.01
Sample II (Heera	0.82±0.03	$0.08 \pm 0.0.4$	0.06±0.05	2.34±0.06	1.8±0.05
bag chowk)					
Sample III	0.62±0.03	0.15±0.02	0.06±0.06	2.10±0.05	1.6±0.04
(Botanical Garden					
of Vinoba Bhave					
University)					

Statistically significant at p < 0.01

Shervani & Mishra RJLBPCS 2019 www.rjlbpcs.com Life Science Informatics Publications Result related to analysis of phytochemicals is presented in (Table 1).It was found that sample collected from Heera bag chowk had maximum phenol content and the value was 0.82%.This was followed by phenol content of Sample I (Pugmil) and the least value was in Sample III (Botanical Garden of Vinoba Bhave University).But the reverse trend was noticed with Flavonoid content where the lowest value was recorded from Sample collected from Heera bag chowk where as the highest content was found in Sample III, Sample II content intermediate value of Flavonoid . Maximum Cardiac Glycosides ,0.09% was found in Sample 1 where as both sample II and sample III content 0.06 % of Cardiac Glycosides.So far Saponin content is concerned Sample I had 2.59% where as Sample II and Sample III had 2.34 % and 2.10 respectively. Total Alkaloid was highest in Sample I i.e 1.9% and Sample II and III content 1.8 and 1.6 % respectively.

4. CONCLUSION

The result clearly show that ecological condition specially the edaphic factors plays important role in Quantitative Parameter of various phytochemicals.So far the Qualitative parameters was concerned, No significant variation was noticed. One of the most striking feature observed in this study was clear cut antagonistic response so far Phenol and Flavonoids are concerned. The sample having highest Phenol content possessed lowest concentration of flavonoid.This shows that there might be some interfering agent so far the synthesis of two important phytochemicals are concerned. Site II also witnessed but growth of *Tinospora cordifolia* as compared to two other sites. It is clear therefore that ecological condition not only affect growth and development of plant has also got influence on its phytochemical contents.

ACKNOWLEDGEMENT

Head department of botany for providing laboratories facilities

CONFLICT OF INTEREST

Authors have no any conflict of interest.

REFERENCES

- 1. Sharma A, Gupta A, Batra SSA. *Tinospora cordifolia*(Willd.) Hook.F.& Thomson-A plant with immense economic potential.J.Chem.Pharm.Res 2010;2(5):327-33.
- Sivakumar V, Dhanarajan M S, Riyazullah MS .Preliminary phytochemical screening and evaluation of free radical scavenging activity of *Tinospora cordifolia*. Int . J of P. Pharm. Sci. 2011;2:186-88.
- Pendse VK, Dadhich AP. Mathur PN, Bal MS, Madan BR. Antiinflammatory, Immunosuppressive and some Pharmacological actions of the water extract of *Tinospora cordifolia*. Ind. J. of Pharm. 1977;9:221-224.
- 4. Manjrekar PN .Jolly CI. Narayanan S. Comparative study of the Immunomodulatory activity of *Tinospora cordifolia* and *Tinospora sinensis*, Fitoterpia2000;71:254-257.
- 5. Jalalpure SS ,Alagawadi KR. Shetty CSM, Shah BN,Salahuddin ,Singh V.,Patil JK Dept. of

- Shervani & Mishra RJLBPCS 2019 www.rjlbpcs.com Life Science Informatics Publications Pharm and Phyto ,K.L.E.S'Col of Pharma ,Belguam 2006; 590-010,
- Gupta M, Thakur S, Sharma A, Gupta S. Qualitative and Quantitative Analysis of Phytochemicals and Pharmacological value of Some Dye Yielding Medicinal Plants. Orient. J of Chem. Bhopal 2013; 29(2) 475-481
- 7. Wagner S,Bladt S.Pant drug analysis-A thin layer chromatography atlas.Sprin Ver Berlin 1996.
- Yadav RNS and Agarwala M. Phytochemical analysis of some medicinal plant .Jour of Phyto 2011;3(12):10-14
- 9. Masaki HS,Skaki S,Atsumi T and Sakurai H,Active oxygen scavenging activity of plant extract ,Bio Pharm Bull.1995;18:162.
- 10. Singh KN, Lal B, Note on traditional uses of Khair (*Acacia catechu* Willd.) by inhabitants of shivalik range of Western Himalaya .Ethno Leaf.2006;10:109-112
- 11. Gautam KK, Salem MTS, Thanislas PT,Prabhu VV, Kishnamoorthy KK, Devaraj NS and Somasundaram JS, Cardioprotective effect of the *Hibiscus rosa sinensis* flowers in an oxidative stress model of myocardial ischemic reperfusion injury in rats BMC Comp Alt Med.2006;6:32
- 12. Jain SK.Dictionary of folk Medicine and Ethanobotany.D. Pub, New Delhi ,1991:179-80
- 13. Ikram M, Khattak SG and Gilani SN.Antipyretic studies on some indigenous Pakistani medicinal plants.J Ethno 1987;19:185-92.
- 14. Asthana JG, Jain S, Mishra and Vijaykanth MS. Evaluation of antileprotic herbal drug combinations and their combination with Dapsone. Ind Drugs 2001;38:82-6
- 15. McDonald S, Prenzler PD, Autovich M and Robards K. Phenolic content and antioxidant activity of olive extracts .Food Chem.2001;73:73-84
- Tanwar S ,Jain J, Verma S and Solanki D. STandarization and phytochemical evaluation of *Tinospora cordifolia* (Willd.) Miers.(Menispermaceae).Int J of P and Pharm Sci.2012;1(4):219-223.
- 17. Chang CC, Yang MH, Wen HM and Chem JC. Estimation of total flavonoid content in propolis by two complementary colorimetric methods. J. F Drug Anal 2002;10:178-182.
- Ramya Premanath and Lakshmidevi N.Studies on Antioxidant activity of *Tinospora cordifolia* (Miers.) Leaves using in vitro models.J of American Sci.2010;6(10):736-743.
- Nasreen S,Radha R,Jayshree N, Selvaraj B and Rajendran A.Asesment of quality of *Tinospora cordifolia* (Willd.) Miers .(Menispermaceae),Pharmacognostical and Phyto-Physicochemical profile.Int J Comp Pharm.2010;1(5):1-4.
- 20. Maurya R, Wazir V, Tyagi A & Kapil RS. Clerodane diterpene from *Tinospora cordifolia*. Phytochem .1995;38:659.
- 21. Kar A, Chaudhary BK & Bandyopadhaya NG.Comparative evaluation of hypoglycemic activity of some Indian medicinal plants alloxan diabetic rats.J Ethnopharm.2003.84(1):105.
- 22. Patel SR.Goyal RK& Shah DS.Studies on the pharmacogological effects of Tinospora

- Shervani & Mishra RJLBPCS 2019 www.rjlbpcs.com Life Science Informatics Publications *cordifolia* .J Res Ind Med1977;13(2):46.
- 23. Raghunathan K ,Sharma PV.Effect of *Tinospora cordifolia* Miers (Guduchi) on induced Hyperglycemia .J Res Med.1969;3(2):203.
- 24. Grover JK, Vats V, Rathi SS, Dawar R. Traditional Indian anti-diabetic plants attenuate progressive renal damage in streptozotocin induced diabetic mice. J Ethnopharmacology. 2003;76(3):233.
- 25. Stanley P,Prince M,Menon VP.Hypoglycemic and other related actions of *Tinospora cordifolia* roots in alloxan –induced diabetic rats.J Ethnopharmacolohy.2000.70(1):9.
- 26. Khuda .MQ, Khaleque A, Basar KA, Rouf MA, Khan MA, Roy N.Studies on *Tinospora cordifolia* II.Isolation of tinosporine, tinosporic acid and tinosporol from the fresh creeper.Sci Res (Dacca) III.1996;9:65.
- 27. Dixit SN, Khosla RL.Chemical investigation on *Tinospora cordifolia* (Willd.) Miers .Ind J Appl Chem.1971;34:46 and Chem Abstr.1974;80:24816y.
- Bhattacharya SK, Satyan KS ,Chakrabarti A.Effect of Trasina an Ayurvedic herbal formulation on pancreatic islet superoxide dismutase activity in hyperglycemia rats.Ind J Exp Biol.1997;35(3):297
- 29. Wadood N, Wadood A, Shah SAW.Effect of *Tinospora cordifolia* on Blood glucose and total lipid levels of normal and alloxan diabetic rabbits .Planta Medica.1992;58(2):131
- 30. Maryamma KI, Ismail PK. Manomohan CB ,Rajan A. aameliorating effect of amruthu (*Tinospora cordifolia*)in aflatoxicosis of ducks.J Vet Anim Sci.1990;21(2):93.
- 31. Rana S, Suttee A. Phytochemical Investigation and Evaluation of free Radical Scavenging Potential of *Benincasa hispida* Peel Extracts.Int J of Cnt Pharm Rvw and Res .2012;3(3):43-46.
- 32. Satish S, Raghavendra MP, Raveesha KA. Evalaution of the antibacterial potential of some plants against human pathogenic bacteria .Adv in Bio Res.2008;2:44-48.