Asian Journal of Research in Botany

7(4): 35-39, 2022; Article no.AJRIB.89949

Comparision of Chlorophyll Content in Diffrent Tulsi Species Found in Paikmal, Bargarh District, Odisha

Akshya Kumar Mishra [a*], Aishwarya Khamari [b] and Debashish Gardia [c]

[a] Department of Microbiology, Batakrushna College of Pharmacy, Nuapada, Odisha, India.
[b] School of Life Science, Sambalpur University, Odisha, India.
[c] Department of Pharmacology, Batakrushna College of Pharmacy, Nuapada, Sambalpur, Odisha, India.

Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

Article Information

Open Peer Review History:
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Original Research Article

Received 20 May 2022
Accepted 25 July 2022
Published 29 July 2022

ABSTRACT

Tulsi is one of the most important plants found in India having medicinal and religious value. It represents by genus *Ocimum* belonging to family *Lameaceae*. There are 60 species of *Ocimum* that all over the world. Medicinally, Tulsi uses as herbal tea, treatment of respiratory disease, cold fever etc. Besides medicinal use it has religious important in Hindu religion Bargarh district located in western Odisha having longitude 82.5167 latitude 20.8167 paikmal generally four species of Tulsi found such *Ocimum tenuiflorum (black Tulsi), Ocimum sanctum (green Tulsi), Ocimum basilicum(dohna) and Ocimum gratissimum (Vana Tulsi).* In this study there was an attempt to made to find out chlorophyll content of different Tulsi species found in Bargarh district Paikmal area of Odisha. Also this studies were compare the chlorophyll pigment of 4 different species of *Tulsi* as *Ocimum tenuiflorum* (black Tulsi), *Ocimum sanctum* (green Tulsi), *Ocimum basilicum*(dohna) and *Ocimum gratissimum* (van Tulsi). Among the results the maximum total chlorophyll content found in *Ocimum tenuiflorum* and list in *Ocimum sanctum*. The chlorophyll a found maximum in *Ocimum basilicum*. And minimum in *Ocimum gratissimum*. The chlorophyll b found maximum in *Ocimum basilicum* and minimum in *Ocimum tenuiflorum*. The total chlorophyll found *Ocimum gratissimum* and minimum in *Ocimum sanctum*. This type of study provides us data regarding distribution of chlorophyll in different species of a genera, and high amount of chlorophyll indicate maximum photosynthetic activity of that plant and its medicinal importance.

**Corresponding author: E-mail: akshyamicrobiologist@gmail.com;*

Keywords: Ocimum sp.; chlorophyll content; medicinal use; spectrophotometer; Paikmal.

1. INTRODUCTION

One of India's most significant herbs, tulsi has both medical and spiritual significance. It stands for the Lameaceae family's genus Ocimum. Ocimum has 60 different species worldwide. Tulsi is used medicinally as a herbal tea, treatment of respiratory disease, cold fever etc. Besides medicinal use it has religious important in Hindu religion. Rashmi Chandra, et.al. [1] works on antimicrobial activities of tulsi. N Sing, et.al. [2] told that tulsi is the mother of all herbal medicine. Sumit Narval, et.al. [3] reviewed on chemical and pharmacological action of tulsi.

Chlorophyll is the photosynthetic green pigment of plants, there are generally a type of chlorophyll. Chlorophyll-a and chlorophyll-b to found in terrestrial plant chlorophyll is a green pigment that has capacity to light energy into chemical energy in particular process of such conversion is called as plant that photosynthesis. The chlorophyll found in all green plant and also in cyanobacterial, algae [4]. The chlorophyll molecule consists of a central magnesium atom surrounded by a nitrogen-containing structure called a porphyrin ring [5,6].; attached to the ring is a long carbon–hydrogen side chain, known as a phytol chain [5,6]. Beside photosynthesis chlorophyll have several health. benefit like and oxidant property, that use in cancer prevention treatment of arthritics, management of obesity, Removal of liver toxicity etc.

Ocimum sanctum is a fragrant and therapeutic plant that has long been valued for its pharmacological properties [7]. In particular, to research stress physiology and abiotic challenges such nutrient shortage, chlorophyll content metres have been effectively utilised to assess foliar chlorophyll content in a variety of plant species without causing any damage [8].

Employing laboratory measurements, analyse the correlation between a variety of hyperspectral chlorophyll indices and the chlorophyll content of wheat crops [9].

By using molecular docking and molecular dynamics (MD) simulation analysis, an effort was made to identify natural phytochemicals from medicinal plants in order to reutilize them against COVID-19.

Three of the potential inhibitors against SARS CoV2 Mpro (Main protease) were found in Ocimum sanctum, according to a molecular docking investigation (Tulsi). [7]

Ocimum sanctum L. (Tulsi) is an erect, much branched sub-shrub ranged from (30-60) cm tall, with simple opposite green or purple leaves that are strongly scented and hairy stems. Leaves have petiole and ovate, up to 5 cm long, usually somewhat toothed. Flowers are purplish in elongate racemes in close whorls. Tulsi is native throughout the world tropics and wide spread as a cultivated plant and an escaped weed.

In this study there was an attempt had to made to find out chlorophyll content of different Tulsi species found in Bargarh district Paikmal area of Odisha.

2. METHODOLOGY

2.1 Study Area

The Bargarh district of Odisha is home to Paikmal block. It is well-known for the Gandhamardhan hill, which is home to several plants of significant medicinal and ethnobotanical value. Paikmal is located in latitude 20.91844 and longitude 82.84955. In this study, plant specimens were gathered at the Paikmal area, which is close to the Nausinghnath Temple.

2.2 Collection of Material

The four species of tulsi, which include Ocimum tenruiflorum (black tulsi), Ocimum sanctum (green tulsi), Ocimum basilicum (dohna), and Ocimum gratissimum (van tulsi), were collected in Nrushingnath area Paikmal, Odisha.

2.3 Extraction of Chlorophyll

Chlorophyll was extracted as per Arnon in (1949) [10].

1. Total chlorophyll = 20.3 (A645) + 8.02(A663)
2. Chlorophyll A = 12.7 (A663) - 2.69 (A645)
3. Chlorophyll B = 32.9 (A645) - 4.68(A663)

Estimation of chlorophyll
⇓
Take 1 gm of Fresh leaf
⇓
Grind with 20 ml of 80% Acetone
⇓
Centrifuge at 5000RPM for 5 min
⇓
Transfer the supernatant
⇓
Take Absorbance at 645 nm & 663 mm in a spectrophotometer
⇓
Estimate chlorophyll by following formula:

3. RESULTS AND DISCUSSION

Form the experiment following results were found.

In *Ocimum tenuiflorum* chlorophyll a content 240.66, chlorophyll b content 154.51 and total chlorophyll contain 315.04.

In *Ocimum sanctum* chlorophyll a contain 42.774, chlorophyll b content 80.636 and total chlorophyll contain 123.366.

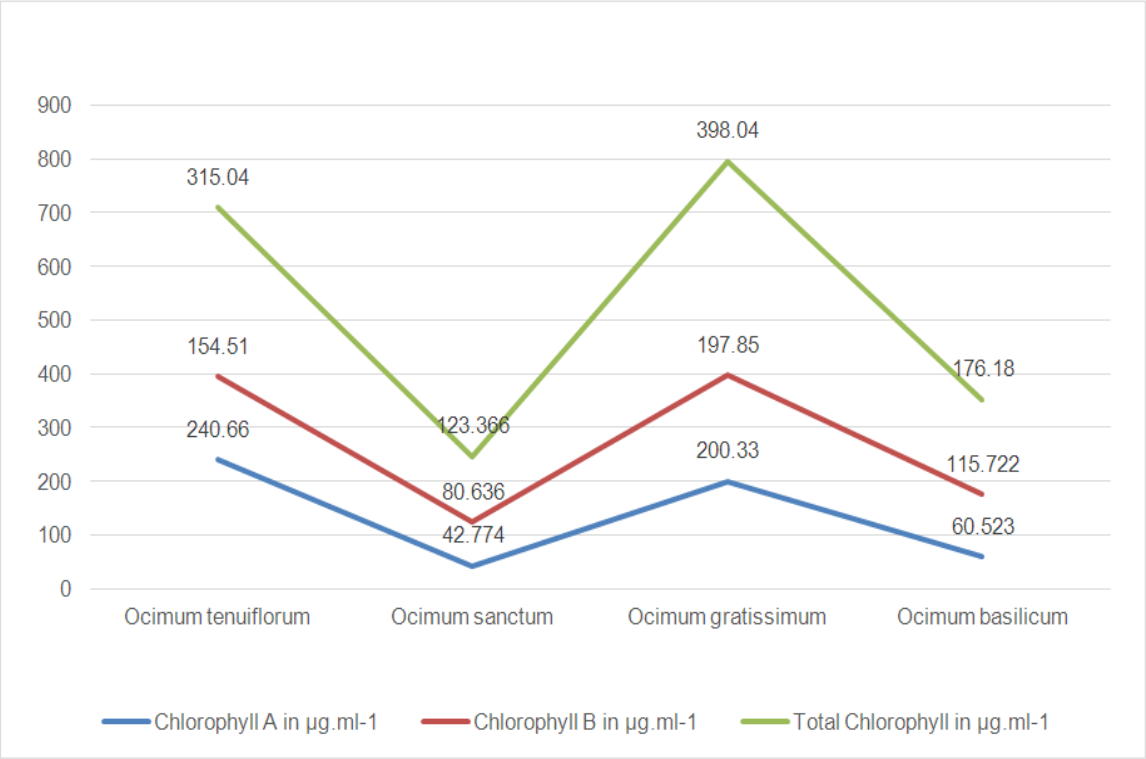
In *Ocimum gratissimum* chlorophyll a contain 200.33, chlorophyll b content 197.85 and total chlorophyll contain 398.04.

In *Ocimum basilicum* chlorophyll a contain 60.523, chlorophyll b content 115.722 and total chlorophyll contain 176.18.

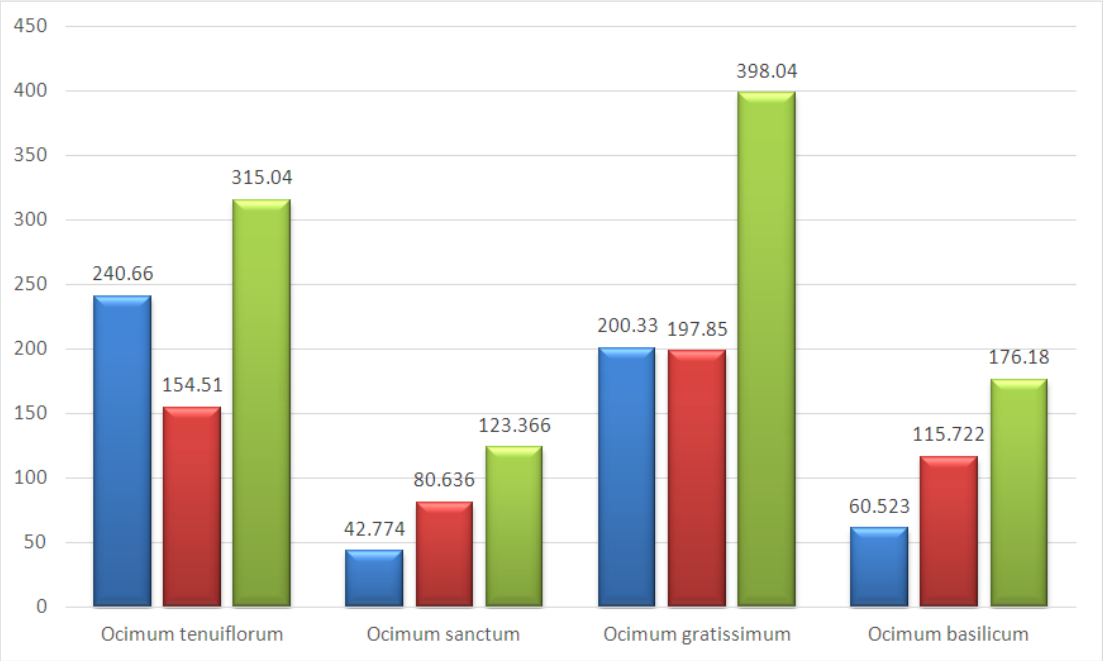
Comparison of chlorophyll content reflected in table and graphs.

Table 1. Comparison of chlorophyll among the Ocimum species

	Name of the species	Chlorophyll A in µg.ml-1	Chlorophyll B in µg.ml-1	Total Chlorophyll in µg.ml-1
1	*Ocimum tenuiflorum*	240.66	154.51	315.04
2	*Ocimum sanctum*	42.774	80.636	123.366
3	*Ocimum gratissimum*	200.33	197.85	398.04
4	*Ocimum basilicum*	60.523	115.722	176.18



Graph 1. Comparision of chlorophyll among the Ocimum species



Graph 2. Comparision of chlorophyll among the Ocimum species

Picture 1. Tulsi plant

4. CONCLUSION

The results in this study compared between chlorophyll pigment of 4 different species of tulsi as *Ocimum tenuiflorum* (black Tulsi), *Ocimum sanctum* (green Tulsi), *Ocimum basilicum* (dohna) and Ocimum gratissimuma(van Tulsi) among them maximum total chlorophyll content found in *Ocimum tenuiflorum* and list in *Ocimum sanctum*. The chlorophyll a found maximum *in Ocimum basilicum*. And minimum in *Ocimum gratissimum*. The chlorophyll b found maximum in *Ocimum basilicum* and minimum in *Ocimum tenuiflorum*. The total chlorophyll found *Ocimum gratissimum* and minimum in *Ocimum* sanctum. This type of study provides us data regarding distribution of chlorophyll in different species of genera, and high amount of chlorophyll indicate maximum photosynthetic activity of that plant and its medicinal importance. This data also used as a chemotaxonomy data for differentiate species with in a genus.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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Peer-review history:
The peer review history for this paper can be accessed here:
https://www.sdiarticle5.com/review-history/89949