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Evaluation of phytochemicals and *in vitro* biological activities of *Semecarpus kurzii* leaf extract

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ABSTRACT

The aim of the present investigation qualitative and quantitative plant secondary metabolites, *in vitro* antioxidant activity and anti-inflammatory activity were analyzed with four different solvent extraction (Aqueous, chloroform, ethanol & hexane) of *Semecarpus kurzii* leaf extract. The studies were done by standard procedure. Totally twelve phytocompounds viz., alkaloids, aminoacids, coumarins, flavonoids, glycosides, phenols, phlobatannins, quinines, saponins, steroids, tannins, terpenoids and triterpenoids were examined. Phenol and saponin present in above mentioned four solvents and alkaloids are strongly present in ethanol extract. Aqueous and ethanol extract recorded in maximum phytocompounds than compared to other extract. In the Phytochemical constituent of 300 µg/100 ml concentrations recorded in maximum antioxidant and anti-inflammatory activity in both solvents and compared with standard.

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INTRODUCTION

Plants were producing many phytochemical constituents that protect against insects, pathogens and herbivores (Taiz and Zeiger, 2002). These phytocompounds act as different biological activities and shield human beings against various diseases (Ghasemzadeh *et al.*, 2015; Khan *et al.*, 2020). According to WHO (World Health Organization), eighty percent of people rely on indigenous plant-based medicines for curing different diseases (WHO, 1993). Phytochemical is a natural biocompounds found in all parts of plants, such as vegetables, fruits, medicinal plants etc., that work with nutrients and fibers to act as a defense system to protect the body against diseases, slow the aging process and reduce the risk of many diseases such as cancer, heart disease, stroke, high blood pressure (Igwenyi *et al.*, 2011). According to their functions phytochemicals are divided into two groups, which are primary and secondary metabolites.

Primary constituents were sugars, amino acids, proteins and chlorophyll while secondary constituents consists of alkaloids, terpenoids, saponin, flavonoids, tannins and phenolic compounds (Krishnaiah *et al.*, 2009). The medicinal values of plants lies in these bioactive phytochemical constituents that produce definite physiological action on the human body (Akinmoladun *et al.*, 2007).

Inflammation, a fundamental protective response, can be harmful in conditions such as life threatening hyper-sensitive reactions to insect bite, drugs and toxins and in chronic diseases such as rheumatic arthritis, lung fibrosis and cancer. Inflammatory response is brought about or mediated by inflammatory mediators such as chemokines, cytokines, cell adhesion molecules, extracellular matrix proteins (Simon *et al.*, 2000) which when in excess are deleterious (Liu and Hong, 2002). Inflammation is a complex pathophysiologic response of vascularised tissue to injury arising from various stimuli including thermal, chemical or physical damage, ischemia, infectious agents, antigen-antibody interactions and other biologic processes (Clark, 2002).

Semecarpus kurzii also known as Bara Bhilawa, it is an endemic medicinal plant of the Andaman and Nicobar Islands. Local tribes use this leaves in traditional medicine for its anti-inflammatory, pain-relieving, and anti-tumor properties. The plant has economic and industrial uses, including the production of marking ink and its use in the oleo chemical industry, while its sweet accessory fruit is edible. The leaves are also used for treating malarial fever and as an anthelmintic agent. The resin of this tree was used for curing skin allergic infections.

MATERIALS AND METHODS

Plant material collection

The leaves of *Semecarpus kurzii* was collected from several tropical rainforest areas in the Andaman Islands.

Preparation of extract

S. kurzii leaves samples were dried in shadow sunlight and powdered in electrical machine. Fifty gram of powdered *S. kurzii* leaf was extracted for 72 hrs with different solvents aqueous, chloroform, ethanol and hexane in a Soxhlet extractor. Whatman filter paper No. 1 was used to filter the extract. A vacuum rotary evaporator (40–45°C) was used to evaporate the filtrate (Jayakar *et al.*, 2020).

Qualitative phytochemical analysis of different parts *Semecarous kurzii*

Test for aminoacids

One ml of *S. kurzii* leaf extract taken in a test tube, add few drops of ninhydrin reagent and vortex the contents. Place the test tube in a boiling water bath for 5 minutes and cool at room temperature. Blue color formation observes presence of aminoacid (Harbone, 1989).

Test for alkaloids

Three ml of *S. kurzii* leaf extract was stirred with 3 ml of 1% HCl on steam bath. Few drops of Dragendorff's reagent were added in one tube and occurrence of

orange red precipitated was taken as positive test for presence of alkaloids (Harbone, 1989).

Test for coumarins

A few drops of ammonia were added on a filter paper. To this, a drop of *S. kurzii* leaf extract was added and fluorescence was observed. This indicates the presence of coumarins (Harbone, 1989).

Test for flavonoids

About five ml of the diluted ammonia solution was added to the filtrate followed by the addition of concentrated sulphuric acid. Appearance of yellow color showed the presence of flavonoids (Harbone, 1989).

Test for glycosides

About 4 mL of leaf extract of *S. kurzii* was dried to till 2 mL and added 1-2 mL of Ammonium hydroxide and shaken well. The appearance of cherish red color indicated due to the presence of glycosides (Harbone, 1989).

Test for phenol

Distilled water (2ml) and few drops of 10% ferric chloride were added to 5ml of the plant extract. Formation of blue or green color indicates the presence of phenols (Harbone, 1989).

Test for phlobatannins

Take 2 ml of conc. sulfuric acid to an *S. kurzii* leaf extract. The formation of red color, particularly at the junction between the layers, indicates the presence of phlobatannins (Harbone, 1989).

Test for quinone

About 1ml of the *S. kurzii* leaf extracts was mixed with concentrated sulphuric acid. The appearance of the colour formation signified that quinone was present (Harbone, 1989).

Test for saponins

About 2 gm of the powdered samples was boiled in 20 ml of distilled water in a water-bath and filtered. The filtrate was mixed with 5 ml of distilled water and shaken vigorously for a stable persistent broth. The broth was mixed with 3 drops of olive oil and shaken vigorously. Formation of emulsion showed the presence of saponins (Harbone, 1989).

Test for steroids

Two ml of acetic anhydride was added to 0.5 ml of *S. kurzii* leaf extract followed by two ml sulphuric acid. The colour changes from violet to green are an indication for the presence of steroids (Harbone, 1989).

Test for tannins

About 0.5 gm of dried powdered was boiled in 20 ml of water in a test tube and then filtered. A few drops of 0.1% Ferric chloride were added to the filtrate. Appearances of brownish green colour indicate the presence of tannins (Harbone, 1989).

Test for terpenoids

Five ml of the *S. kurzii* leaf extract was mixed with 2 ml of chloroform and 3 ml of concentrated sulphuric acid. Formation of reddish brown color at the interface indicates the presence of terpenoids (Harbone, 1989).

Test for triterpenoids

A volume of 1ml of Libermann-Buchard Reagent was added in 1.5 ml plant test samples. Triterpenoids were determined by the appearance of bluish-green color in the test samples (Harbone, 1989).

Quantitative phytochemcial analysis of *S. kurzii* leaf

Alkaloids

Five gram of the sample was weighted into a 250 ml beaker. 200 ml of 10% acetic acid in ethanol was added and allowed to stand for 4 hours (Harborne, 1998). This was filtered and extract was concentrated on a water-bath to one quarter of the original volume. Concentrated ammonium hydroxide was added drop by drop to the extract to get precipitation. The whole solution was allowed to settle down and the precipitate was collected and washed with diluted ammonium hydroxide and filtered. The residue was

may be alkaloid that was dried and weighed. From this alkaloid content was determined.

Alkaloids Content (%) = B - A × 100 / S
Where, B = Weight of Whatmann filter paper.
A = Weight of Whatmann filter paper, after drying.
S = Sample weight.

Aminoacids

Pipette out 1ml of *S. kurzii* leaf extract and now added 1ml of ninhydrin reagent to all the test tubes. Mix the contents of the tubes by vortexing /shaking the tubes. Put a few marble chips in each tube. Cover the mouth of the tubes with aluminium foil. Place all the test tubes in boiling water bath for 15 minutes. Cool the test tubes in cold water and add 1ml of ethanol to each test tube and mix well. Now record the absorbance at 570 nm of each solution using a colorimeter (Meyer, 1957).

Coumarins

The Aluminum Chloride ($AlCl_3$) colorimetric method for quantifying coumarins is based on the principle that coumarins form a complex with $AlCl_3$, which exhibits maximum absorbance at around 415 nm. In this method, a 2% $AlCl_3$ solution in ethanol is used as the reagent, and a known coumarin standard is employed to prepare a calibration curve. The procedure involves mixing the plant extract with the $AlCl_3$ solution and allowing the mixture to incubate at room temperature for 10–15 minutes to ensure complete complex formation. After incubation, the absorbance of the solution is measured at 415 nm, and the coumarin content in the sample is determined by comparison with the standard curve, providing a simple and effective means for quantitative analysis of coumarins in plant extracts (Sethna and Shah, 1945).

Flavonoids

About 100 mg of tannic acid was dissolved in distilled water and the volume was made up to 100 ml. Different concentrations of the standard was obtained by appropriate dilution with distilled water, read at 510 nm and the values were plotted to made standard graph. In a test tube, 0.5 ml of *S. kurzii* leaf extract of sample was diluted with 3.5 ml of distilled water at zero time. 0.3 ml of 5% sodium nitrate was added to the tube. After five minutes, 0.3 ml of 10% aluminium chloride was added. Then 2 ml of 1M sodium hydroxide was added to the mixture. Immediately, the content of the reaction mixture was diluted with 2.4 ml of distilled water and mixed thoroughly. Tannic acid was used as standard compound for quantification of total flavonoids as mg / 100g of edible portion (Min and Chun, 2005).

Glycosides

10 gram of dried plant powder was extracted with 250 ml methyl alcohol in soxhlet extractor. Another wash was also carried out with same solvent, filtered and Alcoholic extract was then treated with lead acetate solution to precipitate tannins, proteins, coloring matter and other non-glycosidal parts. The precipitate formed was filtered and to the filtrate H_2S gas (HCl + ferrous sulphide) was passed to precipitate excess lead as lead sulphide and removed by filtration and Filtrate was evaporated to dryness on water bath. The residue was dried, collected and weighed to get total glycoside content (Solich *et al.*, 1992).

Phenolic compounds

The 0.5 ml/g of extract was taken in test tubes. Eight ml of distilled water and 0.5 ml of Folin's Ciocalteau reagent were added to all tubes. The tubes were kept in BOD incubator at 40°C for 10 minutes. Then, 1 ml of sodium carbonate solution was added and the tubes were kept in dark for incubation for an hour. The colour development was read specrophotometrically at 660 nm. Standard graph was drawn using tannic acid as standard (Ainsworth *et al.*, 2007).

Phlobatannins

The plant extract is treated with 1% hydrochloric acid and then boiled for about 5–10 minutes. The development of a red precipitate indicates the presence of phlobatannins, and the intensity of the coloration or precipitate can be compared against a standard tannin curve (usually prepared with

catechin or tannic acid as reference). For more precise quantification, the absorbance of the solution can be read at 470–500 nm using a spectrophotometer, and the concentration is calculated relative to the standard (Madike *et al.*, 2017).

Saponins

About one ml of test samples were mixed with 80% methanol in 2ml, then add 2ml of 72% sulphuric acid solution was added, mixed well and heated on a water bath at 60°C for 10 minutes, absorbance was measured at 544 nm against reagent blank. Diosgenin is used as a standard material and compared the assay with Diosgenin (concentration 20 µg) equivalents. The results were expressed as mg/100g of saponin content, calculated using the following equation (Trease and Evans, 1989).

Steroids

About one ml of extract of different solvents acetone, ethanol was transferred into 10 ml volumetric flasks. Sulphuric acid (4N, 2ml) and iron (III) chloride (0.5% w/v, 2 ml), were added, followed by potassium hexacyanoferrate (III) solution (0.5% w/v, 0.5 ml). The mixture was heated in a water-bath maintained at 70±20°C for 30minutes with occasional shaking and made up to the mark with distilled water. The absorbance was measured at 780 nm against the reagent blank. β-Estradiol is used as a standard material and compared the assay with β-Estradiol (concentration 20 µg) equivalents (Chanwitheesuk *et al.*, 2005).

Tannins

Powdered sample weight 0.5 gm was transferred to 250 ml conical flask and 75 ml water was added. The flask was heated gently and boiled for 30 min. The samples run at 2,000 rpm for 20 min. The supernatant was collected in 100 ml volumetric flask and made up the volume. One ml of the sample was added to 100 ml volumetric flask containing 75 ml water. 5 ml of folins reagent and 10 ml of sodium carbonate solution was added and diluted to 100 ml with water. The mixture was shaking well. Absorbance was read at 700 nm after 30 min (Fagbemi *et al.*, 2005).

Terpenoids

The different plant extracts was extracted with 10mL of petroleum ether using separating funnel. The ether extract was separated in pre-weighed glass vials and waited for its complete drying (wf). Ether was evaporated and the yield (%) of total terpenoids contents was measured by the formula (wi-wf/wi×100) (Indumathi *et al.*, 2014).

Triterpenoids

A quantitative assay for triterpenoids uses the vanillin–perchloric acid colorimetric reaction: triterpenoids in an extract react with vanillin (in glacial acetic acid) in the presence of perchloric acid to give a pink–red chromogen. Prepare your plant extract in methanol or ethanol, take a measured aliquot, add an equal volume of 5% vanillin in glacial acetic acid, then carefully add perchloric acid, incubate the mixture in a 60 °C water bath for 10–15 minutes, cool to room temperature and measure absorbance against a reagent blank at 548–550 nm. Construct a standard curve using a known triterpenoid standard (e.g., ursolic or oleanolic acid) processed the same way, and calculate total triterpenoid content from the curve (expressed as mg standard equivalents per g sample). Handle perchloric acid and heated reagents with appropriate PPE and in a fume hood (Hiai *et al.*, 1976).

Antioxidant activity of *S. kurzii*

DPPH assay

The DPPH (2, 2-diphenyl-1- picrylhydrazyl) is a stable free radical, due to the delocalization of the spare electron on the whole molecule. Thus, DPPH does not dimerize, as happens with most free radicals. A solution of 0.1 mM DPPH in methanol was prepared and 2.4 mL of this solution was mixed with 1.6 mL of different plant extracts at different concentrations (100-500 µg/ml) (Brand *et al.*, 1995).

The reaction mixture was vortexes thoroughly and left in the dark at RT for 30 min. The absorbance of the

mixture was measured spectrophotometrically at 517 nm. Ascorbic acid was used as reference. Percentage DPPH radical scavenging activity was calculated by the following equation:

% DPPH radical scavenging activity = {(A0– A1)/A0} × 100%

Where A_0 is the absorbance of the control, and A_1 is the absorbance of the extractives/standard.

Then % of inhibition was plotted against concentration, and from the graph. The experiment was repeated three times at each concentration.

Hydrogen peroxide scavenging (H_2O_2) assay

The ability of the aqueous and methanol extracts to scavenge hydrogen peroxide was determined according to the method of solution of hydrogen peroxide (40 mm) was prepared in phosphate buffer (pH 7.4). Different concentrations of extract of *S. kurzii* leaf extract (100, 200, 300, 400 and 500 µg/mL) were chosen for *in-vitro* antioxidant activity. Ascorbic acid was used as the standard. The different concentrations were added to a hydrogen peroxide solution (0.6 mL, 40mM). Absorbance of peroxide at 230 nm decided ten minutes later against a blank answer containing the phosphate buffer while not peroxide. The percentage of hydrogen peroxide scavenging of *S. kurzii* leaf extracts and standard compounds were calculated (Zhu *et al.*, 2025).

% Scavenged $[H_2O_2]$ = [(AC – AS)/AC] × 100

Anti-inflammatory activity

This Bovine serum albumin suspension was used for the estimation of anti-inflammatory property. BSA solution (0.4%, w/v) was prepared in Tris Buffered Saline (one tablet is dissolved in 15 mL of deionized water to yield 0.05M Tris and 0.15M sodium chloride, pH 7.6 at 25° C) (Williams *et al.*, 2008).

The pH was adjusted to 6.4 with glacial acetic acid. Respective aliquots of 100 – 500 µg/ml concentration of different extract of *S. kurzii* were added to test tubes containing 1 mL of 0.4%, w/v BSA buffer solution. Both negative and positive (Diclofenac Sodium) controls were assayed in a similar manner. The solutions were then heated in a water bath for 10 minutes and cooled for 20 minutes under laboratory conditions. The turbidity of the solutions (level of protein precipitation) was measured at 660 nm in a Hach Spectrophotometer against blank.

$$\% \text{ Percentage inhibition} = \frac{100 - \text{Optical Density of sample}}{\text{Optical Density of Control suspension}} \times 100$$

Statistical analysis

All the tests were done in 3 replicates. The data was determined as an average of 3 experiments (n=3) and calculated mean ± standard deviation (SD) using Microsoft Excel (Dewan *et al.*, 2025).

RESULTS AND DISCUSSION

In the present study to analyze the qualitative phytochemical compounds are *S. kurzii* leaf extract with different solvents viz., aqueous, chloroform, ethanol and hexane. Totally twelve phytocompounds such as alkaloids, aminoacids, coumarins, flavonoids, glycosides, phenols, phlobatannins, quinines, saponins, steroids, tannins, terpenoids and triterpenoids were analyzed.

All the four solvent leaves extract of *S. kurzii* contain phenol and saponin are present. Alkaloids are strongly present in ethanol leaf extract of *S. kurzii*. Absence of flavonoid, quinones, tannins and triterpenoids in aqueous extract, alkaloids, coumarins, flavonoids, glycosides, quinones and tannins in chloroform extract, coumarins, glycosides, terpenoids and triterpenoids in ethanol extract and alkaloids, aminoacids, glycosides, phlobatannins, quinones, steroids and tannins in hexane leaf extract of *S. kurzii* recorded respectively (Table 1). The presence of flavonoids in the leaf of *Senna* could account for its use as an anti-inflammatory agent (Ekwueme *et al.*, 2011).

Important biological activities such as antioxidant, anti-inflammatory, antibacterial and antimicrobial activities are known to exist in terpenoids, phenols, flavonoids, saponins, tannins and alkaloids (Kabir *et al.*, 2020).

Table 1. Qualitative phytochemical analysis of *Semecarpus kurzii* leaves with different solvents

Name of the phytochemical compounds	Aqueous	Chloroform	Ethanol	Hexane
Alkaloids	+	-	++	-
Amino acids	+	+	+	-
Coumarins	+	-	-	+
Flavonoids	-	-	+	+
Glycosides	+	-	-	-
Phenols	+	+	+	+
Phlobatannins	+	+	+	-
Quinones	-	-	+	-
Saponins	+	+	+	+
Steroids	+	+	+	-
Tannins	-	-	+	-
Terpenoids	+	+	-	+
Triterpenoids	-	+	-	+

(+) – Present; (++) – Strongly Present; (-) – Absent

In the present investigation to analyze quantitatively in secondary metabolites in aqueous extract of *S. kurzii* was 04.88±0.92, 07.52±1.02, 04.21±0.87, 03.66±0.25, 05.32±0.58, 01.41±0.27, 04.22±0.48, 02.28±0.11, 01.23±0.85 µg/100mg of alkaloids, aminoacids, coumarins, glycosides, phenol, phlobatannins, saponin, steroids and terpenoids recorded correspondingly. Similarly chloroform leaf extract of *S. kurzii* obtained results was 0.532±0.87 µg/100 mg in alkaloids, 06.54±0.21 µg/100 mg in phenols, 01.87±0.54 µg/100 mg in phlobatannins, 04.95±0.87 µg/100 mg in saponin, 01.58±0.35 µg/100 mg in steroids, 01.87±0.36 µg/100 mg in terpenoids and 01.23±0.58 µg/100 mg in triterpenoids recorded (Table 2). Tannins are act as immuno stimulating activities (Priyanka, 2020), Zemali *et al.* (2013) have studied the phytochemicals of *Solanum nigrum* and also confirmed the presence of alkaloids, saponins, tannins, glycosides, coumarins, terpenoids, flavonoids and volatile oils.

According to this result, ethanol leaf extract of *S. kurzii* exhibited the quantity of phytocompounds are alkaloids (06.95±0.38 µg/100 mg), aminoacids (09.34±0.74 µg/100 mg), flavonoids (12.24±1.21 µg/100 mg), phenols (05.87±0.69 µg/100 mg), phlobatannins (01.59±0.36 µg/100 mg), quinines (02.41±0.99 µg/100 mg), saponins (05.11±0.62 µg/100 mg), steroids (02.38±0.87 µg/100 mg) and tannins (02.64±0.34 µg/100 mg) tabulated01.96±0.52.

Table 2. Quantitative phytochemical analysis of *S. kurzii* leaves with different solvents

Name of the phytochemical compounds	Quantity (µg/100mg)			
	Aqueous	Chloroform	Ethanol	Hexane
Alkaloids	04.88±0.92	05.32±0.87	06.95±0.38	-
Amino acids	07.52±1.02	-	09.34±0.74	-
Coumarins	04.21±0.87	-	-	04.32±0.63
Flavonoids	-	-	12.24±1.21	09.98±057
Glycosides	03.66±0.25	-	-	-
Phenols	05.32±0.58	06.54±0.21	05.87±0.69	05.11±0.85
Phlobatannins	01.41±0.27	01.87±0.54	01.59±0.36	-
Quinones	-	-	02.41±0.99	-
Saponins	04.22±0.48	04.95±0.87	05.11±0.62	05.07±0.18
Steroids	02.28±0.11	01.58±0.35	02.38±0.87	02.14±0.00
Tannins	-	-	02.64±0.34	-
Terpenoids	01.23±0.85	01.87±0.36	-	01.96±0.52
Triterpenoids	-	01.23±0.58	-	01.58±0.99

These values are expressed with standard deviation ± error

Hexane leaf extract contains coumarins, flavonoids, phenols, saponin, steroids, terpenoids and triterpenoids as 04.32±0.63, 09.98±057, 05.11±0.85, 05.07±0.18, 02.14±0.00, 01.96±0.52 and 01.58±0.99 µg/100 mg respectively. The four solvent extractions the better results observed in aqueous and ethanol solvents and these solvents are harmless to human health (Table 2).

Saponins are either triterpenoid or steroidal glycosides confirmed as important phytoconstituent with different pharmacological activities such as

antiallergic, antiphlogostic, cytotoxic, antitumour, antiviral, immunomodulating, antihepatotoxic, molluscicidal and antifungal effects.

There is evidence of the presence of saponins in traditional medicine preparations, where oral administrations might be expected to lead to hydrolysis of glycosides from terpenoids (and obviation of any toxicity associated with the intact molecule) (Musa *et al.*, 2011). The saponin content of Senna also might be responsible for its antinflammatory properties (Ekwueme *et al.*, 2011).

Table 3. Antioxidant activity of *S. kurzii* by different methods

Different concentration (µg/100ml)	Percentage of activity (%)					
	DPPH assay			Reducing power assay		
	Standard (Vitamin C)	Aqueous	Ethanol	Standard (Ascorbic acid)	Aqueous	Ethanol
100	25.01±0.03	17.52±0.99	18.58±0.17	27.15±0.10	20.54±1.02	21.53±0.57
200	25.24±0.04	18.67±0.23	19.63±0.25	27.17±0.10	21.17±0.68	22.69±0.32
300	26.66±0.05	19.21±0.85	21.03±0.46	28.18±0.11	23.68±0.14	22.99±0.03
400	27.87±0.09	18.34±0.52	19.67±0.89	29.23±0.13	22.44±0.78	20.35±0.99
500	27.98±0.10	18.01±0.00	18.64±0.25	29.55±0.15	19.79±1.58	18.21±0.54

These values are expressed with standard deviation ± error

In the current study the antioxidant potential of leaf extract was investigated using DPPH and reducing power assay method with different concentrations. The maximum results recorded in reducing power assay than compared to DPPH. Aqueous leaf extract showed 20.54±1.02, 21.17±0.68, 23.68±0.14, 22.44±0.78, 19.79±1.58 % of activity in 100, 200, 300, 400 and 500 µg/100 ml and ethanol extract was 21.53±0.57, 22.69±0.32, 22.99±0.03, 20.35±0.99, 18.21±0.54% of activity in 100, 200, 300, 400 and 500 µg/100 ml than compared to standard Ascorbic acid. In DPPH assay maximum percentage of activity recorded in ethanol leaf extract (18.58±0.17, 19.63±0.25, 21.03±0.46, 19.67±0.89 and 18.64±0.25 % in 100, 200, 300, 400 and 500 µg/100 ml) than compared to aqueous extract and std. Vitamin C (Table 3). Evidently, they reported in extract (20–320 µg/mL) and standard can scavenge free radicals, there was a decrease in the amount of DPPH radicals as the concentration of the extract increased (Sonali *et al.,* 2023). The nuts of *Semecarpus anacardium* were the subject of a comparable investigation on antioxidant activity (Ali *et al.*, 2015).

According to this study experienced in anti-inflammatory activity estimated in aqueous and ethanol leaf extract of *S. kurzii* with standard Diclofenac sodium enlisted in Table 4. The ethanol leaf extract of *S. kurzii* contain 21.34±0.65, 22.04±0.87, 23.15±0.96, 22.01±0.34 and 20.26±0.11 percentage of activity in 100, 200, 300, 400 and 500 µg/100ml concentrations and aqueous extract was 20.05±0.15, 21.78±0.98, 22.26±0.45, 21.01±0.74 and 20.15±0.32 percentage of activity recorded in 100, 200, 300, 400 and 500 µg/100ml concentrations respectively.

Table 4. Anti-inflammatory activity of *S. kurzii* with different solvents

Concentration of sample (µg/100ml)	Percentage of activity (%)		
	Standard (Diclofenac sodium)	Aqueous	Ethanol
100	27.19±0.03	20.05±0.15	21.34±0.65
200	28.37±0.02	21.78±0.98	22.04±0.87
300	29.54±0.00	22.26±0.45	23.15±0.96
400	30.78±0.01	21.01±0.74	22.01±0.34
500	31.88±0.02	20.15±0.32	20.26±0.11

Inflammations are especially chronic inflammation, plays a significant role in the development and progression of many diseases (Eggleton *et al.*, 2008). Nowadays, many plant extracts have been widely studied for their potential in the treatment of inflammations (Jahangir *et al.*, 2022).

In agreed to treat anti-inflammatory activity are plant-derived secondary metabolites, such as phenols, terpenoids, flavonoids, saponins, and tannins (Kaymaz *et al.*, 2019; Otunola *et al.*, 2018).

CONCLUSION

Plants contain many secondary metabolites; these secondary metabolites produced more physiological function on the human immune system. To conclude, *S. kurzii* are traditional ethnomedicine in Andaman Nicobar Island and they are potential *in vitro* antioxidant and anti-inflammatory activity.

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