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PHYTOCHEMICAL SCREENING, ANTI-OXIDANT AND ANTI-INFLAMMATORY ACTIVITIES ON METHANOLIC EXTRACT OF TURKEY BERRY SEEDS (*SOLANUM TORVUM*)

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ABSTRACT

The goal of the current investigation was to identify, whether the *Solanum torvum* seeds have the potential medicinal property. As first step we done phytochemical analysis and identified almost 7 compounds further we analysed the extract of *Solanum torvum* seeds for Anti-Inflammatory and Anti-Oxidant activity. Both the assay showed effective activity while using higher concentration (100µg/ml) when compared to the lower concentrations. Finally, this study reveals that the higher concentration extract of *Solanum torvum* seeds have effective against the infections.

Keywords: *Solanum torvum* seeds, Phytochemical, Antioxidant, Antiinflammatory.

INTRODUCTION

Solanum torvum otherwise called turkey berry. It is commonly considered as a wild plant. *Solanum torvum* comprehensively utilize generally in Asia and Africa for its Medicinal properties for instance Anti-Ulcer and antimicrobial, antihypertensive, nephron production [1]. It is autochthonous and foraged naturalize in West Indies and Africa [2]. *Solanum torvom* have highly in antioxidant distinctive for leaves are typically used in traditional Cameroonian Medicine. A variety of compounds present in *Solanum torvum,* such as isoflavonoid Sulfate, steroidal glycosides, Chlorogenic and Neochlorogenone, derivates of triacontane, 22- O – Spirostanol oligoglycosides, and 26 –O- glucosidase, may have pharmacological effects [3]. The fruit is applied in the treatment of TB and enlarged liver and spleen [4]. It is thought to work as a hemopoietic agent in response to pain. This class includes alkaloids such as torvogenin and Solasodine. Torvanol and torvoside H are examples of flavonoids [5]. It is numerous pharmacological properties Includes those that are antioxidant and Anti - inflammatory, Anti-Diabetic are the subject of much research. For every 100 grams of turkey berry fruits there are 10.7 grams of carbohydrate, 0.4 g of fat, 3.4 g of protein, 4 g ascorbic acid and 390 mg of beta Carotene [6].

Solanum torvum is an excellent source of iron, Vitamins A and C. *Solanum torvum* contain Alkaloids which are found throughout the body, are abundant in it. Pharmaceuticals with strong and efficient and active Ingredients include Solidinine and other Steroids that are taken from the roots and leaves of this species [7]. It has several compounds that may have therapeutic activity, such as the steroid Sapogenin and Chlorogenin. Solasodine is a glycoalkaloid [8]. India employs dried leaf powder as a medication for diabetes patients since it is a liver tonic [9]. Raw fruits are utilized to boost the body's defences again Infection, and leaf juice is used to cool the body down because of its anti-microbial characteristics, which

control a range of microorganisms, the paste made from the leaves and fruit has been applied to heal wounds and scrapes in central America and India [10]. Numerous Conceivably for medicinal purposes active compounds such as triacontane derivatives, isoflavonoid sulphate and steroidal glycosides, chlorogenone and neochlorogenone, 22-b-O-spirostanol Oligoglycosides, and 26-O-b-glycosidase, can be discovered in *Solanum torvum* Shown the methyl caffeate that was separated from *Solanum torvum* fruit to have antibacterial and antimycobacterial properties,

Despite previous reports of the antibacterial activity of crude extracts of *Solanum torvum* leaves [11]. Nephro-defense on rats that were exposed to Doxorubicin (DOX) induced nephrotoxicity, the protective effect of *Solanum torvum* fruits was shown [12]. DOX causes the depletion of kidney cells in both people and rats through the production of a huge quantity of free radicals of the semiquinone type [13]. By raising mucus and neutralization of the acidic content, *Solanum torvum* flavonoid derivatives exhibit anti-ulcer effects [14]. A number of in-Vitro investigation have reported on *Solanum torvum* extracts as a promising source of Antimicrobial Agents [15]. Phenolic compounds have one or more Hydroxyl substitutions on the aromatic ring [16]. Caffeic acid esters, such as phenethyl and benzyl esters, have a specific preventive effect against cardiovascular disease [17].

Materials and Methods

TOXONOMICAL CLASSIFICATION

Kingdom : Plantae
Scientific Name: *Solanum torvum*
Family : *Solanaceae*
Division : *Spermatophyta*
Clade : *S.chrysotrichum*
Order : *Solanales*
Class : *Dicotyledonae*
Genus : *Solanum*
Species : *Solanum torvum Swartz*

GATHERING OF PLANT SPECIMENS

The seeds based on *Solanum torvum* stayed freshly gathered from Chandrapuram Village, Tirupattur District, Tamil Nadu. The *Solanum torvum* seeds are washed thoroughly with using distilled water and shade-dried at ambient temperature. The dried seeds are made using a blender, finely powder. Then a fine powder is put in storage properly with an airtight container bottle and used for further experiment.

EXTRACTION OF SAMPLE

The powder samples of *Solanum torvum* seeds remained extracted with 100ml of methanol 100ml of beyond using Soxhlet apparatus. The solvent continues concentrated employ rotatory evaporator and the sample extract was stored in 4˚C further use.

CHEMICALS

Methanol, DPPH, Ascorbic acid, Potassium chloride (KCL), Sodium chloride (NaCl), (Potassium dihydrogen KH2PO4), Disodium hydrogen phosphate (Na2HPO4) and BSA.

QUALITATIVE PHYTOCHMICAL ANALYSIS

The plant extract was tested for detecting various Phytochemicals present in the Methanol seed extract of *Solanum torvum* plant using the standard procedure [18].

TEST FOR CARBOHYDRATES:

a) Molisch's test:

Plant extract continued treated with a small amount of Alpha naphthol and added concentration sulphuric acid to a mixture in a slanting position. Observance of violet colour ring shows the existence of carbohydrates.

b) Benedict's test:

Benedict's reagent (0.5ml) was added to 0.5ml of sample extract, the mixture was left in a water bath for two minutes. Precipitate formation is a sign that Carbohydrates are present.

Test for tannins:

a) Ferric chloride test:

A tiny quantity of extract was warmed in a water bath after being combined with water. Filtration was done on the mixture. The filtrate has been diluted with five percent ferric chloride. It will form a dark green colour. It suggests that tannins are in existence.

b) Lead acetate test:

To the sample solution and 3ml of 10% lead acetate had been added. The presence of tannins is shown by the presence of tannins is shown by the formation of a large white precipitate.

Test for saponins:

2 ml of distilled water was added with the sample solution and shakes well. Formation of foams indicates the presence of saponins.

Test for alkaloids:

a) Mayer's test:

Mayer's reagent 2 drops are added to the sample solution. Alkaloids can be detected by the formation of a creamy white precipitate.

b) Wagner's test:

The sample extract had been mixed with a few drops of wager's reagent Alkaloids can be detected by the formation of a reddish-brown precipitate.

Test for Flavonoids

First, 1ml of 2N sodium hydroxide is has been added to the sample solution. Flavonoids are present when a yellow colour begins to form.

Test for Glycosides

10% ammonia and 3ml of chloroform are added to the sample solution. The development of a shade of pink colour signifies the existence of Glycosides.

Test for Quinones

The sample is treated with 1ml of concentrated sulphuric acid is added. Quinones are present when a red colour begins to form.

Test for Phenols:

The sample solution is treated with 4 drops of 10% ferric chloride. Phenols are present when a blue or green colour begins to form.

Test for Terpenoids:

When 2ml of chloroform are added to the sample solution and it is treated with strong sulphuric acid, terpenoids are present as evidenced by the formation of a reddish-brown colour.

Test for Steroids:

A small amount of concentrated sulphuric acid is slantly added to the sample solution. The presence of steroids is indicated by the appearance of brown rings.

***In- Vitro* Assessment of Anti-Inflammatory Activity Using BSA Denaturation Assay**

The anti-inflammatory properties of *Solanum torvum* Plant seed extract was utilizing inhibition of by denaturation technique. The reaction mixture 5 ml was composed of 2.0 ml of various test sample concentrations (10, 20, 30, 40, and 50µg/ml), 2.8 ml of phosphate buffer saline (PBS, PH 6.4), and 0.2 ml of BSA. 2.8ml of PBS (PH 6.4), and 2.0 ml of Diclofenac sodium at varying concentrations (10, 20, 30, 40, and 50 µg/ ml) will make up the positive control. The identical amount of BSA and PBS will be added to 2.0ml of distilled water in negative control samples. After 15 minutes of Incubation at 37˚C ± 2˚C, the mixture will be heated to 7˚C for 5 minutes in order to cause denaturation. Using the vehicle as a blank, the absorbance will be measured at 660nm once it has cooled. [19].

The formation will be used to determine the % inhibition of protein denaturation calculated using the formula

(%) Percentage Inhibition = Ac - At/Ac x100

Where it is the absorbance of the test and Ac is the absorbance of the control.

Analysis of Antioxidant Activity In-*vitro* Using DPPH radical scavenging assay

The scavenging free radical potential of methanolic based extract, DPPH is used to determine seed extract. 95% methanol was used to prepare the DPPH solution (0.006%w/v). Different concentration of the methanolic extract of *Solanum torvum* seed (10, 20, 30, 40, and 50 µg /ml) was prepared in methanol. 3 ml of different concentration of methanolic extract of *Solanum torvum* seed a 1 ml of DPPH solution was combined with seeds in the dark. Ascorbic acid, which is a strong antioxidizing agent are seen as standard, prepared in different concentrations using methanol (10, 20, 30, 40 and 50 µg/ml). In the dark, 1 ml of DPPH solution was combined with 3ml of varying concentration standard ascorbic acid solution. The prepare Ascorbic acid solution with samples of plant extracts were incubated for 30 minutes and then absorbance was measured using U.V. Spectrophotometer at 517 nm. Methanol is used in experiment as a blank. As the inhibition percentage of free radical by the sample and was calculated using following formula [20],

DPPH radical scavenging activity (%) = (Control OD- Sample OD) / Control OD x 100

RESULTS AND DISCUSSION

Methanolic extract of *Solanum torvum* Seeds: A Preliminary phytochemical Examination

The preliminary work of phytochemical in the methanolic extract of Solanum *torvum* seeds Analysis was performed. This study has shown that the plant sample composed of essential medicinal phytochemical compounds. The outcome the of the Analysis showed that methanolic extract of *Solanum torvum* seeds is shown as Carbohydrate, Tannins, Saponins, Flavonoids, Quinone, Terpenoid, Steroid is present in the phytochemical Analysis. The final results of phytochemical Preliminary activity was given as in Table 1 with ‘ +’ Symbol signifying presence of phytochemical compound and a ‘ - ’ signifying it’s absence. The results determined that many phytochemicals’ compounds were present in the *Solanum torvum* seeds. As the earlier report shown [21] *Solanum torvum* seeds contains the effective compounds.

Figure 1: Phytochemical Screening using methanolic extract of *Solanum torvum* Seeds

Table 1: The Preliminary Phytochemical Screening utilizing of Methanolic extract of *Solanum torvum* Seeds

S.NO	Phytochemical Constituents	Methanolic Extract of *Solanum torvum* Seeds
1	Carbohydrates	+
2	Alkaloids	-
3	Glycosides	-
4	Phenols	-
5	Flavonoids	+
6	Saponins	+
7	Steroids	+
8	Tannins	+
9	Terpenoids	+
10	Quinones	+

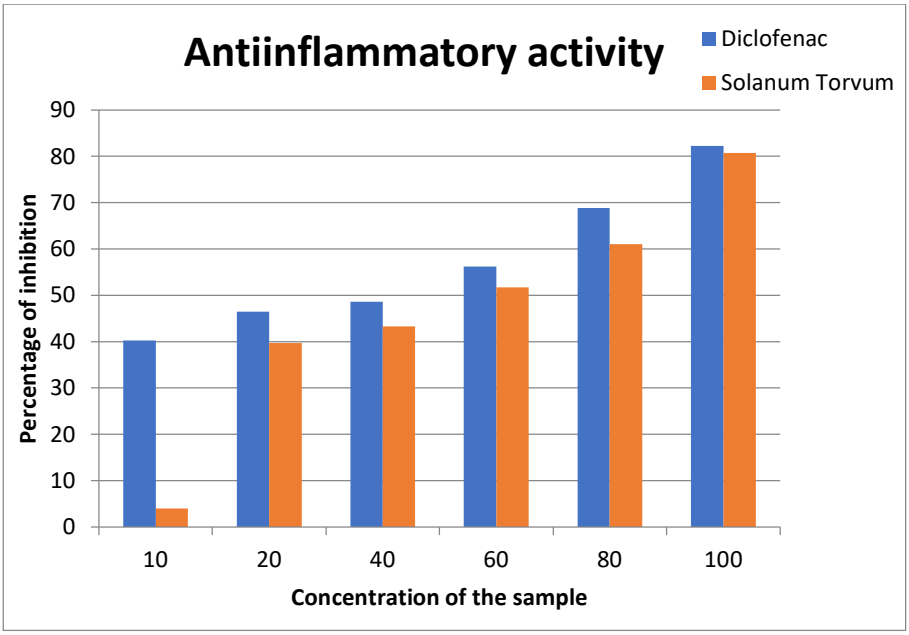
(+) Present, (-) Absent

***In Vitro* Anti-Inflammatory Activity of Methanolic extract of *Solanum torvum* Seeds Using BSA Denaturation Assay**

The Anti-Inflammatory activity stayed done by using BSA denaturation method. The diclofenac sodium was used as the standard for this assay, the *Solanum torvum* showed a gradual increase from Concentrations 10, 20, 40, 60, 80 & 100 µg /ml used. The greatest percentage of inhibition was (80.69) absorbed at 100 µg /ml concentration. This shows the maximum Concentration (100 µg/ml) *Solanum torvum* having the effective activity against the anti-Inflammation. As per literature review an effective way for *Solanum torvum* extract to deplete Inflammation is by suppression of its latter stages by inhibition of cyclo-oxygenase [22].

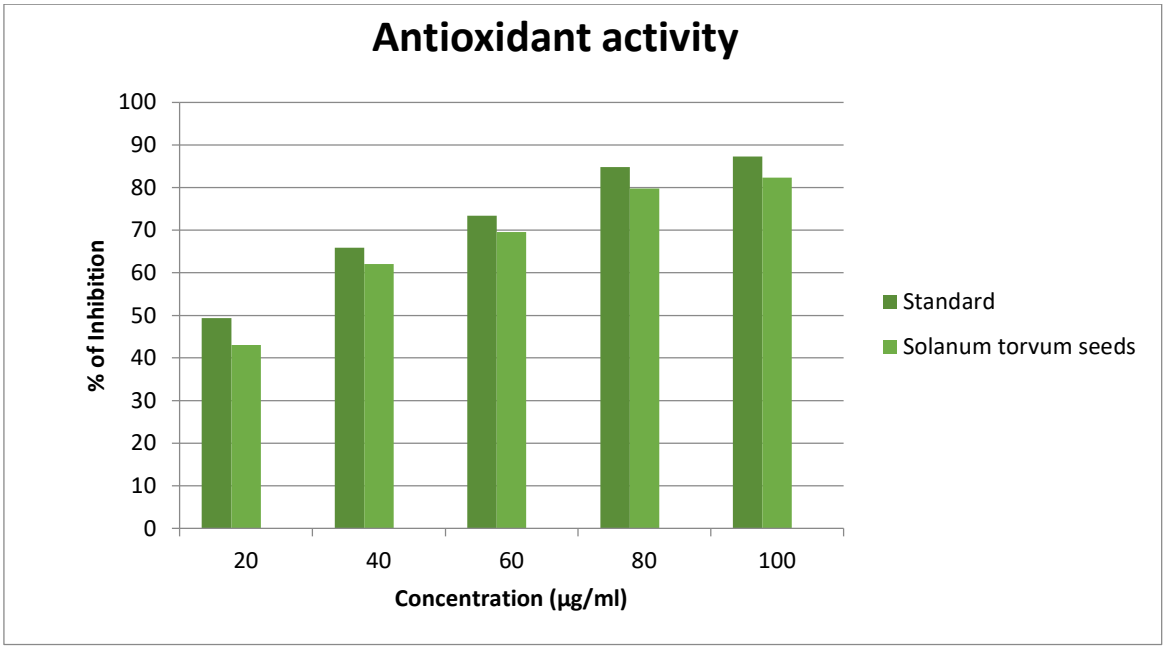
Table 2: *In Vitro* Anti-Inflammatory Activity of Methanolic extract of *Solanum torvum* Seeds Using BSA Denaturation Assay

Concentration in µg/ml	Percentage of inhibition (%)	
	Diclofenac sodium	*Solanum torvum*
10	40.29	4.01
20	46.42	39.71
40	48.60	43.32
60	56.16	51.69
80	68.83	61.03
100	82.18	80.69



***In Vitro* Anti-Oxidant Activity of Methanolic extract of *Solanum torvum* Seeds Using DPPH radical scavenging assay**

By employing the DPPH method, the antioxidant activity of the methanolic extract of *Solanum torvum* seeds is assessed. The result of *Solanum torvum* seeds showed a gradual increase in different concentrations. The extract of *Solanum torvum* seeds revealed a highest percentage of inhibition at 100 µg /ml. when compared to other concentration. As per the literature review, significant antioxidant activity has been observed in vitro in *Solanum torvum.* It is beneficial for lowering oxidative stress [23].



Conclusion

The overall study reveals that the methanolic extract of *Solanum torvum* seed be revealed positive for phytochemicals are Flavonoids, Saponins, Steroids, Tannins, Terpenoids and Quinones. Similarly, the results of *Solanum torvum* seed showed the potential activity against Anti-Oxidant, Anti-Inflammatory studies. The result was observed effectively at 100 µg/ml concentration of extracts. Therefore, the *Solanum torvum* seed having the strong medicines properties while using the higher concentration.

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