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# ASSESSMENT OF AVAILABLE SOIL NUTRIENT STATUS IN SOILS OF UMRI VILLAGE, SAONER TEHSIL, NAGPUR DISTRICT, MAHARASHTRA.

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## ABSTRACT

*Nine composite(0-20cm) soil samples were collected and analyzed as per standard procedure for assessing chemical properties and available nutrient status of soil. The data indicates that all the nine samples under study were moderately alkaline in reaction and it ranged from 7.9 to 8.5. Electrical conductivity varied between 210-285 µS/cm. All the soil samples were moderately calcareous to calcareous due to presence of CaCO3 in soil. In context of nutrient status, soils were low to medium in available nitrogen (11.31 to 15.05 meq/100g), medium in available phosphorous (4.70 to 7.09 meq/100g) and high in available potassium (2.22 to 3.61meq/100g).*

**KEYWORDS :** *collected and analyzed , nutrient status, soils.*

## INTRODUCTION

Soil is an important natural resource gifted to us by nature. The ability of soil to produce crops largely depends on soil fertility, management practices and climate. Soil fertility depends upon proper macronutrients and micronutrients.

The three primary macronutrients are nitrogen(N), phosphorus(P), and potassium(K); all are required in relatively large quantities by plants. The secondary macro nutrients, calcium(Ca), magnesium(Mg), and Sulphur(S), are required in lesser quantities relative to primary category.

The overall productivity and sustainability of a given agricultural sector is highly dependent on the fertility and physicochemical characteristics of soil resources (Wakene,2001: Mohmmed et. al 2005). According to IFPRI (2010), the major causes of nutrient depletion include farming without replenishing nutrients over time (loss through continuous crop harvest), removal of crop residue, low level of fertilizer use and unbalanced application of nutrients. Soil characterization in relation to evaluation of fertility status of the soils of an area is an important aspect in context of sustainable agricultural production (Singh and Mishra 2012). The present study was therefore undertaken to assess the soil available nutrient status in soils of Umri village of Saoner tehsil.

## MATERIAL AND METHOD

Umri is a village in Saoner taluka in Nagpur district of Maharashtra state, India. It belongs to Nagpur division. It is located 37 km towards North from district headquarters Nagpur,808 km from state capital Mumbai. It is surrounded by Kalmeshwar taluka towards south, Parseoni taluka towards East, Sausar taluka towards North, Nagpur taluka towards South[1].

Nine composite samples covering entire village were collected, processed and analyzed for their nutrient status by standard analytical methods. Sieved soil samples were used to determine pH and electrical conductivity at 1: 2.5 soil water suspension[2]. Calcium carbonate was determined by rapid titration method[3]. Available N was determined by alkaline permanganate method as described by Subbiah and Asiya (1956)[4]. The available P was extracted with Olsen's reagent 0.5 M NaHCO3 of pH 8.5 and was estimated calorimetrically as per Jackson (1973)[5], the available K was estimated by extracting the soil with 1N NH4OAc (pH 7.0) by using flame photometer (Jackson 1973)[6].

The simple correlation analysis of the data was computed in relation to available nutrient contents with physico- chemical properties of the soils under study.

**TABLE 1 PHYSICO-CHEMICAL PROPERTIES OF SOIL SAMPLES OF UMRI VILLAGE**

| S.No | Sample ID | **pH** | **EC** µS/cm | **N** (Meq/100g) | **P** (meq/100g) | **K** (meq/100g) | **CaO** (meq/100g) |
|---|---|---|---|---|---|---|---|
| 1 | 1 | 8.1 | 210 | 12.83 | 6.48 | 2.97 | 32.14 |
| 2 | 2 | 8.1 | 285 | 13.48 | 7.09 | 2.31 | 30.46 |
| 3 | 3 | 8.2 | 214 | 11.31 | 6.22 | 2.22 | 41.25 |
| 4 | 4 | 8.1 | 234 | 14.34 | 4.72 | 3.04 | 38.56 |
| 5 | 5 | 7.9 | 241 | 12.54 | 6.42 | 2.85 | 34.25 |
| 6 | 6 | 8.1 | 244 | 11.73 | 6.88 | 5.87 | 30.61 |
| 7 | 7 | 8.2 | 216 | 12.65 | 4.7 | 3.61 | 29.47 |
| 8 | 8 | 8.1 | 225 | 15.05 | 5.48 | 3.29 | 30.58 |
| 9 | 9 | 8.1 | 243 | 14.25 | 6.07 | 2.83 | 25.14 |

**Table 2 Correlation between soil properties and macronutrients**

| | **N** | **P** | **K** | **CaO** |
|---|---|---|---|---|
| pH | -0.1295 | -0.3194 | 0.0173 | 0.0655 |
| EC | 0.1954 | 0.5031 | -0.0386 | -0.3026 |

## RESULT AND DISCUSSION

### SOIL pH and EC

Data presented in Table 1 shows that soil pH varied from 7.9 to 8.5 with an average of 8.1. According to classification of soil reactions suggested by Brady (1985)[7], all the nine samples were moderately alkaline. The alkaline reaction of soil is probably due to presence of sufficient free lime content in these soils[8].

The EC of the soils varied from 216 to 285µS/cm with an average of 235µS/cm. On the basis of limits suggested by Muhr et.al (1965)[9], for judging salt problem of soils, all the samples were found normal (EC less than $10^5$µS/cm).

### Available Nitrogen

Available Nitrogen status varied from 11.31 to 15.05 with an average value of 13.13 meq/100g. Available nitrogen was negatively correlated (r= -0.1295) with pH and positively correlated (r= 0.1954) with EC.

Similar results were reported by Singh et.al (2012) and Verma et.al.(1980)[10,11].

### Available Phosphorus

The available phosphorus content varied from 4.70 to 7.09 with a mean value of 6.00 meq/100g. Available phosphorus was negatively correlated[11] (r= -0.3194) with pH and positively correlated (r= 0.5031) with EC.

### Available Potassium

Status of available potassium in the soils ranged between 2.22 and 3.61 with an average of 2.88 meq/100g of the soil. Available potassium showed positive correlation (r= 0.0173) with pH and negative correlation (r= -0.0386).

## CONCLUSION

Soils of Umri village are moderately alkaline in reaction having EC within the safe limit for crop cultivation. These soils are low to medium in available nitrogen, medium in phosphorus and high in available potassium. The fertilizer dosed should be as per the recommendations.

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