

COMPARATIVE ANALYSIS OF LEAVES OF *OCIMUM SANCTUM*, *AZADIRACHTA INDICA*, *FICUS RELIGIOSA*, *CYNODON DACTYLON* AND *AEGLE MARMELOS* PLANTS FOR ITS FUTURE USE IN FIELD OF AYURVEDA AND NANOTECHNOLOGY

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ABSTRACT

The medicinal plants have become important in the global context today as it offer solutions to the major concerns of human mankind. This paper gives a bird eye view on the comparative proximate analysis of some medicinal plants of Mumbai, India. The study aimed to determine the nutritional content of leaves of *Ocimum sanctum*, *Azadirachta indica*, *Cynodon dactylon*, *Ficus religiosa* and *Aegle marmelos*. Fresh and dried leaves samples were subjected to proximate analysis. Moisture, Ash, Calcium, Magnesium, Crude fiber, Lipids, Crude protein and the presence of Carbohydrates, Flavanoids Alkaloids, Tannin, Steroids, Terpenoids, Saponin, Glycosides and Reducing sugar were determined by Phytochemical analysis and the CHNS elemental analysis revealed the amount of Carbon, Nitrogen, Hydrogen and Sulphur. These analysis plays a vital role in selecting the plant leaves according to its content for the preparation of herbal drugs that can be used for various purposes like respiratory disorders, pharmacological activities, diabetes, etc. The findings indicate that these leaves are a potential source of highly nutritious feed stuff, phytomedicine and Nanotechnology. They are of nutritional, clinical and veterinary relevance considering the diverse pharmacological uses of the plant in different parts of the world.

Keywords: *Ocimum sanctum* (Tulsi), *Azadirachta indica* (Neem), *Cynodon dactylon* (Durwa / Bermuda grass), *Ficus benghalensis* / *Ficus religiosa* (peepal) and *Aegle marmelos* (Bael), Plant oil, Proximate analysis, phytochemical analysis and elemental analysis.

INTRODUCTION

Medicinal plants find application in pharmaceutical, cosmetic, agricultural and food industry [1]. The earliest mention of medicinal use of plants in Hindu culture is found in "Rigveda" which is said to have written between 4500-1600 BC. It is Ayurveda, the foundation of medicinal science of

Hindu culture in its eight division deals with specific properties of drugs and various aspects of science of life and art of healing. Medicinal plants are a source of great economic value all over the world. Nature has bestowed on us a very rich botanical wealth and a large number of diverse types of plants grown in different parts of the country [2]. *Ocimum sanctum* L. (family Lamiaceae) is an aromatic perennial herb widely grown in India. The medicinal value of these plants lies in bioactive phytochemical constituents that produce definite physiological action on the human body [3]. *Ocimum sanctum* belongs to the family *Lamiaceae* and is found mostly in countries including: Libya, India, North and South America, Mexico and Brazil where it is popularly known as alfavaca-cravo, alfavacao, alfavaca [4]. It is traditionally used to relieve pains and used in the treatment of rheumatism, diarrhea, high fever, convulsions, diabetes, eczema, piles and as a repellent [5][6]. The decoction of the stem is inhaled for the treatment of catarrh and bronchitis [7]. *Ocimum sanctum* is popularly used in folk medicine for the treatment of upper respiratory tract infection, diarrhea, cough, fever, gonorrhoea, worm infection, stomach aches, headaches, piles, pneumonia and surface wound. It is also implicated in blood coagulation, anti-inflammatory, cardiovascular and renal function properties have been observed [8]. The plant is used as food spice and for the treatment of ailments such as; malaria, diabetes, respiratory and urinary tract infections, cough, fever, diarrhea, abdominal pains, pneumonia, conjunctivitis, oral wounds and tooth infection [9][10].

Azadirachta indica has been extensively used in India for the treatment of various diseases like leprosy, respiratory disorder in children, intestinal helminthiasis. *Azadirachta indica* offers another option for a safer and effective anti-ulcer drug. Neem is also used to treat viral diseases such as small pox and chicken pox. It protects the liver from damage which in turn helps to clean the blood. It shows hypoglycemic effect [11]. Neem may help in the search for prevention or cure for AIDS which may possibly be treated by ingesting neem leaf extracts or the whole leaf or by drinking a neem tea [12]. It has a multitude of pesticidal active ingredients which are together called "triterpenes" more specifically "limnoids". The four best limnoid compounds are azadirachtin, salannin, meliantriol and nimbin [13]. The seed of Neem tree has a high concentration of oil. Neem oil is widely used as insecticides, lubricant, drugs for variety of diseases such as diabetes and tuberculosis [14, 15, 16]. *A. indica* leaves are widely used among the various tribes of India to cure cuts, wounds and other minor skin ailments [17,18].

Ficus religiosa belongs to the family of Moraceae which is known to be a native Indian tree and is commonly known as Banyan tree in English and Peepal in Hindi [19]. *Ficus religiosa* is gaining great attention in medicinal field because it has many compounds which can help curing various types of diseases like Respiratory disorders, Sexual disorders, Central Nervous System disorders, Cardiovascular disorders, Gastric problems, Skin infections and Diabetes etc. [20,21]. It is well known for its Pharmacological activities such as Antidiabetic activity as it increases the level of insulin and glycogen in liver which helps in decreasing triglycerides and cholesterol [22]. Wound

healing activity as it contains tannins which possess ability to increase the collagen content, which is one of the factor for promotion of wound healing [23,24]. Antimicrobial activity because it possess high antimicrobial activity against selected pathogenic organisms with about 24mm inhibition zone [25] and it also engages in some pharmacological activities such as Proteolytic activity [26], Acetylcholinesterase activity [27] and Immunomodulatory activity[28].

Cynodon dactylonis a traditional medicine in India. On scientific studies it is found that *C. dactylonis* having wide range of antimicrobial activity which include explanation of its antiviral and antibacterial nature[29]. According to an estimation of the World Health Organization, about 80 percent of the world's population uses herbs to fulfill its primary healthcare needs. More than 40,000 plant species are being used around the world as medicinal plants in traditional and ethno medicinal practices. *Cynodon Dactylonis* a traditional medicine in India and has a renowned position for minor treatments [30]. The paste of its root with water when taken internally used to treat fever, in headache its paste is applied in head as analgesic, as antiseptic, to stop bleeding [31,32,33,34,35]. It is traditionally used for diabetes [36]. Anti-inflammatory, kidney problems, urinary disease, gastrointestinal disorder constipation, abdominal pain and as a blood purifying agent [37]. Whole plant is used for-diuretic, dropsy, syphilis, wound infection, piles [38]. The juice of the plant is astringent and is applied externally to fresh cuts and wounds [39]. It is used in the treatment of catarrhal ophthalmia, hysteria, chronic diarrhea, epilepsy, insanity and dysentery. The plant is folk remedy for stones, carbuncles, cough, hypertension, snake bites and gout[40,41]. In ethanolic extract of aerial parts of *C. dactylon* protection against convulsions induced by chemo convulsive agents in mice has been recorded [42]. Ethanol extract of aerial parts of *C. dactylon* has marked CNS depressant, [43] and antioxidant activity [44].

Aegle marmelos belongs to family-Rutaceae which belongs to kingdom-plantae, division - magnoliophyta, class- magnoliopsida and order-sapindales[45]. The chemical constituent of this plant is Coumarins, alkaloids, steroids, and essential oils. xantotoxol, imperatorin and alloimperatorin, different types of carotenoids, ascorbic acid, sitosterol, crude fibers, carotenoids, tannins, skimmimine, aegelin,lupeol, cineol,citral,citronellal, marmesinin, marmelosine, marmin and tannins[46]. It is used in jaundice,astringent, carminative, conjunctivitis, swelling of joints, anti-ulcer, anti-pyretic, cardioprotective, analgesic, radio protective action, wound healing[47]. It inhibits the HMG-COA reductase enzyme which is necessary in cholesterol biosynthesis and Aegeline-2 an alkaloid may be responsible for this action. This will limit cholesterol biosynthesis and show hypolipidemic action [48]. The pharmacological activities of *A.marmelos* includes Lipid lowering effect [49,50,51], Anti-inflammatory effect [52,53], Anti-oxidant activity [54], Hepatoprotective effect [55,56], Antibacterial activity [57], Neuroprotective activity [58], Anti-convulsion activity [59], Testicular activity [60], Anti-fertility effect [61], proximate analysis[62] andComparative

studies of plant help to decide the selection of plant in ayurveda formulation and food supplement [63].

EXPERIMENTAL

Sample Collection:

The plant leaves under investigation were procured from Mumbai region (Maharashtra, India). These plant leaves were authentic, healthy and matured.

CHEMICAL ANALYSIS:

Moisture Content:

To determine the moisture content of the seeds, 2 g of seed powder were oven dried for 2 hours at 110⁰C and the loss in weight was recorded.[64]

Crude Fibre:

About 3g of finely powdered seeds were accurately weighted and transferred to an extraction apparatus and extracted with petroleum ether (40-60)⁰C for 18-20 hours, air dried defatted powder was transferred to dry 100 ml conical flask, 200 ml of 0.25 N sulphuric acid were added and contents were brought to the boiling point. Boiling was continued for exactly 30 minutes, maintaining a constant volume and rotating the flask after every few minutes in order to remove the particles from the sides. The contents were filtered through Buchner's funnel under suction using circular filter paper (Whatman No. 41). The insoluble matter was washed with boiling water until the washings were free from the acids. The residue was washed back into the original flask along with 200 ml of 0.313N Sodium hydroxide. The contents were brought to the boiling point and boiling was continued for exactly 30 minutes. The whole insoluble matter was transferred to the filter paper by means of boiling water. It was then washed with one percent hydrochloric acid and again with boiling water until free from acid, and then it was washed twice with alcohol and thrice with ether. Finally, it was transferred to a dried, previously weighed ash less filter paper and dried at 100⁰C to the constant weight. The increase in the weight of the filter paper was noted. The filter paper and its contents were incinerated and ignited to ash in a silica crucible at dull red heat, cooled and weighted. The weight of the ash subtracted from the increase of the weight on the paper due to insoluble material, the difference was reported as crude fibre. [65]

Lipids:Total lipids were extracted from the whole powder in the Soxhlet apparatus for 20 hours, using petroleum ether (40-60)°C fraction as a solvent and estimated gravimetrically after evaporating the solvent at 60 °C.[66]

Calcium:Prepare 50ml of acidic solution of extracts from powder of plant leaves with 1:1 HCl and dilute upto 250ml in standard measuring flask with distilled water.

Pipette out 25ml of above solution in conical flask, add 2-3 drops of Patton-Reader indicator and 8M KOH till the color of Patton-Reader indicator appeared. Then add one and a half test tube of 10% NH₂OH.HCl solution till clear red solution is obtained and titrate against 0.05M EDTA solution till the color of solution changes to blue.

1000 ml of 1M EDTA ≡ 40.08g of Ca

Magnesium:Prepare 50ml of acidic solution of extracts from powder of plant leaves with 4NH₂SO₄ and dilute upto 250ml in standard measuring flask with distilled water.

Pipette out 25ml of above solution in conical flask, add 10ml of buffer solution and add 2-3 drops of Eriochrome Black T indicator and titrate against 0.01M EDTA solution till the color of solution changes from wine red to blue.

1000 ml of 1M EDTA ≡ 24.32g of Mg

Ash and its analysis:About 5 g of the seed powder were ignited to the ash into a previously ignited and weighted silica crucible. It was cooled in vacuum desiccators over concentrated sulphuric acid, weighted and the increase over the first weight of crucible was taken as the ash content.

For the determination of water-soluble ash, whole ash was boiled with 25 ml distilled water. The suspension so obtained was filtered through an ash-less filter paper (Whatman No. 41) and the residue were thoroughly washed with hot distilled water. The filter paper containing the residue was ignited in the original crucible, cooled and the water insoluble ash was weighted. From these data “water soluble” ash was calculated as follows:

$$\begin{array}{ccc} \text{Water soluble ash} & = & \text{Total ash} - \text{Water insoluble ash} \\ \text{(Percent)} & & \text{(Percent)} \quad \quad \quad \text{(Percent)} \end{array}$$

The alkalinity of water-soluble ash was determined in the filtrate so obtained after cooling and titrating against N/10 sulphuric acid, using methyl orange as indicator. The alkalinity was expressed in terms of sodium carbonate miliequivalents.

1 ml N/10 H₂SO₄ ≡ 0.1 miliequivalents Na₂CO₃

The acid insoluble ash content was determined by boiling the whole ash, equivalents to 5 g seed powder in 25 ml dilute hydrochloric acid (10 percent, v/v) for five minutes and

filtering the suspension through an ash-less filter paper (Whatman No. 41). After washing thoroughly with hot water, the paper containing the residue was again ashed in a pre-weighed silica crucible. It was cooled and weighed again. The difference of the two weights gave the "acid insoluble" ash. [67]

Oxalates: 5g of plant leaves powder was taken with 400ml distilled water in a 600ml pyrex beaker and it was kept on sand bath, while covering the top of beaker with suitable round bottom flask containing cold water to act as condenser. After boiling for half an hour 10ml of 20% Sodium Carbonate solution was added and contents were stirred and cooked for another half an hour. After cooking was done, the content was filtered hot by Whatman no.41. The filtrate was allowed to settle down and enough HCl(1:1) was added drop by drop with constant stirring until final acid concentration became 1%. Then the precipitate was allowed to settle and supernatant liquid was filtered off through the filter paper. Then add ammonical solution and re-acidify with glacial acetic acid. Allow precipitate to settle overnight. Remove the clear supernatant liquid and dissolve the precipitate in sulphuric acid and titrate against 0.05N KMnO_4 .
1ml of 0.05N KMnO_4 = 0.00225g of anhydrous oxalic acid.

PHYTOCHEMICAL ANALYSIS [68]:

Alkaloids: Dragendroff's test: To 0.5ml of alcoholic solution of extracts from powder of plant leaves taken in separate test tubes, 2.0 ml of Hydrochloric acid solution was added. To this acidic medium, 1.0ml of Dragendroff's reagent was added. An orange – red precipitate produced immediately indicates the presence of alkaloid.

Meyer's test: To 10 ml of alcoholic extracts from powder of plant leaves taken in separate test tubes, few drops of Meyer's reagent was added. Formation of white or pale precipitate showed the presence of alkaloids.

Flavonoids: In test tubes containing 0.5ml of alcoholic extracts from powder of plant leaves each was taken, 5 – 10 drops of dilute Hydrochloric acid and small piece of magnesium was added and the solution was boiled for few minutes. Reddish pink color indicates positive test for flavonoids.

Saponins: In test tubes about 5ml of aqueous extracts from powder of plant leaves was taken, a drop of sodium bicarbonate solution was added. The mixture was shaken vigorously and kept for 3min. A honey comb like froth formation in test tubes indicates the presence of saponins.

Carbohydrates: Fehling's test: To 2ml of aqueous extracts from powder of plant leaves taken in separate test tubes, a mixture of equal parts of Fehling's solution A and B were added. The test tubes were boiled for few minutes. Formation of red or brick precipitate indicates the presence of carbohydrates.

Benedict's test: To 0.5ml of aqueous extracts from powder of plant leaves taken in separate test tubes, 5ml of Benedict's reagent was added and boiled for 5minutes. Formation of bluish green color in test tubes showed the presence of carbohydrates.

Steroids:2ml of chloroform extracts from powder of plant leaves taken in separate test tubes, 1.0ml of con Sulphuric acid was added carefully along the sides of the test tube. A red color was produced in the chloroform layer indicates the presence of steroids.

Tannins: Ferric chloride test: 1-2ml aqueous extracts from powder of plant leaves was taken in test tube. Then, few drops of 5% Ferric chloride solution were added. A bluish black color formed which disappeared on addition of diluted Sulphuric acid, forming a yellow brown precipitate indicates the presence of tannins.

Lead acetate test: Test tubes containing 5.0ml of aqueous extracts from powder of plant leaves, few drops of 1% solution of lead acetate was added. Formation of yellow or red precipitate indicates the presence of tannins.

Terpenoids:Four milligrams of extract was treated with 0.5 ml of acetic anhydride and 0.5 ml of chloroform. Then concentrated solution of sulphuric acid was added slowly and red violet color was observed for terpenoid.

Glycoside:To the solution of the extract in glacial acetic acid, few drops of ferric chloride and concentrated sulphuric acid are added, and observed for a reddish brown coloration at the junction of two layers and the bluish green color in the upper layer

Reducing sugar:To 0.5 ml of extract solution, 1 ml of water and 5 - 8 drops of Fehling's solution was added at hot and observed for brick red precipitate.

ELEMENTAL ANALYSIS:

By the use of Elemental analyser amount of Carbon, Hydrogen, Nitrogen and Sulphur was determined from SAIF Department, IIT Mumbai and from the amount of nitrogen present , amount of crude protein in the plant leaves was calculated, by the formula; $W_p = (WN * 12.5)/1000$

RESULT AND DISCUSSION

The result of proximate analysis of certain leaves has shown immense variations in their parameters.

The Chemical analysis revealed the amount of moisture, ash, crude fibre, proteins, calcium, magnesium, lipids and defatted matter. It has been found that moisture was higher in *Ocimum sanctum*(Tulsi) and lower in *Cynodon dactylon*(Durva) where as in *Azardirachta indica*(Neem) and *Ficus religiosa*(Peepal) moisture content was almost equal as shown in Table No.1. The ash analysis was done to determine the amount of total ash then the total ash content of each plant leaves were subjected to various analysis to determine the amount of Water soluble and insoluble ash and Acid soluble and insoluble ash. From this analysis we found that the amount of acid insoluble ash in all the plant leaves were negligible and the variations in acid soluble ash are as follows: 2.886 ± 0.061 in *Ocimum sanctum*(Tulsi), 4.8 ± 0.04 in *Azardirachta indica*(Neem), 3.336 ± 0.109 in *Ficus religiosa*(Peepal), 4.736 ± 0.0737 in *Cynodon dactylon*(Durva), 3.276 ± 0.0305 in *Aegle marmelos*(Bael). Water soluble ash is equivalent to 0.823 ± 0.0832 in *Ocimum sanctum*(Tulsi), 1.376 ± 0.0404 in *Azardirachta indica*(Neem), 2.636 ± 0.0702 in *Ficus religiosa*(Peepal), 1.37 ± 0.0458 in *Cynodon dactylon*(Durva), 1.056 ± 0.0503 in *Aegle marmelos*(Bael) and water Insoluble ash is equivalent to 2.0633 ± 0.0230 in *Ocimum sanctum*(Tulsi), 3.423 ± 0.0057 in *Azardirachta indica*(Neem), 0.7 ± 0.0435 in *Ficus religiosa*(Peepal), 3.366 ± 0.0288 in *Cynodon dactylon*(Durva), 2.22 ± 0.02 in *Aegle marmelos*(Bael). Crude fibre and lipids are found to be greater in *Ficus religiosa*(Peepal) and lower in *Ocimum sanctum*(Tulsi). The amount of calcium in 2.537 ± 0.0080 in *Ocimum sanctum*(Tulsi), 2.664 ± 0.0519 in *Azardirachta indica*(Neem), 3.627 ± 0.0221 in *Ficus religiosa*(Peepal), 0.806 ± 0.0030 in *Cynodon dactylon*(Durva), 3.0906 ± 0.0180 in *Aegle marmelos*(Bael) and amount of magnesium in 0.566 ± 0.0405 in *Ocimum sanctum*(Tulsi), 2.438 ± 0.0711 in *Azardirachta indica*(Neem), 3.255 ± 0.0192 in *Ficus religiosa*(Peepal), 0.369 ± 0.0365 in *Cynodon dactylon*(Durva), 1.728 ± 0.163 in *Aegle marmelos*(Bael).

The Phytochemical analysis revealed the presence of Alkaloids in all plant leaves except in *Cynodon dactylon*(Durva) and the Flavanoids is only present in *Cynodon dactylon*(Durva). Tannin, Steroids, Terpenoids, Saponin, Glycosides and Carbohydrates are present in all the plant leaves. Reducing sugar was only absent in *Ocimum sanctum* (Tulsi) and *Azardirachta indica*(Neem) leaves. As shown in table No.2.

The result of element analysis of air dried leaves as shown in Table No.3 It shows that the Nitrogen content in all the plant leaves is almost same, whereas the amount of Carbon is maximum in *Azardirachta indica*(Neem) and minimum in *Ficus religiosa*(Peepal). The greater amount of Hydrogen has been found in *Aegle marmelos*(Bael) and minimum in *Azardirachta indica*(Neem). From this analysis we found that the amount of Sulphur is zero in all the plant leaves.

The result of proximate analysis and the elemental analysis of air dried leaves are represented graphically in Fig No.1 and Fig No.2.

Fig No.1 Graphical representation of chemical analysis of plant leaves

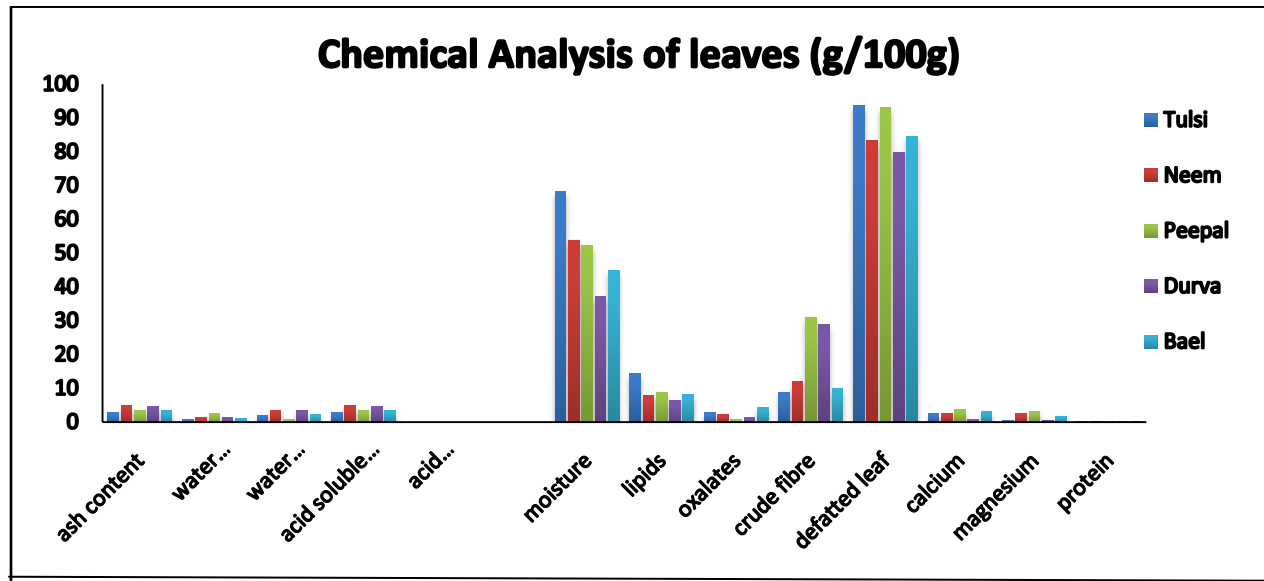


Fig No.2 Graphical representation of elemental analysis of plant leaves

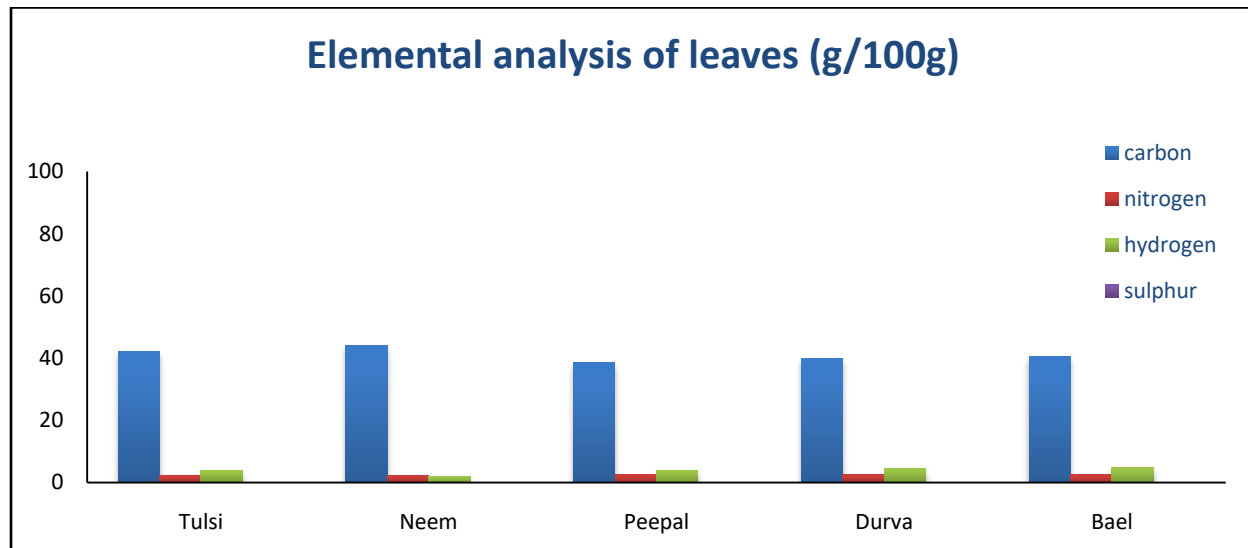


Table No. 1 Chemical analysis of plant leaves

Parameters	Tulsi	Neem	Peepal	Durva	Bael
Ash Content	2.867 ± 0.061	4.8 ± 0.04	3.336 ± 0.109	4.736 ± 0.073	3.276 ± 0.0305
Water Soluble Ash	0.823 ± 0.0832	1.376 ± 0.0404	2.636 ± 0.0702	1.37 ± 0.0458	1.056 ± 0.0503
Water Insoluble Ash	2.0633 ± 0.0230	3.423 ± 0.0057	0.7 ± 0.0435	3.366 ± 0.0288	2.22 ± 0.02
Acid Soluble Ash	2.886 ± 0.061	4.8 ± 0.04	3.336 ± 0.109	4.736 ± 0.0737	3.276 ± 0.0305
Acid Insoluble Ash	0	0	0	0	0
Moisture	68.156 ± 0.0151	53.636 ± 0.0211	52.169 ± 0.0449	37.178 ± 0.0319	44.874 ± 0.0052
Lipids	14.287 ± 0.0645	7.867 ± 0.0305	8.7067 ± 0.0305	6.32 ± 0.0624	8.1167 ± 0.0378
Oxalates	2.703 ± 0.0251	2.292 ± 0.0025	0.723 ± 0.035	1.38 ± 0.03	4.243 ± 0.061
Crude Fibre	8.843 ± 0.0450	12.064 ± 0.0108	31.072 ± 0.026	28.724 ± 0.0262	10.053 ± 0.0242
Defatted Leaf	93.56 ± 0.0818	83.443 ± 0.0702	92.943 ± 0.1106	79.806 ± 0.698	84.456 ± 0.117
Calcium	2.537 ± 0.0080	2.664 ± 0.0519	3.627 ± 0.0221	0.806 ± 0.0030	3.0906 ± 0.0180
Magnesium	0.566 ± 0.0405	2.438 ± 0.0711	3.255 ± 0.0192	0.369 ± 0.0365	1.728 ± 0.163
Protein	0.0296	0.0293	0.0316	0.0323	0.0302
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Acid Insoluble Ash	0	0	0	0	0
Moisture	68.156 ± 0.0151	53.636 ± 0.0211	52.169 ± 0.0449	37.178 ± 0.0319	44.874 ± 0.0052
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Crude Fibre	8.843 ± 0.0450	12.064 ± 0.0108	31.072 ± 0.026	28.724 ±	10.053 ±

				0.0262	0.0242
Defatted Leaf	93.56 ± 0.0818	83.443 ± 0.0702	92.943 ± 0.1106	79.806 ± 0.698	84.456 ± 0.117
Calcium	2.537 ± 0.0080	2.664 ± 0.0519	3.627 ± 0.0221	0.806 ± 0.0030	3.0906 ± 0.0180
Magnesium	0.566 ± 0.0405	2.438 ± 0.0711	3.255 ± 0.0192	0.369 ± 0.0365	1.728 ± 0.163
Protein	0.0296	0.0293	0.0316	0.0323	0.0302

Table No. 2 Elemental analysis of plant leaves

Parameters	Tulsi	Neem	Peepal	Durva	Bael
Carbon	42.115	44.076	38.659	39.854	40.535
Nitrogen	2.373	2.347	2.529	2.583	2.423
Hydrogen	3.988	2.045	3.977	4.557	4.7710
Sulphur	0	0	0	0	0

Table No. 3 Phytochemical analysis of plant leaves

Parameter	Tulsi	Neem	Peepal	Durva	Bael
Carbohydrates	+	+	+	+	+
Flavanoids	-	-	-	-	+
Alkaloids	+	+	+	-	+
Tannin	+	+	+	+	+
Steroids	+	+	+	+	+
Terpenoids	+	+	+	+	+
Saponin	+	+	+	+	+
Glycosides	+	+	+	+	+
Reducing sugar	-	-	+	+	+

DISCUSSION

The present study was carried out on leaves of the plants *Ocimum sanctum*, *Azadirachta indica*, *Cynodon dactylon*, *Ficus religiosa* and *Aegle marmelos*. The nutritive values of plants were shown significant presence of proteins in leaves almost equivalent to 0.035% and presence of carbohydrates in all plant leaves.

It also showed the presence of significant amount of minerals such as Calcium and Magnesium. Screening of *Ocimum sanctum*, *Azadirachta indica*, *Cynodon dactylon*, *Ficus religiosa* and *Aegle marmelos* showed the presence of crude fibre, moisture and elemental constituents like Carbon, Hydrogen and Nitrogen, while reducing sugar was found to be absent in *Ocimum sanctum* and *Azadirachta indica*. The presence of these compounds shows the medicinal potential of the plant. Since reducing sugar is absent in *Ocimum sanctum* and *Azadirachta indica* leaves so different kinds of phenolic compound, amino acids and medicinal value can be detected. Since the present study was only carried out on different leaves that can be studied further for its use in field of Ayurveda and Nanotechnology.

CONCLUSION

The above analysis revealed that *Ocimum sanctum*, *Azadirachta indica*, *Ficus religiosa* and *Aegle marmelos* contains Alkaloids whereas *Cynodon dactylon* do not have Alkaloids, which concludes that the plant leaves which contains alkaloids can act as good reducing agent which can be used for preparation of nanoparticles whereas *Cynodon dactylon* do not have alkaloids which states that the amount or yield of nanoparticles prepared from *Cynodon dactylon* leaves extract might be low compared to extract of other plant leaves. As the leaves possess good nutritive values, so they can be used in Ayurveda for preparation of herbal medicines which act against harmful micro-organisms, etc.

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