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Quantification of Flavonoids & Phenols presents in *Tridax procumbens* L. (*Vishalyakarani*) Leaves found in Gandhamardhan hills, Bargarh (Odisha)

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ABSTRACT

Background: *Vishalyakarani* or *Tridax procumbens* L. is an Ayurvedic herb under asteraceae family with traditional use in wound healing purpose. It has many pharmacological properties including anti-microbial, anti-cancer, wound healing and anti-septic. **Purpose:** The present study is a combined study consisting reviewing the anti-microbial spectrum of *Tridax procumbens* L. (*Vishalyakarani*) and quantification of flavonoids and phenols from its leaves specially from the ganghamardhan hill area, Odisha. This aims to equip researchers a useful data about the chemical contents of *T. procumbens*. The extract was prepared by using Soxhlet extractor and concentrated by distillation. Phytochemical analysis revealed the presence of flavonoids, phenols in extract and quantification by the high-throughput 96-well plate method. **Method:** The review process yielded 748 journals and after thorough discussion 81 papers were selected. The plant has many chemical compounds including flavonoids, essential oils, phenols and wide range of pharmacological activities from which we have included the anti-microbial activities. **Conclusion:** Historically and from Ramayana we have heard about the effectiveness of the *Vishalyakarani* in wound healing and in present review proves its worth. But there was a lack of quantification of two important phyto contents and its done by high-throughput 96-well plate method.

Key words: *Tridax procumbens*, Hot oven method, Soxhlet Extractor, Micro Plate Reader, 96-well plate method

INTRODUCTION

Tridax procumbens L. is a famous Ayurvedic herb under Asteracea family and included in binomial nomenclature system by Linnaeus in 1753.^[1] It is seen as a dominant weed in many states such as Maharashtra, Odisha, Bihar.^[2] It is the most potent species among 30 species of the genus *Tridax*.^[3] This

herb. *T. procumbens* have been used from ancient times to treat wounds, skin diseases and to stop blood clotting. It possesses anticoagulant, antileishmanial, antioxidants, anticancer, immunomodulatory agent, insecticidal, anthelmintic cardiovascular, antiseptic, antimicrobial, and insecticidal properties.^[4]

METHODOLOGY

Review Methodology

An internet based literature search of *T. procumbens* L. was done using Google scholar, Science direct, Google patent, Pubmed, ACS and Mendley desktop databases of plants. Keywords used for literature survey, plant location, and antimicrobial spectrum of *T. procumbens* L. Undergraduate students of SSN Ayurveda College and Research Institute have participated in this exercise and study conducted in Pharmacognosy lab of SSN Ayurved College and RI, Paikmal, Bargarh (Odisha) and Dept of Biotechnology and Bioinformatics,

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Sambalpur University, Burla (Odisha). The recommended reporting items for systematic reviews and Meta Analysis (PRISM) guidelines were followed.

Pharmacological studies methodology

Different extracts were studied for their pharmacological potentials and here special emphasis was given for anti-microbial activities both in vivo and in-vitro.

Anti-microbial activities

Review summary of Anti microbial activities of *T. procumbens L.* (Vishalyakarani)

The anti-bacterial activities with control, MIC/MBC by different methods are mentioned. Various extracts were used such as ether, chloroform, and ethanolic by Agar well diffusion method against *B.faecalis*, *B. subtilis*, *E. coli*, *P.aeruginosa*. The chloroform extracts was found to be effective against *B.faecalis* and *E.Coli*.^[5] After going through all these literatures the summery of the anti-microbial activities are reflected in the given table.

Parts	Class of Compound	Methods	Effects	Standards	Doses	Reference
Leaves	Tannins, Steroids	Agar well diffusion	<i>B. subtilis</i> <i>B.faecalis</i> <i>E.Coli</i>	Ampicillin	200µg 400µg 800µg.	Christudas et al., (2012)
Leaves Flowers	Flavonoids	ROS, Lipid peroxidation	<i>M. aeruginos</i>	Ampicillin	25mg/L- 100mg/L for 10 days	Mecina et.al.,2019
Whole Plant Flowers	Tannins Carbohydrate	Disk diffusion methods	<i>E.Coli</i> <i>S. typhi</i> <i>S. paratyphi</i>	-	-	(Taddei – Rosas-Romero 2000)
Fresh flowers	Essential oils	Tube dilution assay	<i>E.Coli</i> <i>S.typhi</i> <i>S.paratyphi</i> <i>M.segmentis</i>	-	0.14- 0.67mg/L	Joshi and Badakar 2012)
Whole plant	Essential oils	Disk diffusion method	<i>S. aureus</i> <i>E.Coli</i> <i>S.typhi</i> <i>K. pneumonia</i> <i>Shigell. flaxineri</i>	Gentamycin	-	Mir. S and Dar. A 2016
Aerial part	Essential oils	Agar well Dilution method	<i>Microspermum fulvum</i> , <i>Microsporium gypsum</i> ,	Griseofulvin	MIC 1.6 to 12.8 mg/mL	Policegudret al.,2014
Fresh leaves	Essential oils	Disk diffusion	<i>S. aureus</i> , <i>S. pneumonia</i>	Norfloxacin- 5µg/mL	MIC/MFC 25-100µg/	Manjamlai Et al.,2012a

				Cefepime-10µg/mL Gatifloxacin-15µg/mL	mL	
Leaves	Essential oils	Agar well dilution	<i>Candida albicans</i> <i>Asperagillus fumigates</i> <i>A.niger</i> <i>Candida tropicalis</i>	-	MIF 50-500µg/mL	Manjamlai et al, 2012b.
Ariel Parts	Fatty acid	Disk diffusion method	<i>E. coli</i> , <i>P. mirabilis</i> <i>S. aureus</i>	Streptomycin Ampicillin	25-10 mg/mL	Andriana et al., 2019
Leaf	-	Disk diffusion method	<i>E. coli</i> , <i>S. aureus</i> <i>S. pyogenes</i>	Ampicillin Cephalosporin	-	T.et al., 2018

Morphology

Tridax procumbens has a stem which can reach from to 8-30 inches (20-75 cm) long. The leaves are opposite, pinnate, oblong to ovate, and 1-2 inches (2.5-5 cm) long with cuneate bases, coarsely serrate margins, and acute apexes. The flowers have white rays and yellow disk flowers. They are about 0.4-0.6 inches (1-1.5 cm) wide, and held on a 4-12 inches (10-30 cm) long stalk. Flowering occurs in spring. Fruits are achenes that are dark brown to black in color, oblong, and 0.08 inches (2 mm) long, each with a head of pappus bristles that ovary from 0.12-0.24 inches (3-6 mm) long.^[6]

Phytochemical study

Flavonoids

The Phytochemical studies revealed that *Tridax procumbens* L. is a rich source of Flavonoids, responsible for antioxidant, hepatoprotective, Anticancer, Antibacterial & Wound healing properties. The flavonoids responsible for control the growth of toxin-producing bacteria in plants.^[7]

Phenolic Compounds

Tridax procumbens L leaves contents Phenolic compounds having antioxidant properties. The Anti-oxidants are prevent to damage cells by free radicals,

the free radicals released during metabolic process of oxidation. The free radicals are reactive oxygen free radicals species (ROS), hydroxyl radicals (OH.), superoxide anion radical (O₂), hydrogen peroxides (H₂O₂) and peroxy (ROO.). These free radical generates metabolites, which are damage cell membrane DNA. The free radicals are causing carcinogenesis.^[8]

Estimation of Phenols and Flavonoids by 96 well plate method



Micro Plate Reader

Procedure:**Estimation of phenols:****Reagents for Phenols (Total Phenol Content):**

- Folin reagent 10 % Solution:** In the measuring jar Folin reagent is taken 10 ml and adjust 100 ml of volume with the distilled water
- Sodium Carbonate 5 % solution:** In the volumetric flask 5g of Sodium Carbonate is taken and make up with distilled water up to mark in 100 ml.

Procedure: 2 mg of Aqueous Extract is taken in vial. 1.5 ml of Folin reagent is added, 1.5 ml of Sodium Carbonate solution and 2 ml Distilled water is added and made a solution for 96 well plate method solution kept in 37 °C. From this solution 0.1, 0.2, 0.3 ml is added in three wells. The absorbance of the reaction mixture was read at 765 nm using a visible-UV micro plate kinetic reader.^[9]

Estimation of Flavonoids**Reagents for Flavonoids (Total Flavonoids Content):**

- Aluminum Chloride 10 % solution:** In the volumetric flask 10 g of Aluminum Chloride is taken and make up with distilled water up to mark in 100 ml.
- Sodium Hydroxide 4 % solution:** In the volumetric flask 4 g of Sodium Hydroxide is taken and make up with distilled water up to mark in 100 ml.

Sample: 2 mg of Aqueous Extract is taken in vial. 1.5 ml of Aluminum chloride is added, 1.5 ml of Sodium Hydroxide solution and 2 ml Distilled water is added and made a solution for 96 well plate method solution kept in 37°C. From this solution 0.1, 0.2, 0.3 ml is added in three wells. the absorbance of the reaction mixture was read at from 367 to 510 nm using a visible-UV micro plate kinetic reader.^[10]

Result:**Estimation of Phenols and Flavonoids by 96 well plate method:**

TFC X= Readings obtained 0.420, 0.426, 0.419

Y=0.0098

Amount of TFC of 200 µL contains = $\frac{0.420}{Y} = 42.85\mu\text{g}$

For 1000 µL contains = $\frac{1000}{200} \times 42.85 = 214.25$ (For 2 mg of extract)

For 3.583 gm extract = $\frac{3.583 \times 1000 \times 214.25}{2 \times 1000} = 383.82$ mg

TPC X= Readings obtained 0.389, 0.380, 0.386

Y=0.0166

Amount of TFC of 200 µL contains = $\frac{0.384}{0.0166} = 23.43$ µg

For 1000 µL contains = $\frac{1000}{200} \times 23.43 = 117.15$ (For 2 mg of extract)

For 3.583 gm extract = $\frac{3.583 \times 1000 \times 117.15}{2 \times 1000} = 209.87$ mg

Result: The micro plate reader method yielded the following results

Total Phenol Content: 209.87 mg= 5.85%

Total Flavonoids Content 383.82 mg=10.71%

DISCUSSION

The plant extracts have great potential use as antimicrobial compounds against various microorganisms. This plant can be used as antibiotics in various infections. The combined effect of Phenols and flavonoids against various susceptible microbes leads to new choice of treatment for various microorganisms and in future can be used as the drugs of choice for resistant infections. Secondly the plant is found abundantly and the extractions methods are relatively cheap so economically viable.

CONCLUSION

Review of different journals leads to the conclusion that its leaves are definitely anti-microbial in different concentrations for a varieties of microorganisms. Leaves collected from *The Gandhamardhan* hill forest contain 10.71 % flavonoids & 5.85 % phenolic compound in aqueous crude which seems marvelous and opens new avenues for further isolation and quantification of other vital phyto constituents.

FUTURE STUDY

Preclinical studies could be done to test its effectiveness in animal models and latter on clinical trials could be planned.

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REFERENCES

1. Chauhan, B.S and D.E Johnson, Ecology of two troublesome asteraceae species of Rain field rice : Chromolanea odorota and Coat Buttons (*Tridax procumbens*) Johnson Weed. Science, Cambridge, 2008:56:567-573.
2. Chauhan, B.S and D.E Johnson, Ecology of two troublesome asteraceae species of Rain field rice : Chromolanea odorota and Coat Buttons (*Tridax procumbens*) Johnson Weed. Science. Cambridge, 2008: 56:567-573.
3. Chauhan, B.S and D.E Johnson, Ecology of two troublesome asteraceae species of Rain field rice : Chromolanea odorota and Coat Buttons (*Tridax procumbens*) Johnson Weed. Science, Cabridge, 2008: 56:567-573.
4. Chauhan, B.S and D.E Johnson, Ecology of two troublesome asteraceae species of Rain field rice : Chromolanea odorota and Coat Buttons (*Tridax procumbens*) Johnson Weed. Science. Cambridge, 2008: 56:567-573.
5. Muthusamy, R.K. Vasu, L Kangaraj, D.Ponnampallam and B. Wilson. Phytochemical screening and evaluation of Antibacterial activities of methanol extract of *Tridax procumbens*, International Journal of Pharmacy and Biological Science., New Delhi, 2013:3(1),521-524.
6. Chauhan, B.S and D.E Johnson, Ecology of two troublesome asteraceae species of Rain field rice : Chromolanea odorota and Coat Buttons (*Tridax procumbens*) Johnson Weed. Science. Cambridge, 2008: 56:567-573.
7. Bhat, R.S., J.Shankarappa, H.G. Shivakumar,. A review on Pharmacognosy, Pre-Phytochemistry and Pharmacological analysis of *Tridax procumbens*. Asian Journal of Pharmaceutical Sciences, Tokyo, 2007:2(1),11-17.
8. Perez-Gregorio RM, Garcia-Falcon MS, Simal-Gandara J, Rodriguez AS, Almeida DPF, Identification and quantification of flavonoids in traditional cultivars of red and white onions at harvest. Journal of Food Compos Anal, Reading (U.K) 2010:23(6)592-598.
9. Perez-Gregorio RM, Garcia-Falcon MS, Simal-Gandara J, Rodriguez AS, Almeida DPF, Identification and quantification of flavonoids in traditional cultivars of red and white onions at harvest. Journal of Food Compos Anal, Reading (U.K), 2010; 23(6)592-598.
10. Perez-Gregorio RM, Garcia-Falcon MS, Simal-Gandara J, Rodriguez AS, Almeida DPF, Identification and quantification of flavonoids in traditional cultivars of red and white onions at harvest. Journal of Food Compos Anal, Reading (U.K), 2010; 23(6)592-598.

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