



## (RESEARCH PAPER BIOTECHNOLOGY)

**Abstract:**

*Cynodon dactylon* (L.) Pers. is a perennial grass that possesses pivotal medicinal value in Ayurveda. The study includes the effect of the three rivers on the growth and development of the *C. dactylon*. Water samples were collected from the Wanki, the Auranga and the Ghadoi river of Valsad district in Gujarat State in winter season. The samples were analysed by parameter – TDS (Total Dissolved Solids). The results shows that the Wanki and the Ghadoi river water support the proper growth of *C. dactylon*. The water of the river Auranga was not suitable for growth of *C. dactylon*.

**Key Words:** *Cynodon dactylon*, River water, TDS.

**Introduction:**

Due to suitable climate and habitat, a flora of India is famous all over the world. India is a treasure house of medicinal plants. "The Royal Botanical Garden", Kew reported in 2016 that, about 17,810 species of plants are used as a medicinal plants. *Cynodon dactylon* (L.) Pers. is such type of species which can be used as medicinal plants. It is found all over the world. It belongs to the family Poaceae. The scientific name, *C. dactylon*, is derived from Greek word, 'kuon' meaning a dog and, 'daktulos' meaning finger – refers to the inflorescence which is digitate (arranged like a finger on the hand). *C. dactylon* is weed plant and it is used by domestic animal as a food. *C. dactylon* identified as a sacred grass as it is used in Hindu rituals like worshiping of the Lord Ganesha, wearing it as a ring in *homa*, etc. it is said that it purifies a person taking part in a devotional activity if he or she wears a *Cynodon dactylon* grass as a ring. *Cynodon dactylon* comprises many medicinal properties like anticancer, antidiabetic, antiseptic, antimicrobial, antifungal, diuretic, etc.

Water is important for living a life on the earth. Any organism cannot live on the earth without water. Human requires water for day to day life. Plants require water for their growth. Fishes need water for habitation. And animals also require water to survive. Most of the part on the earth is of sea water, which cannot be used by any organism living on a land. Only 2.5 – 2.75 percent of fresh water is seen on the entire earth. Out of which, 1.75 – 2 percent water is frozen in glaciers, ice and snow, 0.5 - 0.75 percent water is as a fresh ground water and soil moisture. Only 0.01 percent of total water is surface water in lakes, rivers, etc.

So river is an important resource of a fresh water. A fresh water in a river comes from rain or glaciers. Use of this water is done by nearby human and animals to survive. And also a nearby land is used for cultivation. In this way, river water has its own importance on mankind, flora and fauna. Chemical analysis of river water is done by water quality parameter. It is done by different persons by implementing different methods. For example, in Maharashtra, chemical analysis of Godavari River was done by parameters such as pH, TDS and EC (Shinde, 2016). In Madhyapradesh, whether the water of Narmada River is suitable for drinking, domestic and irrigation purpose, a chemical analysis was done by parameters such as Turbidity, pH, Conductivity, TDS, BOD, COD, DO, etc. (Satish Piplode and Veer Singh Barde, 2015).

Valsad city is located in north Gujarat. Valsad city is included into the list of cities of south Gujarat where rain fall is higher. It possesses sub-tropical climate and moderately high humidity. Valsad city is connected with Auranga, Wanki, Ghadoi, Paar, Damanganga, etc rivers.

Water is responsible for transporting important nutrients through the plants. Measuring plant growth determines how capable the water is in transporting these nutrients. Since plants have a high composition of water using dry weight as a measure of plant growth tends to be more reliable (Renan P. Limjuco, *et al.*, 2014).

In our study, we used water from three rivers and tap water of Valsad city for the growth of *C. dactylon* in winter season. These three rivers includes Wanki, Auranga and Ghadoi. It was seen that what effects are occurring on the growth and development of *C. dactylon*. And it was also observed that in which water the growth of *C. dactylon* happens in terms of plant height and plant colour. TDS parameter was used for the measurement of water.

Total Dissolved Solids (TDS) is an analysis of dissolved group of organic and inorganic substances into a water. The main use of TDS measurement is for a water quality study of different sources like streams, rivers, lakes, etc. characteristics of drinking water and its chemical contaminations can also be known by TDS.

**Materials And Methods:**

Monitoring and measurement of growth and TDS respectively for different rivers had been done for *Cynodon dactylon* for 30 days. This study was carried out in winter season in the Valsad city of Gujarat state. Collection of river water was done from different rivers of Valsad city e.g. Wanki, Auranga and Ghadoi.

In winter season, first of all, we had taken four pots, namely, A, B, C, D. Then after, we filled up a soil into those pots. This soil was same as where the small plants of *C. dactylon* were collected. After that, small plants of *C. dactylon* containing root, stem and leaf were planted into those pots. 10 to 12 plants were been planted into each pots. After that, measurement of heights and analysis of colours of plants of each pots were done. Watering of these pots were done from different sources as follows:

- Pot – A: Wanki River
- Pot – B: Auranga River
- Pot – C: Ghadoi River
- Pot – D: Tap water

This process was done precisely for all Pots in terms of same timing and same quantity on the daily bases for a month in natural environment so that plants can grow naturally. After a month, again heights of *C. dactylon* of each pot were measured. In height measurement of *C. dactylon*, a height of stem from soil surface to tip of a plant was measured. And also the length of roots located beneath the soil was measured. This measurement was done by measure tap in inch unit. And also the change in colour of plants was analysed. Water samples were measured by TDS parameters. This measurement was done in ml/L or ppm (parts per million) unit. By this, it can be known that TDS of which river is higher and TDS of which river is lower and also growth of *C. dactylon* less for which water and that is more for which water. (Takase, *et al.*, 2010)

**Results:**

In winter season, an analysis of tap water and river water samples which were taken from rivers Wanki, Auranga and Ghadoi of Valsad city was done by TDS parameter so that we can understand the importance of river water for the growth of *C. dactylon* plant. We can conclude on the bases of the result obtained from this study that,

effect of different river water is different on the growth of *C. dactylon* plant.

**Table 1: Report on TDS of water samples**

Sr. No.	Samples	TDS (Total Dissolved Solids) in mg/L
1	Wanki River	430
2	Auranga River	745
3	Ghadoi River	185
4	Tap water	346

It can be seen from the Table 1 that TDS of water samples of rivers range from 745 to 185 mg/L where as TDS of a sample of tap water is in the range of 346 mg/L. Highest TDS measuring sample is Auranga river, 745 mg/L. TDS of Wanki river and Ghadoi river were 430 and 185 mg/L. TDS of tap water was 346 mg/L.

**Table 2: Report on height of the plant in inch**

Pots	Water	Height (inch)		Colour	
		At initial stage	After 30 days	At initial stage	After 30 days
A	Wanki River	2.5	16	Green	Green
B	Auranga River	6.5	6.5	Green	Yellow
C	Ghadoi River	4	13	Green	Green
D	Tap water	5	14	Green	Green

It is observed from the Table 2 that, after 30 days, a growth of *Cynodon dactylon* was more for a water of Wanki River than other water samples. Heights of *C. dactylon* plants for different river water of Valsad city were seen as: Wanki River –16 inch, Auranga River – 6.5 inch, Ghadoi River – 13 inch where a height of plant was 14 inch for tap water of Valsad city.

It can also be concluded from above observations that a *C. dactylon* plant which was grown up by a water was seen to be healthy and green. Colours of plants of pots A, C and D which were watered by Wanki River, Ghadoi River and tap water respectively were only observed to be green. While the growth of a plant which was in pot B which was watered from Auranga River was not occurred. So that plat was dried and so of yellow in colour.

#### Discussion:

The results obtained from this experiment that, in winter season a growth of *C. dactylon* plant is affected differently by 4 types of water in which, 3 samples from 3 different rivers and a sample of tap water was analysed by TDS parameter. Among these all samples, the highest TDS measuring sample was of Auranga River. While samples from Wanki River, Ghadoi River and Tap water, measurements for TDS were 430, 185 and 346 mg/L respectively.

TDS gives the idea about number of units of impurities for every one million units of water. This parameter is also known as salinity, a measure of the amount of salts in the water, and as such is very much associated to conductivity of water as well (Renan P. Limjuco, *et al.*, 2014). It stands for the total dissolved substances, which could be salts and or minerals in water remaining after evaporating the water and weighting the residue (Water quality Tester, n. d.). According to the report noted for the TDS of different types of water, an average

TDS of a tap water is 140 to 400 mg/L and that of a river water is 25 to 500 mg/L.

The highest growth of *C. dactylon* plant was observed for Wanki River water. Whereas, lowest growth was seen for Auranga River water. So that, we can say that, the growth of plant *C. dactylonis* lowest or negligible or it is dried out for water having highest TDS. It also becomes yellow. However, at lowest TDS level, the growth of *C. dactylonis* highest.

#### Conclusion:

This experiment concluded that, Auranga River water was not suitable for the growth of *Cynodon dactylon* plant. The Wanki River water will be the best option for growing *C. dactylon* in Winter season in Valsad city in Gujarat.

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