How to Cite:
Muraleedharan, A., Bupesh, G., Vasanth, S., & Balaji, K. (2022). Physicochemical, phytochemical and antioxidant efficacy of the medicinal plant Coccinia Grandis. *International Journal of Health Sciences*, *6*(S4), 7110–7122. https://doi.org/10.53730/ijhs.v6nS4.10151

Physicochemical, phytochemical and antioxidant efficacy of the medicinal plant Coccinia Grandis

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***Abstract*---**India contains seven thousand plant species. Plants are important for human health. (*Coccinia grandis)* is an edible food crop. (*Coccinia grandis*) (methanolic extract) alkaloids, flavonoids, cardiac glycosides, terpenoids, phenolics, proteins, carbohydrates, steroids and coumarins (phytochemical assay, physiochemical assay). Estimates were made using standard algorithms. The soxhlet extraction was used to extract the different extracts. This study reveals the presence of different types of phytochemicals, physicochemicals and antioxidants. (*Coccinia grandis*). The leaves of this plant contain excellent antioxidants. Methanolic and Ethanolic extract were used (plant leaf) for the Antioxidant assays (DPTH, Hydrogen peroxide scavenging activity, FRAP assay and Total Antioxidant capacity assay). Antioxidants are very important, especially when getting rid of disease. (Louis 1989). Plant phytochemicals have protective functions (immunization). (*Coccinia* grandis). Extracts made from plant materials. It contains phenolics. It destroys the antioxidant breakdown of lipids. This increases the nutritional value of the food and the quality of the food. This study

was done to reveal the medicinal properties and value of medicinal plants. Our study is important for foundation research and future pharmaceutical research.

Keywords---antioxidants, Coccinia grandis, medicinal properties. phytochemical, physiochemical,

Introduction

The WHO record shows that 80% of developing countries use more herbal medicine for basic health problems[1,2] (*Coccinia grandis)* Pumpkin family. This is trivial found in tropical areas. Medicinal plants are widely used to cure diseases in rural areas. India contains seven thousand plant species. Plants are important for human health. (*Coccinia grandis)* is an edible food crop. (*Coccinia grandis)* grows fast and is a perennial plant. It has alternative leaves. The lower part of the plant is hairy. (*Coccinia grandis)* The plant is native to East Africa [3,4]. History shows that people used plants as medicine. 248,000 identified plants. 12,000 plants found clinical value. Natural medicinal plants are very important for human health. Economically plant use has increased. The Himalayas are rich in medicinal plants. These plants are rich in medicinal properties. (WHO) helps identify plants and supply safe medicines to countries. Liver damage occurs during lipid peroxidation. Scavenging activity captures antioxidant free radicals. Polyphenolic compounds have antioxidant and biological effects on activity [1,5–8]. In the presenty study the Physicochemical, Phytochemical and Antioxidant efficacy of the medicinal plant *COCCINIA GRANDIS* were studied.

Materials and Methods

Collection of Plant

Coccinia grandis (Cg) were Collected from Sulthan Bathery (Wayanad district, Kerala, India) and authendicated from Thomas Arts and science College, (Dr. anto PV, professor, Department of botany) Thrissur.

Preparation of Plant Leaf Powder

The leaf of Cg was shade dried. (Pratap et al.,). Then it Powdered using electric blender.

Soxhlet Extraction

The powder was made using an electric blender. Powder extracted using a soxhlet tool with methanol and ethanol (both individually) solution. Once the extraction was complete, Rotovac tools were used to remove excess solvent from the extract. The final extract Cg (*Coccinia grandis*) was placed in the refrigerator to be used for evaluations. Standard protocol followed as per the Ayurvedic Pharmacy of India.

Physicochemical experiments

These Physicochemical experiments were carried out following a standard method [2,9,10].

Extractive yield

Medicinal Plant *Coccinia grandis* material was washed in cold water and allowed to dry completely. Ethanol and methanol and water were used in soxhlet extraction. After completion the weight was. Calculated by its Percentage [9].

Estimation of total ash

3 grams of *Coccinia grandis* was placed in Dart platinum or silica dish then it was kept in the muffle furnace at a temperature of 450°C. Samples were taken after carbon elimination. It was then allowed to cool and the weight was taken off. For some models another way to remove carbon was followed. The burnt mass was taken out and discharged into hot water. Remnants collected with ash-free filter paper. The residue was burned with filter paper. filtrate was used. After evaporation it was ignited at a temperature of 450 C. The percentage of ash is estimated depending on the air-dried sample [3,6].

Estimation of Water Soluble Ash

25 ml of water was taken and the ashes were boiled for 5 min. Collected insoluble materials using non-greasy filter paper. Washed in warm water. It was then ignited for 15 min at a temperature of 450 degree Celsius. The weight of the ash is subtracted from the weight of the insoluble material, and the weight difference represents the water-soluble ash. The percentage of ash is estimated depending on the air-dried sample. (*Coccinia grandis*)

Estimation of Alcohol Soluble Extractive

Take a closed jar and add 100 ml of alcohol. 5 g of air-dried sample powder was added. (*Coccinia grandis*). Kept for twenty-four hours. Stir the mixture frequently. The mixture was allowed to stand for eighteen hours. The mixture was carefully filtered into a flat shallow pan. 25 ml of alcohol evaporated mixture was dried at 1050 C. The percentage of alcohol-soluble extract was calculated with an air-dried sample. (*Coccinia grandis*).

Estimation of water-Soluble Extractive

Take a closed jar and add 100 ml of chloroform water. 5 g of air-dried sample powder was added. (*Coccinia grandis*). Kept for twenty-four hours. Stir the mixture frequently. The mixture was allowed to stand for eighteen hours. The mixture was carefully filtered into a flat shallow pan. 25 ml of chloroform water evaporated mixture was dried at 1050 C. The percentage of chloroform water - soluble extract was calculated with an air-dried sample. (*Coccinia grandis).*

Estimation of Moisture content

Procedure for determining the amount of turbulent material. (Example of water drying out from the plant sample. (*Coccinia grandis*). 10 g sample was taken (*Coccinia grandis*). Samples were taken without a preliminary drying process. The sample was weighed accurately. The sample was placed in an evaporator. (*Coccinia grandis*). The 10 g cut sections of the specimen were approximately 3 mm thick. Fruits and seeds cracked. (3 mm) High-speed grinding process was avoided when preparing the samples. Moisture loss during preparation was avoided. The sample was dried in a volatile vessel at 1059° C for five hours. Samples were taken and weighed five hours later. (*Coccinia grandis*). Weight was taken every one hour. Weighing was done after drying for 30 min and cooling in a desiccator for 30 min. This showed a difference of 0.01 g in the desiccator.

Phytochemical assays Alkaloids

This assessment was carried out by the following author. (*Coccinia grandis*) Yellow precipitate indicates the presence of alkaloids [11].

Phytochemical assay flavonoids

Appears red colour from samples. This indicates the presence of flavonoids.

Cardiac glycosides

A reddish-brown colour appears at the interface of the sample mixture, indicating the presence of cardiac glycosides [12].

Antioxidant Efficacy of *Coccinia grandis* extracts
DPPH Assay

DPPH reacts with an antioxidant compound. It donates hydrogen and lowers DPPH. A mixture of ascorbic acid and methanol was used as the standard solution. Three millilitres of methanol was added with different concentrations of plant extracts and with control. 150 µl DPPH solutions was added to all test tubes. The colour changed from deep purple to pale yellow. It measured 516 nm on an ultraviolet light spectrum scale. Methanol is used as a blank solution [13–15].

$$\text{DPPH Scavenging activity} = \frac{Control\ OD - Test\Delta\ OD}{Control\ OD} \times 100$$

FRAP Assay

This method is used to measure the oxidizers that reduce ferric iron. It is based on the reduction of complex (ferric iron and 2,4,6-tripridyl-S-triazine) (TPTZ) (ferrous form at low pH). This reduction was monitored by measuring the change in absorption. UV spectrophotometer (593 nm) was used. (Ben-Zee and Strain 1999) FRAP reagent mixed with extracts at different concentrations. The samples were placed in the dark for 30 min. Absorption was recorded at 593 nm.

FRAP Value of Sample (µM) = $\frac{OD\ of\ Sample\ \ X\ FRAP\ value\ of\ Std\ (\mu M)}{OD\ of\ Std}$

Hydrogen Peroxide Scavenging Assay

The Scavenging activity of hydrogen peroxide was carried out as follows (Ruch et al.1989). 40 mmol / l solutions of H2O2 were prepared at PBS (pH 7.4). Plant extracts of various concentrations of ethanol extract were prepared. All samples were mixed with 0.6 ml of 40 ml / LH2O2 solution (prepared in PBS and incubated for 10 min). Absorption (against blank solution) was taken at 230 nm. This PBS does not contain H2O2. Quercetin was used as the standard solution. Control sample phosphate buffer + H2O2[13,14].

$$\% \text{ Hydrogen peroxide scavenging activity} = \frac{\text{Control OD} - \text{Test OD X 100}}{\text{Control OD}}$$

Total Antioxidant Capacity (Tac)Assay

(Pilar et al., 1999) Test sample solution with 300µl standard solution / reducing species. (In water, ethanol). A test tube was filled with 3 ml of reagent solution (1.0 ml each of 0.6M H2SO4, 28mM sodium phosphate and 4mM ammonium molybdate). The test tubes were closed and incubated at 95°C (90 min). The samples were allowed to cool to room temperature. Absorption was measured at 695nm against a blank (DW). A control solution contains 3 ml of reagent solution. The exact amount of solvent used for the sample. It is incubated under the same conditions as other models. The total antioxidant capacity is expressed as equal to that of ascorbic acid.

Results and Discussion

Physico-chemical, phytochemical and Antioxidant evaluations were performed for its efficacy evaluatled in *Coccinia grandis* extracts.

Physico-chemical assay

The (*Coccinia grandis*) Physico-chemical results were revealed good activity such as follows 34.62% of Extractive Yield, 4.567% of Moisture content, 9.28%. of Total Ash. Water Soluble Ash is 2.16%, Acid Insoluble Ash is found as 1.587%, Water Soluble Extractive id 24.16%, Alcohol Soluble extractive is 9.25% found.

Phytochemical evaluations

Alkaloids, flavonoids, cardiac glycosides, terpenoids, phenolics, proteins, carbohydrates, steroids and coumarins (*Coccinia grandis*) (leaf methanolic extract) were recorded in these results (Table 1). Average levels of alkaloids, flavonoids, terpenoids, phenolics, proteins, carbohydrates, and coumarin in methanolic extract results were recorded. Trace levels of cardiac glycosides and steriod in methanolic extracts were recorded.

Table 1 :Phytochemical analysis of *Coccinia grandis* Ethanolic extract

Phytochemical analysis (Ethanolic Extract) (++ average amount) (+Trace amount)		
SL NO	Secondary Metabolites	Results
1	Alkaloids	++
2	Flavonoids	++
3	Cardiac Glycosides	+
4	Terpenoids	++
5	Phenolics	++
6	Proteins	++
7	Carbohydrates	++
8	Steroids	+
9	Coumarins	++

Table 2 Physicochemical analysis of *Coccinia grandis* Ethanolic extract

Physicochemical analysis		
SL NO	Proximate Compounds	*Coccinia Grandis*(Shade dried leaf*)*
1	ExtractiveYield	34.62%
2	Moisture content	4.567%
3	Total Ash	9.28%
4	Water Soluble Ash	2.16%
5	Acid Insoluble Ash	1.587%
6	Water Soluble Extractive	24.16%
7	Alcohol Soluble extractive	9.25%

Antioxidant activity

Antioxidant activity were evaluated through the DPPH,FRAP, hydrogen peroxide Total antioxidant assays using *Coccinia grandis* methanolic ethanolic extract. (Table 1, table 2, Table 3and Table 4)

DPPH ASSAY

The highest DPTH activity (84%, 95%) was recorded in ethanolic extracts (concentration 80, 100 µg/ml) and maximum DPTH activity (76%, 89%) was obtained in methanolic extracts (concentration 80, 100 µg/ml) (Table 3). An average DPTH activity (ethanolic extract 46% methanolic extract 43%) was recorded in the Concentration of the 40 (µg/ml).

Fig- 1 DPPH Free radical scavenging assays of *Coccinia grandis* methanolic ethanolic extract

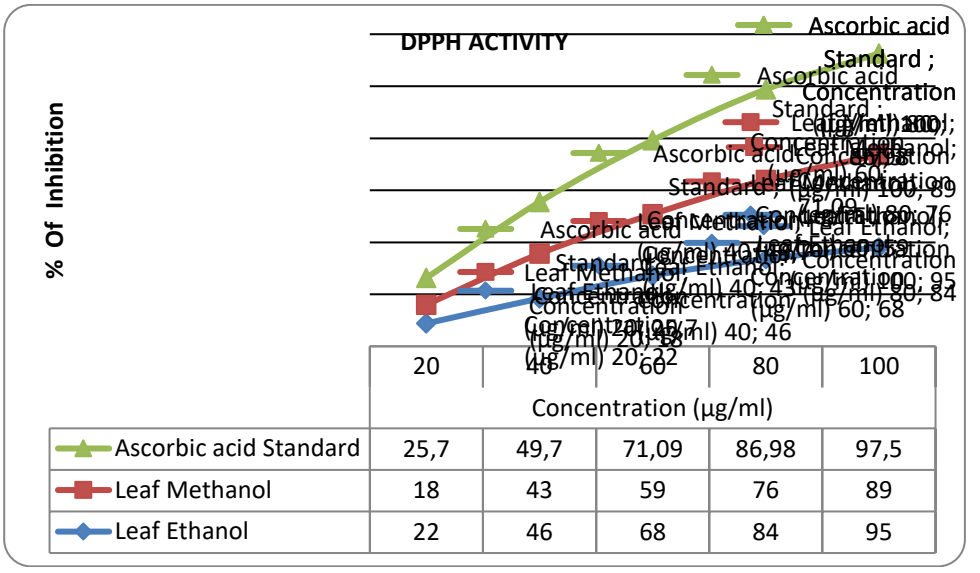

Table 3

Sl No	Concentration (µg/ml)	% Of inhibition		
		Ethanol (Leaf)	Methanol (Leaf)	Ascorbic acid Standard
1	20	22	18	25.7
2	40	46	43	49.7
3	60	68	59	71.09
4	80	84	76	86.98
5	100	95	89	97.50

Hydrogen Peroxide Scavenging Assay

The highest scavenging activity (76%, 84%) was recorded in ethanolic extracts (concentration 40, 50 µg/ml).. Maximum scavenging activity (73%, 80%) was obtained in methanolic extracts (concentration 40, 50 µg/ml) (Table 4). A average scavenging activity (ethanolic extract 60% methanolic extract 61%) was recorded in the concentration of the 20 (µg/ml).

Fig- 2 Hydrogenperoxide Free radical scavenging assays of *Coccinia grandis* methanolic ethanolic extract

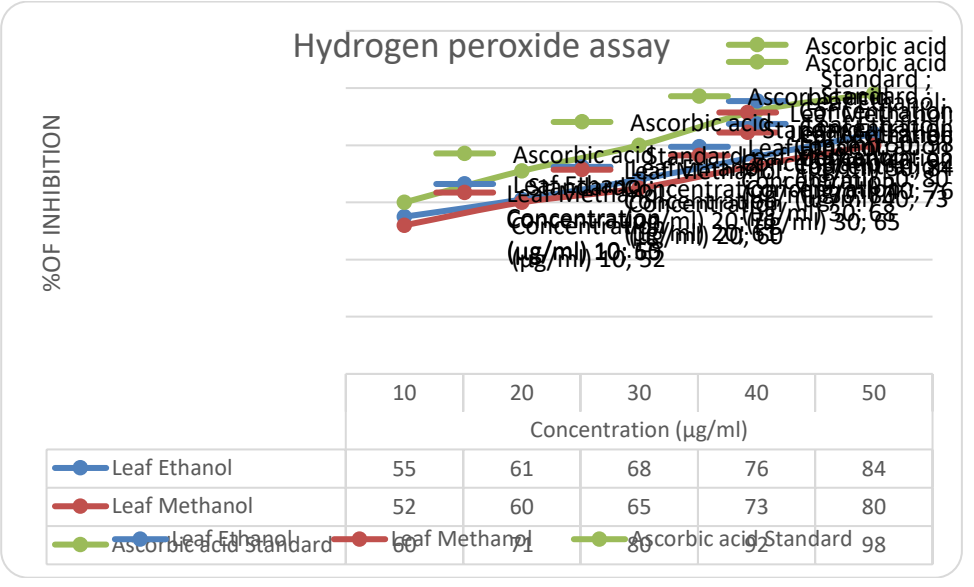

Table 4

Sl No	Concentration (µg/ml)	% Of inhibition		
		Ethanol (Leaf)	Methanol (Leaf)	Quercetin Standard
1	10	55	52	60
2	20	61	60	71
3	30	68	65	80
4	40	76	73	92
5	50	84	80	98

FRAP ASSAY

The highest FRAP activity (82%, 112%) was recorded in ethanolic extracts (concentration 100, 125 µg/ml).. Maximum FRAP activity (76%, 103%) was obtained in methanolic extracts (concentration 100, 125 µg/ml) (Table 5). A average FRAP activity (ethanolic extract 40.6% methanolic extract 35.6%) was recorded in the concentration of the 50 (µg/ml).

Fig- 3 FRAP Free radical scavenging assays of *Coccinia grandis* methanolic ethanolic extracts

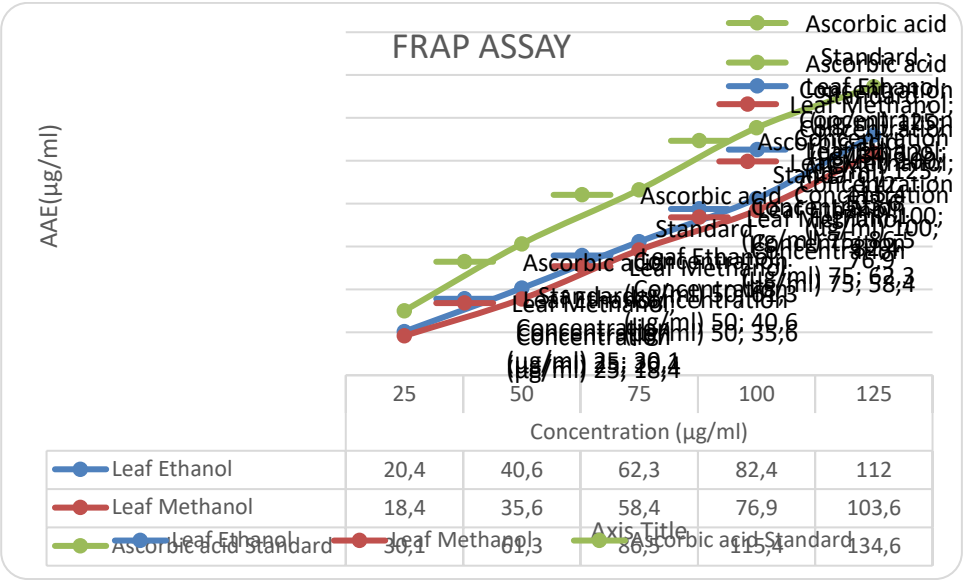

Table 5

Sl No	Concentration (µg/ml)	AAE(µg/ml)			
		Ethanol (Leaf)	Methanol (Leaf)	Ascorbic acid standard	OD at 593nm
1	25	20.4	18.4	30.1	0.0604
2	50	40.6	35.6	61.3	0.1374
3	75	62.3	58.4	86.5	0.2048
4	100	82.4	76.9	115.4	0.2854
5	125	112.0	103.6	134.6	0.3474

Total Antioxidant Assay

The highest total Antioxidant activity (66.0 %, 181.5%) was recorded in ethanolic extracts (concentration 200, 150 µg/ml).. Maximum total Antioxidant activity (59.4%, 160.3%) was obtained in methanolic extracts (concentration 200, 150 µg/ml) (Table 6). A average total Antioxidant activity (ethanolic extract 35.5% methanolic extract 31.6%) was recorded in the concentration of the 50 (µg/ml).

Fig- 4 Total Antioxidant Potential of *Coccinia grandis* methanolic ethanolic extracts

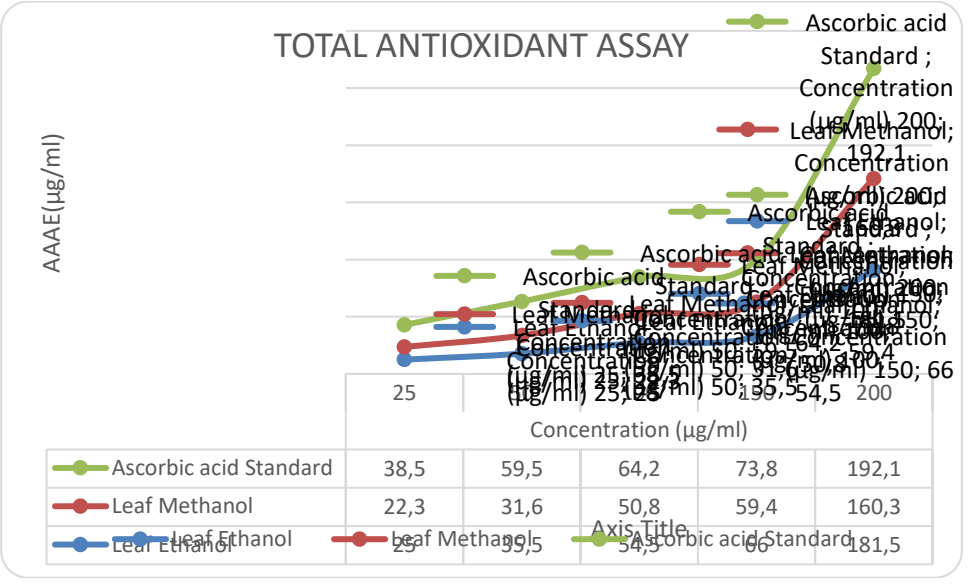

Table 6

Sl No	Concentration (µg/µl)	AAE(µg/ml)			
		Ethanol (Leaf)	Methanol (Leaf)	Ascorbic acid standard	OD at 700nm
1	25	25.5	22.3	38.5	0.0837
2	50	35.5	31.6	59.5	0.2132
3	100	54.5	50.8	64.2	0.3100
4	150	66.0	59.4	73.8	0.4106
5	200	181.5	160.3	192.1	0.5290

Phytochemicals help to develop antiviral agents in the immune system. Phytochemicals are important in affecting blood cholesterol. Phytochemicals have the ability to penetrate the membrane, which acts against cancer. Phytochemicals are very important for the human body [16,17]. Phenols have antioxidant activity. (Amogaha et al. 2002) Involved in the enzyme activity in conjunction with phytochemicals grafting. This compound is used against microorganisms (antimicrobial) [18,19]. Phytochemicals are important in plant metabolism. The main role of phytochemicals is to work on the immune defense. For this important reason, therapeutic drugs are made from these plants. Alkaloids reduce nitrate production. It helps in protein synthesis. Phytochemicals help suppress sucrose transfer work. It causes paralysis in parasites [20–22]. Alkaloids are important for cytotoxic activity. It can be used for cancer. (Chowdhury, 2009) The main role of phenolics and flavonoids is antioxidant work. Plant extract is used for coughs and bronchitis. It is used to treat bronchitis, diarrhea and colds.

Phytochemical compound research needed .phytochemicals Effects should also be tested for clinical purposes. Alkaloids enter parasitic DNA, making antibiotics. Alkaloids act as anti-oxidant effects [23,24]. Phytochemicals phenol and flavonoids are important for herbal medicine. Flavonoids and alkaloids and phenols are used to treat inflammation and cancer, stomach and hips. Such as phytochemicals derived from plant extracts [25,26].

Conclusion

In this above research work phytochemicals assay and physicochemical assay and antioxidants efficacy of *Coccinia Grandis* were evaluated. The results of the antioxidant and other properties demonstrated that the Cg ethanolic extract can be useful for preventing the oxidative damages due to smoking, high intake of medications and stress.

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