

## DETERMINATION OF SOIL PARAMETERS IN AND AROUND NANDGAON TAHSIL (MS), INDIA

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### *Abstract*

The physicochemical parameters have been studied in the present research work. Soil contain N,P,K macronutrients along with Ca, Mg, B, C, Pb, Cu, Cl as micronutrients. Soil samples were collected from different regions of Nandgaon Tahsil in Nashik District (Maharashtra) India. The parameters like  $pH$ , TDS, electrical conductivity, calcium carbonate, gypsum, acidity/alkalinity, chloride, sulphides were studied from the collected soil samples.  $pH$ , and electrical conductance were measured by  $pH$  meter and conductometer respectively while other parameters were determined by different titration methods .

**Keywords:** TDS, EDTA, gypsum, bulk density, calcium carbonate.



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**Introduction:** Farming is the foremost occupation in India. Agricultural sector has vital role in Indian economy. More than 70% of the population depends on the income obtained from agriculture. To provide the sufficient food for the higher population is challenging to agriculture. Agriculture in India plays a crucial role in solving the problems of food for its ever increasing population, especially when the available land for agriculture is decreasing by days because of urbanization. Farmers are using high percentage of inorganic fertilizers to achieve the highest yield. These inorganic fertilizers contain macronutrients and micronutrients. But, the excess use of chemical fertilizers changes the composition of soil and affects the natural productivity [3].

The major constituents present in the soil required for the crop growth are N, P, K and minor constituents are Ca, Mg, B, C, Cu, Fe, and Mn. The proportion of all the constituents in appropriate manner makes the soil fertile while imbalance of these nutrients can destroy the productivity of soil [4]. The percentage of primary and secondary nutrients in the soil has been detected by some researchers [1, 2]. Along with this nutrients  $pH$ , soil salinity, alkalinity, TDS plays an important role for soil productivity. Heavy metals presents in the soil may contaminate the vegetables or crops grown in the soil [5].

## Materials and Methods:

**Study area:** The soil samples were collected from different villages in Nandgaon Tahsil. Nandgaon is a drought affected area having population around 23,191.

**Preparation of solution:** Soil samples were mixed and ground to fine powder and then it homogenized. The weighed soil samples were mixed with distilled water to prepare soil solution. Series of sample solutions were prepared in the small beakers.

**Standards and Analysis:** All the reagents required for analysis were obtained from Sigma Aldrich and E Merck (India). Standard solutions of 0.01M EDTA, 0.01M KCl, 0.1M AgNO<sub>3</sub>, 0.2M BaCl<sub>2</sub>, 0.2M KMnO<sub>4</sub>, 0.1M NaOH and indicators were prepared by using distilled water.

**Sample Sites:** Thirteen different sites were selected from the Nandgaon Tahsil in Nashik District, Maharashtra.

(S1) Site 1- Wakhari, (S2) Site 2- Wadali Bk, (S3) Site 3 – Pimparkhed North region, (S4) Site 4- Palashi, (S5) Site 5- Bangaon, (S6) Site 6- Pimparkhed South, (S7) Site 7-Sakore, (S8) Site 8- Jalgaon Bk, (S9) Site 9-Wakhari, (S10) Site 10-Nandgaon, (S11) Site 11- Pokhari, (S12) Site 12- Nastanpur, (S13) Site 13- Wadali Kh

**Methodology:** 1- pH of the soil sample solution were determined by calibrated pH meter.

2- Electrical conductivity was determined by conductometer with 0.01 M KCl solution.

Cell constant can be determined by the ratio of specific conductance to the observed conductance.

Specific conductance = Cell constant × Observed conductivity.

2- The amount of Calcium carbonate determined by titration methods with 0.1 M NaOH.

3- 0.01 M EDTA solution was used for titration to find out the amount of gypsum present in the soil sample.

4- Methyl red and Bromothymol blue indicator solutions were used to find out alkalinity of the solution.

5- Bulk density was calculated by using the weight of the sample in gm per volume in cm<sup>3</sup>.

**Table 1: pH, TDS, electrical conductivity, bulk density, calcium carbonate and gypsum content from the soil sample.**

Sr.No	Site	pH	TDS (ppm)	Electrical Conductivity ( $\mu\text{Scm}^{-1}$ )	Bulk Density (gm/cc)	Calcium carbonate (%)	Gypsum (kg/ha)
1	S1	8.52	116	360	1.48	11.9	6935.4
2	S2	8.77	98	256	1.48	15.9	9246.7
3	S3	8.93	132	357	1.47	17.5	5493
4	S4	7.92	104	271	1.47	9.18	3852.8
5	S5	8.42	144	280	1.47	13.2	6935.04
6	S6	8.60	85	260	1.47	13.98	5394
7	S7	8.33	273	783	1.47	12.2	5394
8	S8	8.61	102	287	1.50	14.8	5394
9	S9	8.63	101	260	1.48	14.7	13099.5
10	S10	8.77	87	250	1.50	11.9	6935.04
11	S11	8.77	126	349	1.48	14.3	5394
12	S12	8.33	273	783	1.47	12.2	5392
13	S13	8.77	98	256	1.48	15.9	9246.7

**Result and Discussion:** 1- pH of the sample is in between 7.92 to 8.93. The samples S3, S10, S11, and S13 have higher pH values.

2- The lower TDS value in the observed sample S6 is 85 while higher TDS value for sample S12 is 273.

3-Electrical conductivity value ranges from 250 to 783. Soil sample S10 has lower value while sample site S7 has higher value of electrical conductivity.

4- Calcium carbonate content varies from 9 to 18 % in the soil samples.

5-Gypsum concentration in kg/ha was in the range of 5394 to 13099.5

6- Bulk density slightly varies in between 1.47 to 1.50 gm/cc

**Conclusions:** Through the present work, different soil parameters from the collected samples were documented. The percentage of calcium carbonate were studied and analyzed. It was found that  $\text{CaCO}_3$  percentage in most of the samples was higher than the required limit which affects the yield of crop. High value of Gypsum shows that soil contains has higher percentage of rocks. This may be the reason for the least yield in Nandgaon Tahsil. Finally, it

can be concluded that use of organic farm manure with least possible chemical fertilizers can enhance the soil productivity.

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