LEACHING LAB RESULTS\_LAB1

|  |  |
| --- | --- |
| **Treatments** |  |
| **1** | **Check** |
| **2** | **Nitrogen** |
| **3** | **Phosphorus** |
| **4** | **Potassium** |
| **5** | **N+ Stabilizer** |
| **6** | **MgCO3 + Potassium** |

**Results:**

Nutrient Mobility Nine inches of water added to leach the fertilizer materials. Soil test results from field samples have been entered in Table 1. Perform the indicated calculations to complete Table 1.

Table 1. Soil test results1 of surface (0-6”) and subsoil (6-18”) layers of sampled soil.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | NO3-N | P | K | N+ | K+MgCO3 |
| Layer | Fertilized |
| Surface | **3** | **454** | **920** | **2** | **1142** |
| Sub | **45** | **201** | **533** | **1** | **527** |
|  | Control |
| Surface | **3** | **178** | **373** | **3** | **373** |
| Sub | **3** | **149** | **408** | **3** | **408** |
|  | Fertilized – Control2 |
| Surface |  |  |  |  |  |
| Sub |  |  |  |  |  |
| Sum found |  |  |  |  |  |
|  |
| Total added | **1000** | **1000** | **1000** | **1000** | **1000** |
|  | Percentage of total applied found3 |
| Surface |  |  |  |  |  |
| Sub |  |  |  |  |  |
| Calculated Immobility and Mobility  |
| Immobility4 (X) | ( ) | ( ) | ( ) | ( ) |  |
| Mobility5 |  |  |  |  |  |
|  |  |  |  |  |  |
| Average mobility6 |  |  |  |  |  |
| Relative mobility7 |  |  |  |  |  |

1All values in units of lb/acre unless otherwise indicated.

2For each nutrient form and layer, subtract the control value from the fertilized value.

3Divide ‘Fertilized-Control values’ by ‘total added’ and multiply by 100.

4Calculated immobility is based on nutrient retention in the surface soil. Dividing each value for ‘surface, percentage of total applied found’ by the largest value in that row and multiply by 100. Percent mobility may be assumed to be the difference between 100 and percentage immobility, therefore, subtract the percentage immobility from 100 and recording the value in **( )**.

5 Calculate mobility by dividing each value for ‘Sub, percentage of total applied found’ by the largest value in that row and multiplying by 100.

6Sum the value for mobility calculated from surface soil retention **( )** and that found in the subsoil and divide the result by two.

7Divide the largest value into each value, multiply by 10 and round the value to a whole number.

Fertilizer Leaching. Record soil test results, as provided by the instructor, and perform the indicated calculations to complete Table 2.

Table 2. Plant-available1 nutrient levels from soil test results of **subsoil** (6-18 inch) from fertilized and control soil.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | N | P | K | N+ | K+MgCO3 |
| Area | Nutrient |
| Fertilized | **45** | **201** | **533** | **1** | **527** |
| Control | **3** | **149** | **408** | **3** | **408** |
| Fertilized – Control2 |  |  |  |  |  |
| Total added | **1000** | **1000** | **1000** | **1000** | **1000** |
| Percent leached3 |  |  |  |  |  |

1All values in units of lb/acre unless otherwise indicated. P and K extracted by Mehlich-3, Cl by saturated CaSO4 solution, and N using 1M CaCl2.

2For each nutrient form, subtract the value for the control from the value for the fertilized area.

3Divide ‘fertilized – control’ by ‘total added’ and multiply by 100.

**Questions**:

1. The most mobile nutrient was \_\_\_\_\_\_\_\_\_\_\_\_\_\_.
2. The second most mobile nutrient was \_\_\_\_\_\_\_\_\_\_\_\_.
3. Identify a chemical characteristic of the two most mobile nutrients that might account for their high mobility and explain why this characteristic is related to high mobility of nutrients in soils.
4. The least mobile nutrient in this soil was \_\_\_\_\_\_\_\_\_\_\_\_\_.
5. The second least mobile nutrient was \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
6. Identify chemical characteristic(s) of the two least mobile nutrients that might account for their low mobility and explain the relationship to low mobility of nutrients in soils.
7. Compare relative nutrient mobility values and percentage of fertilizer leached. Do these results agree?

If not, explain the differences.

1. Explain why you believe fertilizer leaching is or is not a serious problem in Oklahoma soils.
2. Describe a condition of this exercise that was not normal for fertilizer use in Oklahoma.
3. What cultural practices (at least two) would you recommend to reduce fertilizer leaching from what was found in this exercise.