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QUALITATIVE AND QUANTITATIVE SCREENING OF PHYTOCOMPONENTS AND ANTIOXIDANT POTENTIAL ANALYSIS OF TUBER SAMPLES OF ETHNOBOTANICAL PLANT *Actinoscirpus grossus var. kysoor* (Roxb.) Noltie (FAMILY: CYPERACEAE)

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ABSTRACT

Actinoscirpus grossus var. kysoor (Roxb.) Noltie (Family: Cyperaceae) is a perennial herb, with long stolons/ rhizomes ending in small tubers. This plant popularly known as Kasheruk in Sanskrit indravyaguna. Traditionally it was used for various medicinal purposes like a liver tonic, anti-diarrhoea, anti-emetic and hepatoprotective agent and also it has some progesterone-like activity and helps in secretion of milk and development of breast. In the present research, qualitative and quantitative screening of tuber sample of plant was performed with analysis of antioxidant potential. Cold extraction method was used to prepare methanolic and chloroform extract of tuber samples. The better results were obtained in the qualitative preliminarily screening of methanolic tuber extract compared to chloroform extract. The test results showed the presence of flavonoids, alkaloids, protein, terpenoids, tannin, carbohydrate in methanolic extract. Quantitative screening of total phenolic content and total flavonoid content reported higher amount of phenolic compounds in plant i.e., 398.33±7.264 mg GAE/g of sample and 20.96±2.863 mg QE/g of sample respectively. Anti-oxidant activity of methanolic tuber extract was assessed by DPPH (diphenyl-1-picryl-hydrazyl-hydrate) radicle scavenging assay. Ascorbic acid was used as positive control. The IC_{50} value of positive control ascorbic acid was found to be **133.63 ± 0.41 µg/ml** and that of methanolic tuber extract was found to be **305.24 ± 0.30 µg/ml**. IC_{50} value of test sample was very nearer to standard, indicating strong antioxidant potential of plant. The plant is proven to be a good source for the preparation of

drugs from its extract which can be very beneficial for advancement in medicine. Advance research is encouraged to understand the mechanism of plant's biological activities and provision of value for future studies.

Keywords: ***Actinoscirpus grossus var. kysoor*****, Antioxidant, Phytochemicals, Quantitative, Tuber extract**

INTRODUCTION

Plant based products are most important sources for both food and medicinal purpose. In the past many years, the varieties of consumed crops are increasing globally, with many endemic varieties and crops species being collected from the wild for human nutrition and medicinal uses. This increase is based on traditional knowledge of indigenous peoples who used different plant parts including leaves, stem, tuber, bark, thorns, roots, fruits, young shoots, latex, and flowers for medicinal purposes **[1]**. Plants are the source of inspiration for novel drug combinations, as drugs derived from plants have made significant contributions to human health and well-being. The first generation of plant drugs were usually simple botanicals employed more or less in their crude form. The second generation of plant-based drugs emerged as the isolation of active phytoconstituents from plant extract using a scientific processing method **[2]**.

The practice of traditional medication has continued as a most reasonable and effortlessly accessible primary sources of treatment for the human since the prehistoric time in the effective management of disease and others various ailments **[3-6]**. Naturally occurring compounds in plants, also known as phytochemicals, are responsible for the colour, test and odor as well as protective health benefits of plants. More than ten thousand phytocomponents have been identified by researchers, including phytoestrol, saponins, alkaloids, flavonoids, glucosinolates, polyphenols, terpenes, lectins, etc. **[7]**.

Based on the biological requirements in plants, the naturally occurring phytochemicals can be broadly classified into primary metabolites and secondary metabolites. The primary metabolic processes in plants produces primary metabolites like carbohydrates, fats, amino acid and nucleic acid **[8]**. These metabolites are primarily important for the indispensable biological functions in plants which include the growth, development, and reproduction of plant cell. The secondary metabolites are very specific and found great in numbers among the several groups of plants. The diverse combination of plant secondary metabolites produces unique chemical feature among the classes of plant species

which plays an important tool for the taxonomical researchers to classify the taxonomy of plant species **[9]**. These phytocomponents has the potential to reduce the risk of cardiovascular disease, cancer, and diabetes. Many researchers have found that phytochemicals stimulate the immune system, reduce inflammation by preventing DNA damage and repair, and decrease the oxidative damage to cells. Nowadays laboratories focus on assessing the antioxidant properties of phytochemicals. In human body overproduction of oxidant, will responsible for the pathogenesis of some disease and scavenging of this oxidant is thought to be an effective measure to depress the level of oxidative stress of organisms, for that antioxidant phytocomponents found in many foods and medicinal plants can play an important role in preventing and treating many chronic diseases caused by oxidative stress **[7]**.

Actinoscirpus grossus var. kysoor (Roxb.) Noltie (Family: Cyperaceae) is a perennial herb with long stolons/ rhizomes ending in small tubers. It is a principle weed of southeast Asian countries, presumably as a weed of rice crops. It occurs in swampy and inundated places, pools, ditches, and marshes, and is locally abundant especially in lowlands. The tubers of this plant are used by tribal communities as anti-diarrheal, anti-emetic, and hepatoprotective agents for medicinal purposes, also it has some progesterone-like activity and helps in secretion of milk and development of breast. The roots are used for cooling, tonic to liver, laxative, diuretic and burning sensation. Kaseru is an excellent remedy for jaundice, vomiting and pitta disorders **[10-13]**. In the present research, preliminary phytochemical screening was conducted for qualitative analysis of secondary metabolites, quantitative analysis of total phenol and flavonoid content, and antioxidant potential analysis of tuber sample of *Actinoscirpus grossus var. kysoor* (Roxb.) Noltie.

MATERIALS AND METHODS

The main purpose of doing this experiment is to perform the qualitative and quantitative screening of phytocomponents of the tuber of *Actinoscirpus grossus var. kaysoor* (Roxb.) Noltie along with analysis of antioxidant potential.

MATERIALS:

Plant Material

Scientific Name: *Actinoscirpus grossus var. kaysoor* (Roxb.) Noltile

Plant Part Used: Tubers

Image 1: Tuber sample of *Actinoscirpus grossus var. kaysoor* (Roxb.) Noltile

Chemical Requirements:

All the reagents and chemicals used for experiments were of analytical grade. The DPPH was procured from Sigma-Aldrich (Germany). Follin-ciocalteu reagent, Millons reagent, Dragendorff's reagent and Molish reagent etc., were procured from Himedia, India. Solvents like Methanol, Chloroform, Ethanol etc. were purchased from SRL, India.

METHODOLOGY

Collection and Drying of Plant Part (Tubers):

The tubers of *Actinoscirpus grossus var. kaysoor* (Roxb.) Noltie were collected from the irrigated field of village Sanand, Ahmedabad, India in January 2021 (23°01'43.0" N 72°22'45.8" E). Parts of the collected tubers were washed and sun-dried for 2-3 days and then grinded with the help of an electronic grinder machine to prepare powder and then this powder is used for the extract preparation.

Extract Preparation Method:

The 10 gmtuber powder was dissolved in 100 ml solvent (Methanol and Chloroform). The tuber powder and solvent mixed together and then kept for 24 hours on a shaker. The petri-plates in which the solution having the plant material dissolved in solvent is to be placed were weighed prior for its dry weight and then the solution is filtered using Whatman filter paper No 1 with the help of a funnel and this filtrate is stored in a petri-plate after the complete filtration process. The filtrate was kept to evaporate properly. Now again the petri-plates with extract were weighed, and then sealed with the help of parafilm and stored in a cool and dry place. The yield of the extract was calculated using the below formula:

$$\textbf{Yield (\%)} = W_1 \times 100 / W_2$$

Where W_1= Weight of extract after solvent evaporation, W_2= Weight of powdered leaf

Phytochemical Screening of Plant Extract:

Preliminary phytochemical screening of methanolic and chloroform extract of tuber sample of *Actinoscirpus grossus var. kaysoor* (Roxb.) Noltile was conducted by the following tests:

1. <u>Alkaloids</u>:

- **Mayer's test:** 1 ml Mayer's reagent added to 2 ml filtrate; white creamy precipitates show presence of alkaloids.
- **Wager's test:** 2 ml filtrate mixed with 2ml Wager's solution, which is added dropwise from side of test-tube; reddish brown ppt confirms presence of alkaloid.
- **Hager's test:** 2 ml filtrate with 2 ml Hager's reagent; if yellow ppt are seen then alkaloid is present.
- **Dragendroff's test:** 1ml filtrate mixed with 2ml Dragendroff reagent; orange ppt confirms presence of alkaloids.

2. Carbohydrates:

- **Molish test:** Molish reagent added dropwise by side to 2 ml filtrate; presence of violet ring confirms carbohydrate.
- **Fehling's test:** 1 ml Fehling A and B added to 1 ml filtrate, boil it for 5 min in water bath; if red ppt is obtained carbohydrate is confirmed.
- **Barford's test:** 1 ml filtrate and 1 ml Barford's reagent boiled for 2 min; red ppt shows presence of carbohydrate.
- **Benedict test:** 1 ml filtrate and 1 ml Benedict's reagent boiled for 2 min; any colored ppt confirms presence of carbohydrate.

3. Glycosides:

- **Bortrager's test:** 2ml filtrate and 3ml chloroform shake it and add 10% ammonia solution; pink color shows presence of glycoside.
- **Acetic acid test:** 2ml filtrate, 2ml chloroform and add 2ml acetic acid then add conc. H_2SO_4, then cooled on ice; if color changes from violet to blue and finally green then glycoside is present.
- **Keller-Killiani test:** 2 ml extract, 1ml glacial acetic acid and 2 drops of 2% $FeCl_3$ solution then pour to test-tube having 1ml Conc. H_2SO_4; if upper layer is reddish brown and lower bluish green then glycoside is present.

4. Proteins:

- **Millon's test:** 2 ml filtrate in 1 or 2 ml Millon's reagent; if white ppt is obtained shows presence of protein.
- **Biuret test:** 2ml filtrate in 2% C_USO_4 (0.5ml) with 1 ml ethanol (95%) and 1 KOH pellet; if pink colored ethanoic layer is seen then protein is present.

5. Phenols:

- **Ferric chloride test:** 2 ml filtrate and 2 drops of 5% $FeCl_3$solution; if dark green color is seen then phenol is present.
- **Lead acetate test:** 2ml filtrate in 0.5 ml lead acetate, if white ppt is obtained then phenol is present.
- **Folin-ciocalteu test:** 0.5 ml extract and 1ml Folin–ciocalteu reagent; if bluish green color is seen then phenol is present.

6. Flavonoids:

- **Alkaline test:** 2 ml extract and 3ml 2% NaOH; yellow color will appear after adding dilute H_2SO_4, if yellow color disappears then flavonoid is present.
- **Lead acetate test:** 2 ml extract with few drops of 10% lead acetate; if yellow ppt is obtained flavonoid is present.

7. Saponins:

- **Froth test:** 2 ml extract and 20 ml distilled water shaken for 10 min; presence of foam confirms saponin.

8. Fixed oils and fats:

- A small amount of extract is taken between the filter paper and pressed for

few seconds; if stain is left on filter paper, then fixed oil is present.

9. **Terpenoids:**

- **Salkowski test:** 2 ml extract and chloroform added with 3 ml Conc. H_2SO_4; if reddish brown colored ring is seen, then terpenoids are present.
- **Copper acetate test:** 1ml extract and 1 or 2 drops of copper acetate solution; if emerald green colored ppt are obtained then terpenoids are present.

10. **Cardiac glycosides:**

- **Legal test:** 2ml filtrate in 1 ml pyridine and 1 ml 20% sodium nitroprusside; pink or red color shows presence of cardiac glycoside.

11. **Steroids:**

- **Liebermann burchard's test:** 1ml filtrate and 2 to 3 ml acetic anhydride solution; if violet or green color is seen then steroid is present.
- **Salkowski's test:** 2mg extract shaken with chloroform and add H_2SO_4 side by side; red color shows presence of steroids.

Total Phenolic Content:

Total phenolic content of plant extract was determined by Follin-ciocalteu reagent method with some modification **[14]**. 1 ml methanolic extract of tuber sample (0.2 mg/ml) was used, followed by 1 ml of Folin-ciocalteu reagent (Himedia, India) and 10 ml of distilled water. After that 4 ml 20% sodium carbonate (Na_2CO_3) (Himedia, India)was added to test solution and the final volume was made up to 25 ml with the help of distilled water. Further, it was kept for incubation in dark for 30 minutes at room temperature and finally the absorbance was recorded in spectro-photometer at 765 nm. Gallic acid was used as standard with concentration 20 µg/ml – 200 µg/ml and proceeded with a similar procedure to obtain a calibration curve. The experiment was conducted in 3 replicates to avoid errors. The total phenol was estimated as milligrams of gallic acid equivalent/gram of sample (GAE/g of sample) using below equation.

$$GAE = C \times V / M$$

Where, C = Concentration of gallic acid established from the calibration curve in mg/ml, V = Volume of the Extract solution in ml, M = Weight of the extract in g

Total Flavonoid Content:

To determine the total flavonoid content of plant extract, the Aluminium chloride colorimetric method was used with some modification **[15]**. Plant extract was dissolved in methanol (SRL, India) to obtain concentration 0.2 mg/ml. 1 ml methanolic tuber extract was mixed with 100 µl 10% aluminium chloride ($AlCl_3$) (SRL, India), followed by 100 µl 1M potassium acetate (CH_3COOK) (SRL, India); finally, 4.8 ml distilled water was added and vortexed to mix well. Afterwards, incubation was given to the test-tube for 30 minutes in dark at room

temperature. Eventually,absorbance was recorded at 415 nm in spectrophotometer. The total flavonoid content was calculated from calibration curve obtained by known concentration of standard Quercetin (20 µg/ml – 200 µg/ml). The above procedure repeated 3 times to avoid errors. The results were expressed as milligram of quercetin equivalent/gram of sample (QE/g of sample). Which was calculated using below equation.

$$QE = C \times V / M$$

Where, C = Concentration of quercetin established from the calibration curve in mg/ml, V = Volume of the Extract solution in ml, M = Weight of the extract in g

Antioxidant Assay:

Antioxidant activity of the tuber sample of *Actinoscirpus grossus var. kaysoor* (Roxb.) Noltie was analysed by the DPPH radical scavenging assay with some modification **[16]**. This is a most common and popular method used to check the presence of free radicle scavenging activity of a given plant material. 2, 2 diphenyl-1-picrylhydrazyl (DPPH) is a dark purple colored powder having stable free radical molecules. DPPHis light sensitive and is degenerate if it is exposed to light. The experiment is conducted in dark to avoid light exposure. The fresh stock solution of DPPH (Sigma-Aldrich, Germany)was prepared with 0.04 mg/ml concentration in methanol. 2 ml DPPH solution was added to 1 ml of methanolic extract of tuber sample (20 µg/ml – 200 µg/ml). Which was then incubated for 30 minutes in absolute dark at room temperature. The absorbance of test mixture was recorded at 517 nm in spectrophotometer. The Ascorbic acid of the same concentration (20 µg/ml – 200 µg/ml) was used as positive control. The test was conducted in three replicates to avoid errors. The results of experiment were expressed as IC_{50} value, calculated from the plot of percentage scavenging activity vs concentration. The percentage scavenging activity was computed using below equation:

$$\% \text{ Scavenging Activity} = \frac{A - B}{A} \times 100$$

Where, A = Absorbance of the Blank, B = Absorbance of the Sample

Statistical analysis: -

All the experiments were carried out in three replicates to avoid errors. The results were presented as mean ± standard error (S.E.) of three independent replicates. The statistical analysis and calculation of IC_{50} value was performed using the latest version of GraphPad Prism 7.0 Windows Software.

RESULTS

Yield: -

In the present study, extracts were prepared using cold extraction method. The significant yield was obtained for both methanol and chloroform extract i.e., **5.09%** and **0.83%** respectively. The methanol extract of tuber sample was sticky

and reddish yellow in colour, while the chloroform extract of tuber sample was pale yellow in colour with moderate stickiness.

Preliminary Phytochemical analysis: -

In phytochemical screening, 6 test showed positive results, they are Alkaloids, Carbohydrates, Proteins, Phenols, Tannins, and Terpenoids. Of all these phytocomponents, alkaloids and phenols are present in both methanol and chloroform extract. Flavonoids, terpenoids, steroids and cardiac glycosides are present in methanol but absent in chloroform. Glycosides and Saponins are absent in both methanol and chloroform extract. The results suggest that most of the phytocomponents were detected in tuber methanol extract **(Table 1)**.

Total Phenol Content (TPC): -

The study of total phenol content revealed the standard calibration equation as y = 0.0049x – 0.0971 (R^2 = 0.9892) **(Graph 1)**. Phenol content of tuber sample of *Actionoskirpus grossus var. kysoor* was calculated using above calibration equation and was found to be **398.33 ± 7.26 mg GAE/g of sample**.

Total Flavonoid Content (TFC): -

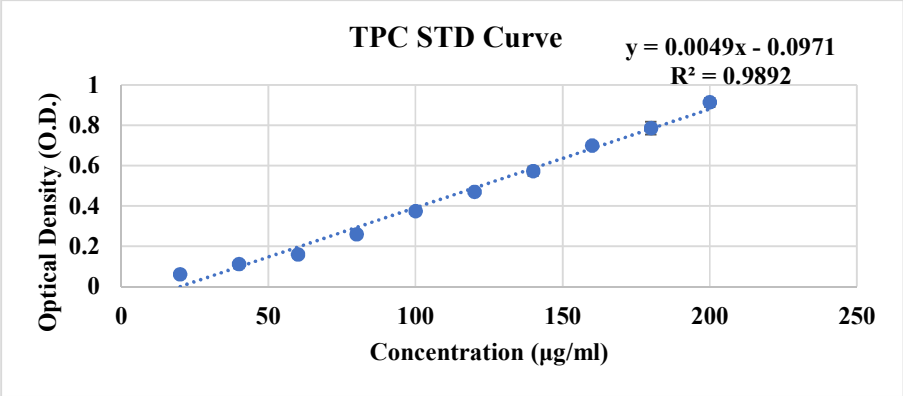
Total Flavonoid Content of tuber sample of *Actinoscirpus grossus* var. kaysoor (Roxb.) was found to be **20.96 ± 2.86 mg QE/g of sample**, which is calculated using regression equation of standard curve of quercetin i.e., y = 0.0128x + 0.1165 (R^2 = 0.9915) **(Graph 2)**.

Antioxidant activity: -

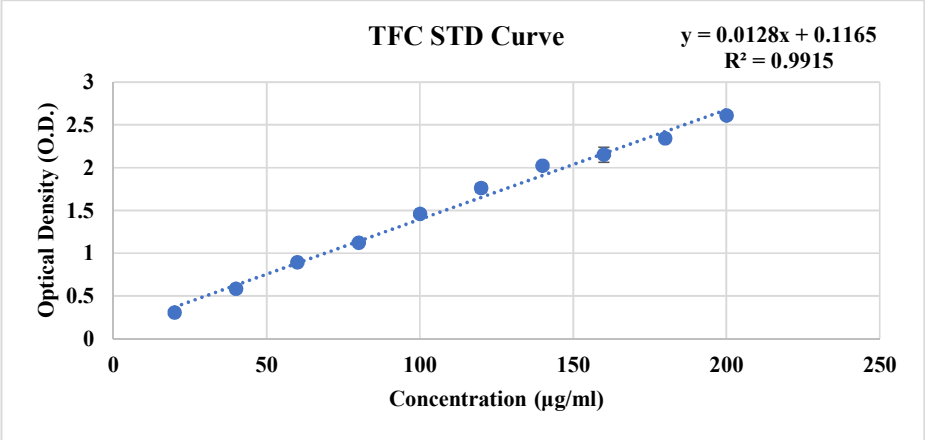
Antioxidant activity of tuber sample was evaluated using DPPH radical scavenging assay. The basic principle of the assay is that DPPH is free radical, which is stable at room temperature and gives purple color in methanol. Antioxidant molecule reduce DPPH molecule to give colorless to yellowish solution, with significant decline in absorbance at 515 nm, which is measured by spectrophotometer. In the present investigation results were represented as IC_{50} value i.e., 50% inhibition concentration. The IC_{50} value of positive control Ascorbic acid was found to be **133.63 ± 0.41 µg/ml** and IC_{50} value of methanolic tuber extract was found to be **305.24 ± 0.30 µg/ml (Graph 3)**.

Table 1: Preliminary phytochemical screening of Tuber of *Actionoskirpus grossus var. kysoor*

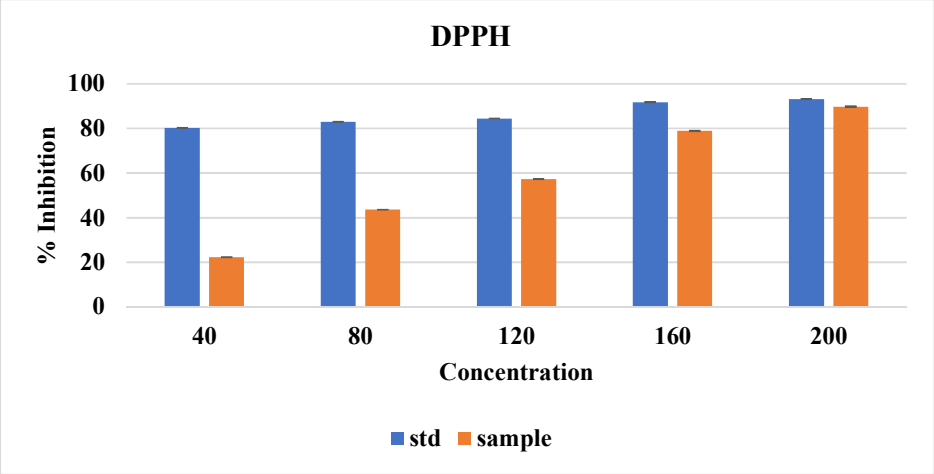
Sr. No.	Phytocomponents	Test	Results (MeOH)	Results (CH)
1	Alkaloids	Mayer's test	P	P
		Wager's test	A	P
		Hager's test	P	P
		Dragendorff 's test	P	P
2	Carbohydrates	Molish test	P	A
		Fehling 's test	A	P
		Barford test	P	A
		Benedict test	A	A
3	Glycosides	Borntrager 's test	A	A
		Acetic acid test	A	A
		Keller–Kiliani test	A	A
4	Proteins	Millon's test	P	A
		Biuret test	P	A
5	Phenols	Ferric chloride test	P	P
		Lead acetate test	P	P
		Folin–ciocalteu test	P	P
6	Flavonoids	Lead acetate test	P	A
		Alkaline test	P	A
7	Tannins	Lead acetate test	P	P
		Ferric chloride test	P	P
8	Terpenoids	Salkowski test	P	P
		Copper acetate test	P	A
9	Saponins	Froth test	A	A
10	Fixed oils	Fixed oil test	A	A
11	Steroids	Liebermann test	A	P
		Salkowski test	P	P
12	Cardiac Glycosides	Legal test	P	A



Graph 1: Standard curve of Gallic acid for total phenol content



Graph 2: Standard curve of Quercetin for total flavonoid content



Graph 3: DPPH radical scavenging activity of standard Ascorbic acid and tuber sample of *Actinoscirpus grossus var. kaysoor* (Roxb.)

DISCUSSION

The study is performed to determine the Qualitative and Quantitative screening of phytocomponents of tubers of *Actinoscirpus grossus var. kaysoor* (Roxb.) Noltie to determine the plant secondary metabolites profile, total phenolic content (TPC), total flavonoid content (TFC) and assessment of its antioxidant potential. It was an ethnomedicinally recognised plant for medicinal purposes. Bioactive compounds contained in various plants plays an important role in the formation of new drug so that they can be used as a medicinal raw material. Bioactive compound includes secondary metabolites like alkaloids, flavonoids, terpenoids, and saponins, tannins, carbohydrates, glycosides, phytosterols, cardiac glycosides, phenolics, proteins, and many other compounds having their own physiological functions **[17, 18]**.

In the present investigation, preliminary screening of methanolic and chloroform tuber extract was conducted. The alkaloids, carbohydrates, phenols, terpenoids, tannins and steroids were present in both extracts. Proteins, flavonoids and cardiac glycosides were present in methanolic extract while absent in chloroform extract. Saponins, glycosides and fixed oils were absent in both extracts. These results suggest that tubers of *Actinoscirpus grossus var. kaysoor* (Roxb.) Noltie contains many important phytonutrients that could be used in the nutraceutical and pharmacological industries in future. Prominent results were obtained in methanolic extract so we used methanolic tuber extract for further experiments. The preliminary phyto-

chemical analysis conducted by Ganapathi and his co- workers revealed similar results, as secondary metabolites like carbohydrates, coumarins, flavonoids, steroids, tannin, and terpenoid were present in the tuber of *Actinoscirpus grossus var. kaysoor* which may help in the hepatoprotective activity **[19]**. Comparable results were also obtained in another study conducted by noval and co-workers. The results indicate presence of flavonoids, tannins, saponins, phenolics, steroids and terpenoids in the methanolic extracts of *Actinoscirpus grossus var. kaysoor* **[20]**. Achmad performed the tests for chemical characterization in ethanol extract of *Scirpus grossus* and found positive results for flavonoids, tannins, glycosides, steroids, and terpenoids, and negative for alkaloids **[21]**. Subedi and co-workers performed the phytochemical screening of methanolic root extract of *Scirpus kaysoor*, and results indicated the presence of flavonoids, alkaloids and tannins **[22]**. Quantitative analysis of phytocomponents of *Scirpus articulates* revealed alkaloids, 0.0265 g/100 g DM, and saponins 0.808 g/100 g DM **[23]**. Schultes and Raffaud observed the presence of metabolites like coumarins, flavonoids, terpenes, and steroids in the Cyperus species like *Cyperus articulates* and *Cyperus rotundus* **[24]**.

Plant derived phytocomponents including flavonoids, polyphenols, unsaturated fatty acids, glycosides, tannins, saponins and alkaloids shows many biological activities important in therapeutical studies. Many chemical compounds including hydroxy citric acid, garcinol, ginkgo alkaloids, and flavonoid were effective for liver diseases like hepatitis, liver cirrhosis and toxin induced liver dysfunctions **[25-30]**. Ganapathi reported that ethanolic tuber extract of *Actinoscirpus grossus* showed protective effects in ethanol induced hepatotoxicity **[31]**.

According to many scientific reports, phytocomponents were solely responsible for the potential antioxidant and anti–inflammatory and hepatoprotective activities of the plants, especially phenols and flavonoids that have anti-inflammatory, antihepatotoxic, antitumor, antioxidant and anti-bacterial properties **[21]**. Phenols are the most essential components of plants. The scavenging capacity of phenolic hydroxyl groups shows a linear relationship between total phenol and anti-oxidant activity of plant species. The flavonoid content of medicinal plants is also equally responsible for their antioxidant potential, as it can scavenge various oxidizing agents **[32, 33]**. The results of the present investigation indicated the presence of higher total phenol and flavonoid content i.e., 398 ± 7.264 mg GAE/g of sample and 20.96 ± 2.863 mg QE/g of sample respectively, which is in accordance with

many studies. Phenol content obtained in present investigation was much higher than previously reported studies. The study conducted by Bhardwaj and co-workers reported prominent amount of total phenol (26.673 mg GAE/100 mg and flavonoid (9.568 µg CE/100 mg) content in *Scirpus articulates* **[23]**. The other investigation reported significant phenol content in ethanolic extract of *Scirpus Validus* (6.7 ± 2.0 GAE/g extract) **[34]**.

DPPH free radical scavenging assay is widely used and popular method to determine the antioxidant activity of plant extract, as it is simple, easy, rapid, sensitive and reproducible procedure **[35, 36]**. In the present research, antioxidant potential of tubers of *Actinoscirpus grossus var. kaysoor* (Roxb.) Noltie was assessed with DPPH assay. The results showed IC_{50} value of standard and methanolic tuber sample was **133.63 ± 0.41 µg/ml** and **305.24 ± 0.30 µg/ml** respectively. Lower the IC_{50} value of compound indicates stronger antioxidant potential. In present study, we have found the IC_{50} value of sample very close to the standard, indicating stronger radical scavenging ability of the plant. The reports on significant antioxidant potential of *Actinoscirpus grossus var. kaysoor* (Roxb.) Noltie are not yet much available. Further detailed in-vitro and in-vivo research of the plant is needed to explore its therapeutical and pharmaceutical actions.

CONCLUSION

Ethnobotanical plant *Actinoscirpus grossus var. kysoor* (Roxb.) Noltieis traditionally used by people to cure many chronic diseases, especially liver diseases, as this plant is rich in phytonutrients. The tuber of plant is used as a folk remedy in liver tonic. The main objective of this research is preliminary screening of phytochemicals, qualitative and quantitative estimation of phytonutrients present in plant-like phenolic compounds, flavonoids and analysis of the antioxidant potential of tuber extract of *Actinoscirpus grossus var. kysoor* (Roxb.) Noltie. Methanolic tuber extract showed presence of phenolics, flavonoids, carbohydrate, terpenoids, and steroids. The study confirmed the presence of phytonutrients that play important role in clinical and pharmacological properties and found remarkable amount of phenol and flavonoid content. This study has also revealed the good antioxidant activity of the plant, and the higher antioxidant potential of medicinal plant represents a sign of wealthy plant. The plant is proven to be a good source for the preparation of drugs from its extract which can be very beneficial for advancement in medicine. The conventional study of this plant will be needed to enhance the knowledge of ethnobotany, also the extraction, purification, isolation and characterization of phytoconstituents will be important to

know its active constituent. Advance research is encouraged to understand the mechanism of plant's biological activities and provision of value for future studies.

DECLARATION

Author Contribution: The first, second and third author made equal contribution to this paper. Roshnika Vasava and Krishnaben Desai performed the practical work, literature search and drafting of manuscript, while Nainesh Modi read the manuscript thoroughly, gave appropriate comments, and gave final approval.

Conflicts of Interest: The authors declare no conflict of interest.

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