

## Ultimate Analysis Of Some Medicinal Plants (Tulsi, Neem, Karanj, Kalmeg) Of Chhattisgarh, India and Their Comparative Study

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**Abstract:** The Ultimate analyses of selected medicinal plants of Chhattisgarh were undertaken with the aim of presenting the quantitative analysis of various elements like carbon, hydrogen, nitrogen, sulphur and oxygen present in the sample. The leaves of Neem (*Azadirachta indica*), Tulsi (*Oscimum sanctum*), Karanj (*Milletia pinnata*) and the mixture of leaves, stem, flowers and fruits of Kalmeg (*Andrographis paniculata*) were gathered, which are taxonomically authenticated. Results showed that the percentage of carbon in the leaves of medicinal plants varied between 35-42%, the amount of hydrogen is between 4-11.3%, the level of nitrogen is 3.3-12.4% and 0.3-0.8% of sulphur content is available, while the amount of oxygen is between 38-51%. The results are tabulated to demonstrate the difference in their elemental quantities of medicinal plants.

**Keywords:** Medicinal plants, *Azadirachta Indica*, *Oscimum Sanctum*, *Milletia Pinnata*, *Andrographis Paniculata*, Ultimate analysis.

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### I. Introduction

Medicinal plants have contributed tremendously to medicinal services. A noteworthy number of current drugs have been isolated from natural sources, quite of plant origin<sup>[1]</sup>. Medicinal plant incorporate various types of plants used as a part of herbalism. It is the use of plants for medicinal purposes, and the study of such uses. Medical information alluded in the old Indian literatures incorporates a few therapeutic herbs, which have been in the utilization under the indigenous arrangement of pharmaceutical, for thousands of years, in various forms. In India, 45,000 plant species have been recognized, around 15-20 thousand plants are of good medicinal esteem. However, traditional groups utilize just around 7000-7500 plants for therapeutic purposes. The Siddha arrangement of drug utilizes around 600, Ayurveda 700, Unani 700 and present medicine about 30 medicinal plants for treating an assortment of sicknesses in man and animals<sup>[2-4]</sup>. In context of enormously rich bio social fair assortment in the state and dependence of forest occupants for their prosperity need on remedial plants, the legislature in July 2001 has pronounced Chhattisgarh as the natural state. The common region of CG is organized in Deccan bio geographical area. The state is out and out rich in endemism with respect to a few plants having remedial criticalness.

Tulsi (*Ocimum sanctum*) is also called Manjari/Krishna tulsi (Sanskrit). These are aromatic in nature due to the presence of a sort of scented oil in them<sup>[5]</sup>. Tulsi is used in Ayurvedic preparations for treating different afflictions. Tulsi leaves contain a bright yellow volatile oil which is helpful against insects and microorganisms. Tulsi have important antagonistic to extend properties. Its leaf blend improves appetite. It is carminative, antipyretic, diaphoretic, expectorant and vermifugal and it is proper to an extensive variety of fever, cough, cold, bronchitis, dysentery, diarrhoea etc. Oil extracted from the leaves is utilized as a pest repellent, antibacterial and insecticide<sup>[6]</sup>. Tulsi leaves, oil and extracts have a significant expansive number of medicinal uses and can be utilized as a natural insecticide<sup>[7]</sup>. Neem (*Azadirachta indica*) is a tree of Meliaceae family. The sources of neem oil are its fruits and seeds. Since ancient times, the remedial properties of Neem have been seen and have been extensively used as a part of Ayurveda, unani, and homeopathic medication<sup>[8]</sup>. Many compounds for instance, limonoids, azadirone, azadirachtin, and flavonoids, having remedial potential, have been confined from different parts of neem tree and have been surveyed for their pharmacological activities and possible therapeutic applications alongside their security appraisal. Recent studies exhibited that neem gain anti-inflammatory, antiarthritic, antipyretic, hypoglycemic, antigastric ulcer, antifungal, antibacterial, and antitumor activities<sup>[9-13]</sup>. Neem is additionally used to respect viral illnesses for instance, small pox, and chicken pox. It protects the liver from harm which accordingly cleans the blood. It exhibits hypoglycemic effect<sup>[14]</sup>. Neem may help in the look for anticipation or cure for AIDS may potentially be managed by ingesting extracts of Neem leaf or the entire leaf or by drinking a neem tea<sup>[15]</sup>. Karanja is a medium sized evergreen tree which has minor economic importance in India. The total karanja tree has got excellent medicinal properties. The locals and

traditional healers of CG utilize distinctive parts of karanj (Millettiapinnata) as medicine as often as possible. As indicated by Ayurveda, Karanj is antihelminthic, alexipharmic and valuable in the illnesses of eyes, vagina, skin tumors, wound, ulcers, itching, growth of spleen, abdomen urinary releases etc. karanj roots and barks are utilized in joint pains<sup>[16]</sup>. Kalmeg (Andrographis paniculata) extract shows against typhoid and antifungal activities. It also possess anti-hepatotoxic, anti-toxin, anti-malarial, anti-hepatitic, antithrombogenic, anti-inflammatory, anti-snake venom and antipyretic properties to mention a few besides its general uses as immune stimulant agent Kalmeg is known for its exceptional capacity to ensure liver, cerebrum and heart. The biomass was effectively utilized for expulsion of surfactant from waste water which is in fact pertinent and practical<sup>[17-20]</sup>. Ultimate analysis also known as elemental analysis is dependent on quantitative analysis of various elements present in the sample. It is the method to determine the carbon, hydrogen, sulphur, oxygen, and nitrogen content present in the sample. High value of carbon shows better in quality. Hydrogen is associated with volatile matter. Nitrogen comes from protein us matter in vegetable matter. Sulphur is undesirable and its oxidization product cause corrosion of equipment in presence of moisture and pollution. The moisture holding capacity is increases with increasing in oxygen content. It is necessary to comprehend the properties of materials to assess their utility. So the present study includes exploring the ultimate analysis of medicinal plants generally available in Chhattisgarh and studying their qualities.

## II. Methods and Materials

### 2.1 Collection of samples:

The leaves of medicinal plants like Oscimum sanctum (Tulsi, Lamiaceae family), Azadirachta indica (Neem, Meliaceae family), Millettia pinnata (Karanj, Fabaceae family) and the mixture of the powder of stems, leaves, flowers and fruits of Andrographis paniculata (Kalmegh, Acanthaceae family) were taken under the studies from Chhattisgarh state. These samples were dried in the sun and also dried in the shade. A special care was taken for the selection of healthy plants and the fresh parts of plant were accumulated for the examination and in the ultimate analysis it was dried for a week.

### 2.2 Ultimate analysis:

The ultimate analysis is imperative for determining the elemental composition such as C, N, H, S, O etc. in medicinal plants. It was done by utilizing CHNS analyser (Model: Elementar Vario micro cube, Germany at SSS-NIRE, Kapurthala).

## III. Results and discussion

Since the main elemental components of the above medicinal plants include hydrogen, oxygen, carbon, nitrogen and sulphur. The range of carbon content in the leaves of tulsi is 42% as compared to the leaves of other plants varies between 35-37%. Neem had the least in carbon content. The value of hydrogen is 4.0-9.4% in the leaves of above plants. The percentage of nitrogen is 3.3-12.4%. Neem contains higher nitrogen value than other, because these plants require some nitrogen in functional molecules such as porphyrias and also a nitrogen fixer. Since nitrogen is an inert and incombustible gas, so a little nitrogen content show the better quality. The sulphur content is present in the range of 0.3-0.8%. Sulphur produces harmful and corrosion causing SO<sub>2</sub> and SO<sub>3</sub> gases, which pollute the atmosphere. Sulphur is usually present to the extent of 0.5 to 3%. The percentage of oxygen present in the range from 38-51%. Tulsi containing high percentage of oxygen than the other. (Table 1)

S.No.	Specimen	Elemental analysis				
		%C	%H	%N	%S	%O
1.	Oscimum sanctum	42	9.4	7.4	0.7	51
2.	Azadirachta indica	35	8.7	12.4	0.5	45
3.	Millettia pinnata	37	4.0	3.3	0.3	38

Table 1 Ultimate analysis on leaves of Tulsi (Oscimum sanctum), Neem (Azadirachta indica) and Karanj (Millettia pinnata)

S.No.	Experimental studies	Dried and powdered mixture of leaves, stems, flowers and fruits of Kalmeg ( Andrographis paniculata )%
1.	%C	40
2.	%H	11.3
3.	%N	8.3
4.	%S	0.8
5.	%O	48

Table 2 Ultimate analysis on the dried & powdered mixture of leaves, stems, flowers and fruits of Kalmeg (Andrographis paniculata)

The mixture of dried and powdered of stems, leaves, flowers and fruits of Kalmeg (Andrographis paniculata) contain 40% carbon, 11.3% hydrogen, 8.3% nitrogen, 0.8% sulphur and 48% oxygen. (Table 2).

#### IV. Conclusion

The plant kingdom plays an important role in the life of human beings and animals. The plant, as one of the important sources, still keeps up its unique place in the treatment of different diseases, with no ill effects. Indeed medicinal plants are effectively accessible, less expensive and have no toxicity. The ultimate analysis has been carried out to get the valuable data. For this purpose we collect and dried the leaves of *Ocimum sanctum*, *Azadirachta indica*, *Millettia pinnata* and the leaves, stems, flowers and fruits of *Andrographis paniculata*. Ultimate analysis also known as elemental analysis exist the percentage of carbon, nitrogen, oxygen, hydrogen and sulphur. We determine each element through ultimate analysis and express it as a percentage of the aggregate mass of the sample. Greater the percentage of carbon and hydrogen, better in quality. The low composition of nitrogen and sulphur in virtually all the sample selected will result in low emission of oxides of nitrogen and sulphur into the atmosphere. The low percentage of sulphur is good for combustion since good fuels are known to have low sulphur contents. The ultimate analysis of these specimens will give a unique mark of whether the species is adulterated or not. The results show how they are different in their quantities and qualities also.

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