

## MINERAL AND BIOCHEMICAL ANALYSIS OF VARIOUS PARTS OF CISSUS QUADRANGULARIS LINN.

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### ABSTRACT:

Ash, minerals and biochemical contents were determined in various parts of root, stem and leaf of *Cissus quadrangularis*. The maximum ash content was observed in the root. The maximum concentration of carbohydrate and protein in the root and phosphorus, iron, calcium and lipids in the stem were observed.

### INTRODUCTION

In recent years, there has been an increasing awareness that the significance of medicinal plant studies goes beyond mere anthropological curiosity. In Africa, for example 80% of the population depends principally on herbal medicine. In addition, many modern drugs are derived from natural plant products are chemical simulators of such substances (1).

*Cissus quadrangularis* Linn. (Cucurbitaceous) is a shrub growing throughout India. It is extensively used in traditional medicine. The leaves and young shoots are used in bowel complaints, root is used in scurvy, asthma, muscular pains, burns and wounds, Digestive troubles, body pains, Muscular pains, poison bite, as anti-helminthic and stomachic(2). The plant contains protein, fat, wax, fibre, carbohydrate, ash, mucilage, pectin, tartaric acid, vitamin C, Minerals,  $\beta$ -sitosterol,  $\delta$ -amyryn and  $\delta$ -amyryne (3). A perusal of literature revealed that the parts of literature revealed that the parts of *Cissus quadrangularis* have not been subjected to

quantitative analysis of its mineral and biochemical constituents. In this paper, we report the presence of minerals like calcium, phosphorus and iron and biochemicals like carbohydrates, proteins and fat.

### MATERIALS AND METHODS

#### Collection of the Medicinal Plant

The medicinal plant *Cissus Quadrangularis* was selected and collected with its parts-root, stem and leaves from around Sivapuram village, Pudukkottai district, Tamilnadu, India. The collected plant materials were brought into the laboratory for mineral and biochemical analysis.

#### Ash Content and Preparation of Ash Solution

The plant materials were dried under shade and ground well to fine powder shade and ground well to fine powder. 1g of dry powder of root, stems & leaves were taken in cleaned, weighed silica crucibles and heated at 600°C for 4-6 hours using Muffle

Furnace. They were then cooled and a drop of conc.  $\text{HNO}_3$  was added to the ash and heated again at the same temperature for one hour. Heating, cooling and weighing were repeated until constant values were obtained. The weight of the ash was determined.

The ash obtained was dissolved in 1N HCl (1ml of conc. HCl + 99ml of distilled water) and filtered through whatman no. 42 to remove any undissolved matter. The acid solution was made upto 100ml.

### **Mineral Analysis:**

The ash solution was used for estimation of calcium (4), Phosphorus (5) and iron (6).

### **Biochemical Analysis**

Fresh plant material was taken for biochemical analysis. One gram of the plant material was weighed and homogenized with 10ml of distilled water using pestle and mortar. From this, 1ml of the extract was treated with 3 ml of Potassium hydroxide and then the tube was kept in boiling water bath for 15 minutes, cooled and centrifuged. The supernatant was used to determine the total carbohydrate (7). 0.5g of plant material was ground well with 10ml of 80% ethanol and centrifuged. The sediments were collected and dissolved in 1N NaOH and made upto 10ml. From this, protein was estimated (8). A weighed amount of plant material was extracted with chloroform methanol (2:1) mixture in a Teflon homogenizer. The extraction was repeated thrice with fresh chloroform methanol mixture. The lipid extraction was transferred to separating funnels containing 2.0ml of physiological saline and left overnight, after which the lipid extracts were drained into weighed beakers and allowed to dry to a constant weight. From this, the total lipid content was calculated (9).

## **RESULTS AND DISCUSSION**

The role of various mineral elements in human system is well known. The extraordinary role of some minerals occurring in traces (Trace elements) in the biochemical functions of living organism and their utility in human and animal nutrition has been reported (10,11). Table I shows ash content of various parts of *C. quadrangularis*.

The present study reveals that calcium was found in stem (1.76g/100g), Followed by leaf (1.68g/ 100G) and root- (1.51g/100g) (Table.2.). Calcium plays an important role in living cells as an intracellular regulator or messenger. It helps to regulate the activity of skeletal muscle, heart and nervous tissues. Calcium is very important especially during infancy, pregnancy and lactation. Phosphorus was found in stem (1.82g/100g), followed by leaf (1.42g/100g), and root- (1,26g/100g) (Table2).it is well known that iron deficiency causes anemia and the presence of iron as hemoglobin in the erythrocytes.

The protein content of various parts of *C. Quadrangularis* was stem 10.4g/100g, followed by root 11.1g/100g and leaf 9.16g/100g (Table3). Proteins are necessary for health. Dietary proteins supply raw materials for the formation of digestive juice, hormones, plasma proteins, hemoglobin, Hormones, plasma proteins, hemoglobin, Vitamins, and enzymes, Carbohydrate content 34.3g in stem, 33.7g in leaf and 37.5g/100g in root (Table 3) were observed. Carbohydrates supply energy for the immediate use of the body. The main source of energy soon after a meal is carbohydrate. Fat content 1.33g in stem, 0.9g in leaf and 0.66g/100g in root were observed. Fats and oils are concentrated

sources of energy. Each gram of pure fat yield calories. Fat is used in transport and absorption of the fat soluble vitamins. So the efficacy of a particular medicinal herb

depends on its chemical constituents either organic or inorganic or on a combined effect of both.

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**TABLE 1**  
**ASH CONTENT OF VERIOUS PARTS OF C.QUADRANGULARIS**

| S.No. | Parts of Plant | Weight of Powder in grams | % of ash content |
|-------|----------------|---------------------------|------------------|
| 1.    | Root           | 100                       | 16.9             |
| 2.    | Stem           | 100                       | 11.29            |
| 3.    | Leaf           | 100                       | 11.13            |

**Table 2**  
**PHOSPHORUS, IRON AND CALCIUM CONTENT OF VARIOUS PARTS OF**  
**C.QUADRANGULARIS (g/100g)**

| S.No. | Parts of Plant | Phosphorus  | Iron          | Calcium     |
|-------|----------------|-------------|---------------|-------------|
| 1.    | Root           | 1.26 ± 0.05 | 0.071 ± 0.003 | 1.51 ± 0.06 |
| 2.    | Stem           | 1.82 ± 0.07 | 0.122 ± 0.005 | 1.76 ± 0.07 |
| 3.    | Leaf           | 1.42 ± 0.05 | 0.042 ± 0.002 | 1.68 ± 0.06 |

Values are expressed as mean ± SD

**TABLE 3**  
**CARBOHYDRATE, PROTIEN AND LIPID CONTENT OF VARIOUS**  
**PARTS OF C.QUADRANGULARIS (g/100g)**

| S.No. | Parts of Plant | Carbohydrate | Protein     | Lipid       |
|-------|----------------|--------------|-------------|-------------|
| 1.    | Root           | 37.5 ± 1.5   | 11.1 ± 0.44 | 0.66 ± 0.02 |
| 2.    | Stem           | 34.3 ± 1.4   | 10.4 ± 0.42 | 1.33 ± 0.05 |
| 3.    | Leaf           | 33.7 ± 1.3   | 9.16 ± 0.37 | 0.90 ± 0.03 |

Values are expressed as mean ± SD