

## THE GENUS *TETRAEDRON* KÜTZING (ALGAE - CHLOROPHYCEAE) FROM CHAUTH MATA TEMPLE POND OF CHAUTH KA BARWARA, SAWAI MADHOPUR (RAJASTHAN) INDIA

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### Research Paper

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### ABSTRACT

The present communication gives the taxonomic enumeration of 10 taxa of Chlorococcalean genus *Tetraedron* Kützing. These taxa were identified from the sacred Chauth Mata Temple pond situated at Chauth ka Barwara Tehsil headquarters of Sawai Madhopur district (Rajasthan). These taxa were *Tetraedron minimum*, *T. tumidulum*, *T. muticum*, *T. caudatum*, *T. gracile*, *T. trigonum* var. *longispinum*, *T. pusillum*, *T. trilobulatum*, *T. simmeri* var. *minus*, *T. pentaedricum*. All these taxa have been reported for the first time in Chauth ka Barwara Tehsil.

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### INTRODUCTION

Chauth ka Barwara town is the tehsil headquarters of Chauth ka Barwara tehsil of Sawai Madhopur district of Rajasthan state of India, which is located at a distance of 25 kilometers from Sawai Madhopur district headquarters on the Jaipur-Sawai Madhopur railway track. It lies between 26.045 °N latitude and 76.1562 °E longitudes covering an area of 522.89 sq. km. This is an ancient town of Sawai Madhopur district which is known throughout the country due to the Chauth Mata temple established by Maharana Bhim Singh Chauhan in Vikram Samvat 1451 on the peak of the Aravalli Mountain Range. Due to the presence of many temples like Chauth Mata Temple, the temple of Bhagwan Devnarayan ji, the worshipable god of the Gurjar community, the temple of Meen Bhagwan, the worshipable god of the Meena tribe, Khul-Khul Mata Temple, Shree Raj Rajeshwar

Shiva Temple, etc., it is famous as a religious and cultural city and is the center of faith of the people. Chauth ka Barwara Fort, built by Chauhan kings in the 14th century on a small hill at a short distance from the Chauth Mata temple, is a historical heritage of this town in which a five star hotel Six Senses Barwara Fort is currently operating. Chauth Mata Temple Pond is an ancient and religious pond built in 1463 between Chauth Mata Temple Hill and Chauth ka Barwara Fort, which is considered sacred due to the faith of the devotees. Along with recharging the groundwater, its water is used for performing various religious rituals, religious bathing, washing clothes, recreation and cattle use etc. Apart from this, this pond is a natural habitat of various types of flora and fauna.

Algae are a large group of diversified, widely distributed photosynthetic plants that live in habitats

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with different environmental conditions such as freshwater, marine water, warm water sources, ice, soil and even in symbiotic relationships with other organisms. They are the first organisms to act as bio indicators to indicate the health of aquatic ecosystems as they have the ability to grow rapidly and are very sensitive to changes in their environmental conditions. The diversity and species composition of algae in an aquatic ecosystem reflects the seasonal variation of its physicochemical factors, its stability, trophic status, ecological functions etc. Hence, the floristic study of algae is crucial for understanding the utility, health condition and future of aquatic ecosystems.

*Tetraedron* Kützing is a unicellular, solitary free floating green algal genera belonging to Tetraedronoideae subfamily of Hydrodictyaceae family of order Chlorococcales in class Chlorophyceae. Its shape is polygonal (triangular, quadrangular, pentangular, octagonal) with spines present or absent at the corners or corners are produced into branched or unbranched processes. While studying the Chlorophyceae algal diversity from the sacred Chauth Mata Temple pond situated at Chauth ka Barwara Tehsil headquarters of Sawai Madhopur district (Rajasthan) from 2021-2022 to 2022-23 the authors collected, identified and systematically described total 10 taxa of this genera.

*Tetraedron* of India has been studied by Kamat (1963); Jose and Patel (1992); Jadhav and Chavan (2009); Roy and Pal (2015); Sankaran and Thiruneelagandan (2015); Jadhavar and Papdiwal (2016); Patil *et al.* (2017); Yadav (2018); Barupal (2019); Mallikarjuna *et al.* (2019); Reddy (2020); Desingurajan *et al.* (2021); Saravanan *et al.* (2024); Reddy (2025); Habib, I. (2025).

## MATERIAL AND METHODS

This study work was done for 2 consecutive years from June 2021 to May 2023. Two sites S1 and S2 were selected at Chauth Mata Temple Pond in Chauth Ka Barwara town and during this time period, algal samples were collected from each site on a seasonal basis between 8.00 to 10:00 am in 1 liter clean plastic bottles. The samples were freshly studied in the laboratory and some samples were preserved in 4% formalin for future study. Microphotographs of algal taxa were taken with the help of camera by observing in binocular microscope and their systematic identification was done with the help of recent research papers, standard books, monographs and

flora (Philipose, 1967; Sevindik, 2010; John *et al.*, 2011; Merza and Abdul, 2020; Pereira *et al.*, 2024).

## RESULTS AND DISCUSSION

A total of 10 taxa of *Tetraedron* Kützing, 1845 have been reported and the taxonomic enumeration of each species is given below as follows:

### 1. *Tetraedron minimum* (A. Braun) Hansgirg (Plate 1, fig. 1)

Cells small, four-sided, flat and quadrangular shaped, opposite sides of cells are deeply concave and angles are rounded. Cell wall thick and smooth. Cells are 7-30  $\mu$  in their diameter.

Collection site: S1 & S2 during all seasons.

### 2. *Tetraedron tumidulum* (Reinsch) Hanaging (Plate 1, fig. 2)

Cells tetragonal in shape with angles usually rounded or sometimes with knob-like projections and all the four sides of cells more or less concave. Cells are 16-58  $\mu$  in diameter.

Collection site: S2 during all seasons.

### 3. *Tetraedron muticum* (A. Braun) Hansgirg (Plate 1, fig. 3)

Cells are small, triangular and flat and all three faces are slightly concave, Cell angles are broadly rounded or sometimes may be truncate. Cell walls smooth. Cells are 6-30  $\mu$  in diameter.

Collection site: S2 during pre - monsoon and monsoon season.

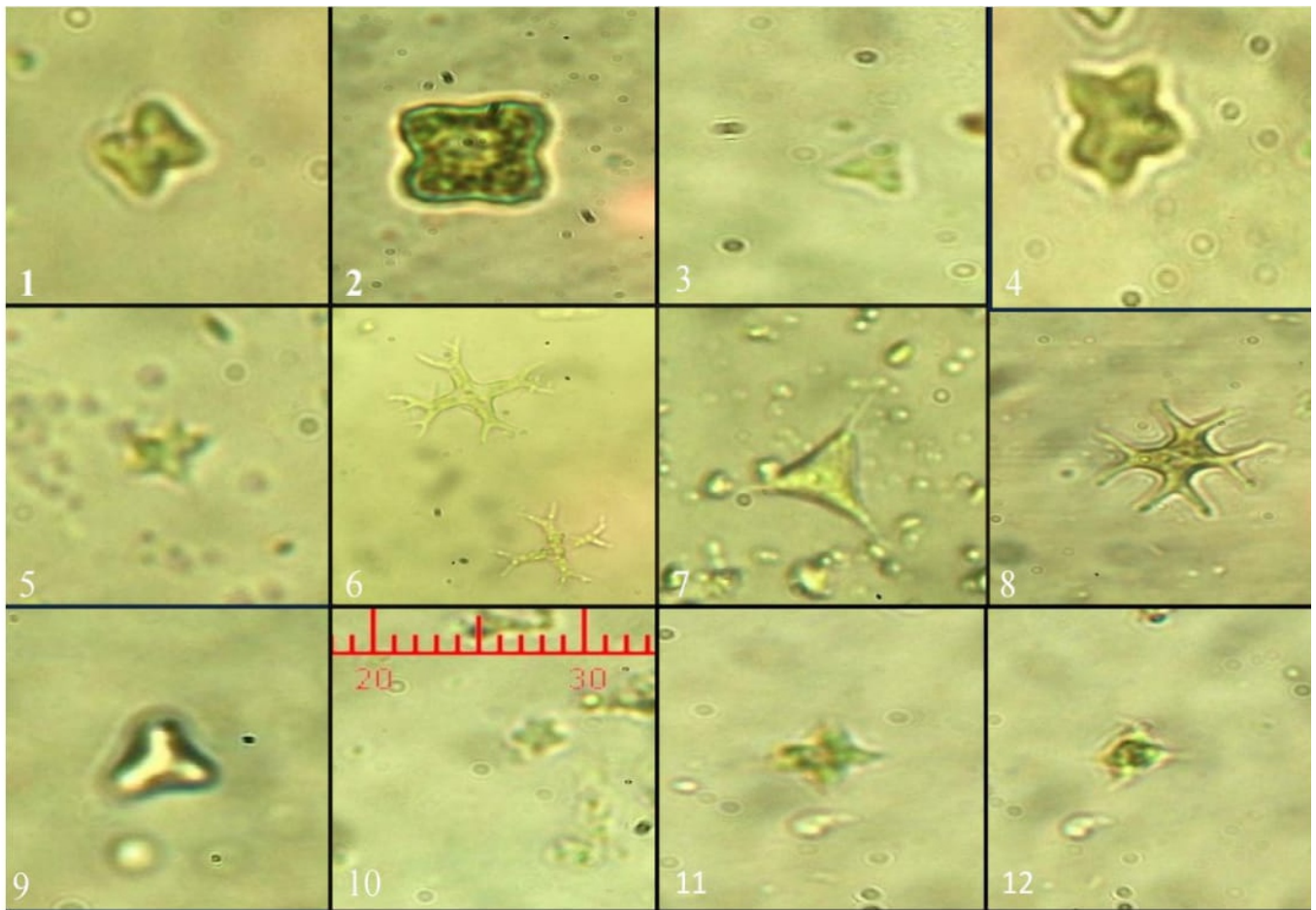
### 4. *Tetraedron caudatum* (Corda) Hansgirg (Plate 1, fig. 4, 5)

Cells are small, flat and having lobes, the cells are almost star shaped with five faces, four of which are concave but the fifth face has a relatively deep groove. All the five angles are rounded and each bearing a short and straight spine. Cells are 6-23  $\mu$  in diameter and Spines are 1-4  $\mu$  long.

Collection site: S1& S2 during pre - monsoon and monsoon season.

### 5. *Tetraedron gracile* (Reinsch) Hansgirg (Plate 1, fig. 6)

Rectangular flat cells with narrow projections extending from their edges. These projections are usually twice branched and have spines at their ends. Primary branches are at right angles to each



**Plate 1: Tetraedron Kutzing identified from Chauth Mata Temple Poind, Chauth Ka Barwara, Sawai Madhopur (Rajasthan).**

**Figures:** 1. *Tetraedron minimum*; 2. *T. tumidulum* 3; *T. muticum* 4, 5; *T. caudatum*; 6. *T. gracile*; 7. *T. trigonum* var. *longispinum*; 8. *T. pusillum*; 9. *T. trilobulatum*; 10. *T. simmeri* var. *minus*; 11-12 *T. pentaedricum*.

other and usually parallel with one side of cell. Cell diameter with projections is  $32-40\ \mu$  and without projections  $10-20\ \mu$ .

Collection site: S2 during all seasons

**6. *Tetraedron trigonum* var. *longispinum* var. nov. (Plate 1, fig. 7)**

Cells are flat and triangular in their shape, All three faces of the cells are slightly to firmly concave. Angles are sharply pointed and each with single long and steep spine. Cells are  $12-18\ \mu$  in diameter and Spine length  $9-15\ \mu$ .

Collection site: S1 during pre - monsoon season.

**7. *Tetraedron pusillum* (Wallich) W. et G. S. West (Plate 1, fig. 8)**

Cells are cross-shaped, typically bearing four processes—occasionally three—each terminating in a pair of backward-curving spines. Viewed from the side, the cells appear elongate-ellipsoid with tapering ends. Cell dimensions are approximately  $9.5\ \mu$ m in width and  $23\ \mu$ m in length.

Collection site: S1 & S2 during monsoon & post - monsoon season.

**8. *Tetraedron trilobulatum* (Reinsch) Hanaging (Plate 1, fig. 9)**

Cells are triangular in shape, with all sides of equal length and prominently concave. The corners of the triangle are broadly rounded. The cell wall is thick and has a smooth surface. Cells can reach up to  $25\ \mu$ m in diameter.



Collection site: S2 during post - monsoon & pre - monsoon season.

**9. *Tetraedron simmeri* var. *minus* var. nov. (Plate 1, fig. 10)**

Cells are pentangular and all the five sides of cells are slightly concave. Angles are rounded and cell membrane thin, cells are with parietal chloroplast with a central pyrenoid. Cells 9-13  $\mu$ m in diameter.

Collection site: S1 & S2 during monsoon & post - monsoon season.

**10. *Tetraedron pentaedricum* W. et G. S. West (Plate 1, fig. 11 - fig 12)**

Cells are small and have an irregular five-lobed structure, with four lobes aligned in one plane and the fifth projecting at an angle. The lobes have slightly pointed tips, each bearing a short, gently curved spine. The diameter of the cells, excluding spines, ranges from 10.5 to 15  $\mu$ m, while the spines measure between 3.5 and 5  $\mu$ m in length.

Collection site: S2 during all seasons.

## CONCLUSION

The present work described a total of 10 taxa of genus *tetraedron* collected from Chauth Mata Temple Pond of Chauth Ka Barwara, district Sawai Madhopur (Rajasthan). All these taxa have been reported for the first time in Chauth ka Barwara, Tehsil.

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