**APÉNDICE 1**

**PROMEDIO DE LOS DATOS OBTENIDOS EN LAS VARIABLE**

 **RENDIMIENTO (Kg/ha.)**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Tratamientos** | **T1****urea** | **T2****u + z** | **T3****humus** | **T4****h + z** | **T5****zeolita** | **T6****testigo** |
| **Bloques** |
| **B1** | 5265.6 | 4503.9 | 4024.7 | 4047.7 | 5600.6 | 5059.7 |
| **B2** | 6231.5 | 5099.1 | 3399.2 | 5219.9 | 4903.68 | 4232.8 |
| **B3** | 6355.1 | 5885.4 | 4629.8 | 3332.9 | 5038.8 | 4807.2 |
| **B4** | 6067.9 | 5887.7 | 2717.3 | 4563.0 | 4138.0 | 3233.1 |
| **Promedio** | **5980.0** | **5344.0** | **3692.8** | **4290.9** | **4920.3** | **4333.2** |

**APÉNDICE 2**

**PROMEDIO DE LOS DATOS OBTENIDOS EN LA VARIABLE**

**ALTURA DE PLANTA (cm)**

**(1ra LECTURA)**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Tratamientos** | **T1****urea** | **T2****u + z** | **T3****humus** | **T4****h + z** | **T5****zeolita** | **T6****testigo** |
| **Bloques** |
| **B1** | 45.9 | 45.5 | 38.2 | 45.6 | 46.4 | 41.8 |
| **B2** | 44.7 | 47.3 | 44.1 | 41.1 | 37.2 | 45.0 |
| **B3** | 43.0 | 45.9 | 47.3 | 42.2 | 45.9 | 41.7 |
| **B4** | 48.4 | 46.2 | 42.3 | 47.6 | 44.2 | 39.6 |
| **Promedio** | **45.5** | **46.2** | **43.0** | **44.1** | **43.4** | **42.0** |

**ALTURA DE PLANTA (cm)**

**(2da LECTURA)**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Tratamientos** | **T1****urea** | **T2****u + z** | **T3****humus** | **T4****h + z** | **T5****zeolita** | **T6****testigo** |
| **Bloques** |
| **B1** | 87.1 | 78.5 | 72.1 | 89.8 | 89.6 | 80.0 |
| **B2** | 83.7 | 90.8 | 72.4 | 71.2 | 68.1 | 79.9 |
| **B3** | 75.3 | 71.6 | 73.8 | 55.7 | 74.0 | 73.8 |
| **B4** | 78.9 | 81.6 | 56.4 | 82.2 | 72.3 | 57.0 |
| **Promedio** | **81.2** | **80.7** | **68.7** | **74.7** | **76.0** | **72.7** |

**ALTURA DE PLANTA (cm)**

**(3ra LECTURA)**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Tratamientos** | **T1****urea** | **T2****u + z** | **T3****humus** | **T4****h + z** | **T5****zeolita** | **T6****testigo** |
| **Bloques** |
| **B1** | 165.0 | 134.6 | 121.7 | 150.1 | 156.0 | 141.2 |
| **B2** | 147.3 | 163.3 | 110.9 | 128.5 | 114.8 | 141.8 |
| **B3** | 138.9 | 125.3 | 122.9 | 85.6 | 135.6 | 134.2 |
| **B4** | 141.5 | 147.5 | 84.6 | 147.7 | 132.7 | 90.1 |
| **Promedio** | **148.2** | **142.7** | **110.0** | **128.0** | **134.8** | **126.8** |

**ALTURA DE PLANTA (cm)**

**(4ta LECTURA)**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Tratamientos** | **T1****urea** | **T2****u + z** | **T3****humus** | **T4****h + z** | **T5****zeolita** | **T6****testigo** |
| **Bloques** |
| **B1** | 184.7 | 163.8 | 160.1 | 173.9 | 181.4 | 169.6 |
| **B2** | 172.5 | 180.5 | 148.8 | 169.3 | 157.4 | 174.0 |
| **B3** | 183.3 | 166.1 | 157.9 | 143.0 | 169.6 | 179.5 |
| **B4** | 176.2 | 175.4 | 136.4 | 176.9 | 166.7 | 141.1 |
| **Promedio** | **179.2** | **171.4** | **150.8** | **165.8** | **168.8** | **166.0** |

**APÉNDICE 3**

**PROMEDIO DE LOS DATOS OBTENIDOS EN LAS VARIABLE**

**DIÁMETRO DEL TALLO (cm)**

**(1ra LECTURA)**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Tratamientos** | **T1****urea** | **T2****u + z** | **T3****humus** | **T4****h + z** | **T5****zeolita** | **T6****testigo** |
| **Bloques** |
| **B1** | 1.7 | 1.4 | 1.3 | 1.7 | 1.6 | 1.6 |
| **B2** | 2.5 | 1.7 | 1.7 | 1.4 | 1.3 | 2.3 |
| **B3** | 1.6 | 1.6 | 1.6 | 1.2 | 1.6 | 1.6 |
| **B4** | 1.6 | 1.8 | 1.3 | 1.8 | 1.6 | 1.3 |
| **Promedio** | **1.8** | **1.6** | **1.5** | **1.5** | **1.5** | **1.7** |

**DIÁMETRO DEL TALLO (cm)**

**(2da LECTURA)**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Tratamientos** | **T1****urea** | **T2****u + z** | **T3****humus** | **T4****h + z** | **T5****zeolita** | **T6****testigo** |
| **Bloques** |
| **B1** | 2.7 | 2.4 | 2.1 | 2.6 | 2.5 | 2.5 |
| **B2** | 2.4 | 2.5 | 2.2 | 2.2 | 2.1 | 2.4 |
| **B3** | 2.3 | 2.1 | 2.1 | 1.7 | 2.3 | 2.2 |
| **B4** | 2.1 | 2.3 | 1.7 | 2.2 | 2.2 | 1.8 |
| **Promedio** | **2.4** | **2.3** | **2.1** | **2.2** | **2.3** | **2.2** |

**DIÁMETRO DEL TALLO (cm)**

**(3ra LECTURA)**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Tratamientos** | **T1****Urea** | **T2****u + z** | **T3****humus** | **T4****h + z** | **T5****zeolita** | **T6****testigo** |
| **Bloques** |
| **B1** | 2.9 | 2.1 | 2.3 | 2.4 | 2.5 | 2.3 |
| **B2** | 2.4 | 2.7 | 2.2 | 2.3 | 2.2 | 2.3 |
| **B3** | 2.6 | 2.3 | 2.4 | 1.9 | 2.4 | 2.3 |
| **B4** | 2.5 | 2.6 | 1.9 | 2.5 | 2.5 | 2.1 |
| **Promedio** | **2.6** | **2.4** | **2.2** | **2.3** | **2.4** | **2.3** |

**DIÁMETRO DEL TALLO (cm)**

**(4ta LECTURA)**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Tratamientos** | **T1****urea** | **T2****u + z** | **T3****humus** | **T4****h + z** | **T5****zeolita** | **T6****testigo** |
| **Bloques** |
| **B1** | 2.9 | 2.2 | 2.4 | 2.4 | 2.6 | 2.4 |
| **B2** | 2.6 | 2.8 | 2.2 | 2.4 | 2.3 | 2.5 |
| **B3** | 2.8 | 2.6 | 2.5 | 2.3 | 2.6 | 2.7 |
| **B4** | 2.6 | 2.8 | 2.0 | 2.5 | 2.5 | 2.2 |
| **Promedio** | **2.7** | **2.6** | **2.3** | **2.4** | **2.5** | **2.4** |

**APÉNDICE 4**

**PROMEDIO DE LOS DATOS OBTENIDOS EN LA VARIABLE LONGITUD DE LA MAZORCA (cm)**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Tratamientos** | **T1****urea** | **T2****u + z** | **T3****humus** | **T4****h + z** | **T5****zeolita** | **T6****testigo** |
| **Bloques** |
| **B1** | 16.2 | 15.1 | 14.3 | 14.3 | 16.5 | 15.6 |
| **B2** | 15.8 | 15.7 | 13.3 | 16.2 | 15.1 | 15.5 |
| **B3** | 15.8 | 15.6 | 14.3 | 13.9 | 15.4 | 15.7 |
| **B4** | 15.7 | 16.2 | 14.0 | 15.4 | 13.9 | 11.0 |
| **Promedio** | **15.9** | **15.7** | **13.9** | **14.9** | **15.2** | **14.5** |

**APÉNDICE 5**

**PROMEDIO DE LOS DATOS OBTENIDOS EN LA VARIABLE DIÁMETRO DE LA MAZORCA (cm)**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Tratamientos** | **T1****urea** | **T2****u + z** | **T3****humus** | **T4****h + z** | **T5****zeolita** | **T6****testigo** |
| **Bloques** |
| **B1** | 4.3 | 4.4 | 4.4 | 4.2 | 4.5 | 4.5 |
| **B2** | 4.4 | 4.4 | 4.2 | 4.6 | 4.4 | 4.4 |
| **B3** | 4.4 | 4.4 | 4.4 | 4.2 | 4.6 | 4.4 |
| **B4** | 4.4 | 4.6 | 4.3 | 4.5 | 3.8 | 3.9 |
| **Promedio** | **4.4** | **4.4** | **4.3** | **4.4** | **4.3** | **4.3** |

**APÉNDICE 6**

**PROMEDIO DE LOS DATOS OBTENIDOS EN LA VARIABLE NUMERO DE GRANOS POR MAZORCA**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Tratamientos** | **T1****urea** | **T2****u + z** | **T3****humus** | **T4****h + z** | **T5****zeolita** | **T6****testigo** |
| **Bloques** |
| **B1** | 420.5 | 339.1 | 333.3 | 365.2 | 362.7 | 354.2 |
| **B2** | 394.0 | 417.2 | 318.9 | 403.9 | 376.1 | 365.7 |
| **B3** | 396.0 | 384.5 | 320.5 | 302.2 | 362.0 | 359.8 |
| **B4** | 372.5 | 416.6 | 324.0 | 385.6 | 346.9 | 235.5 |
| **Promedio** | **395.7** | **389.4** | **324.2** | **364.3** | **361.9** | **328.8** |

**APÉNDICE 7**

**PROMEDIO DE LOS DATOS OBTENIDOS EN LA VARIABLE PESO DE LAS MAZORCAS (g)**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Tratamientos** | **T1****urea** | **T2****u + z** | **T3****humus** | **T4****h + z** | **T5****zeolita** | **T6****testigo** |
| **Bloques** |
| **B1** | 143.1 | 140.0 | 135.4 | 124.5 | 152.3 | 162.1 |
| **B2** | 152.8 | 153.7 | 106.8 | 175.0 | 143.1 | 157.5 |
| **B3** | 157.2 | 131.5 | 132.5 | 107.6 | 159.7 | 158.1 |
| **B4** | 161.3 | 175.5 | 79.8 | 155.6 | 128.5 | 80.3 |
| **Promedio** | **153.6** | **150.2** | **113.6** | **140.7** | **145.9** | **139.5** |

**APÉNDICE 8**

**PROMEDIO DE LOS DATOS OBTENIDOS EN LA VARIABLE PESO DE GRANOS POR MAZORCA (g)**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Tratamientos** | **T1****urea** | **T2****u + z** | **T3****humus** | **T4****h + z** | **T5****zeolita** | **T6****testigo** |
| **Bloques** |
| **B1** | 101.8 | 95.1 | 89.5 | 82.8 | 105.0 | 100.4 |
| **B2** | 104.4 | 100.5 | 76.4 | 112.9 | 95.1 | 94.1 |
| **B3** | 104.6 | 91.7 | 89.6 | 75.1 | 109.4 | 95.9 |
| **B4** | 103.7 | 110.0 | 64.0 | 101.7 | 85.3 | 52.3 |
| **Promedio** | **103.6** | **99.3** | **79.9** | **93.1** | **98.7** | **85.7** |

**APÉNDICE 9**

**PROMEDIO DE LOS DATOS OBTENIDOS EN LA VARIABLE PESO SECO DEL FOLLAJE (lb)**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Tratamientos** | **T1****urea** | **T2****u + z** | **T3****humus** | **T4****h + z** | **T5****zeolita** | **T6****testigo** |
| **Bloques** |
| **B1** | 3.8 | 2.3 | 3.1 | 3.1 | 4.0 | 3.2 |
| **B2** | 3.6 | 4.0 | 2.0 | 3.8 | 2.0 | 3.9 |
| **B3** | 3.4 | 2.5 | 2.1 | 2.0 | 3.7 | 3.9 |
| **B4** | 3.1 | 3 | 2.0 | 3.4 | 4.0 | 2.0 |
| **Promedio** | **3.5** | **2.9** | **2.3** | **3.1** | **3.4** | **3.2** |

**APÉNDICE 10**

**Análisis de varianza de altura de planta en el cultivo de maíz con 6 tratamientos CENAE 2004 (1ra Lectura)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Fuente de Variación** | **Grados de Libertad** | **Suma de cuadrados** | **Cuadrado medio** | **Pr > F** |
| Total | 23 |  |  |  |
| Tratamiento | 5 | 49.9 | 10.0 | 0.45 N.S |
| Repetición | 3 | 7.2 | 2.4 | 0.87 N.S |
| Error Experimental | 15 | 149.7 | 10.0 |  |

Coeficiente de Variación = 7.17%

\*\* = Altamente significativo al 5 % de probabilidad

\* = Significativo al 5 % de probabilidad

N.S = No significativo

**Análisis de varianza de altura de planta en el cultivo de maíz con 6 tratamientos CENAE 2004 (2da Lectura)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Fuente de Variación** | **Grados de Libertad** | **Suma de cuadrados** | **Cuadrado medio** | **Pr > F** |
| Total | 23 |  |  |  |
| Tratamiento | 5 | 426.6 | 85.3 | 0.40 N.S |
| Repetición | 3 | 623.8 | 207.9 | 0.08 N.S |
| Error Experimental | 15 | 1171.3 | 78.1 |  |

Coeficiente de Variación = 11.7%

**Análisis de varianza de altura de planta en el cultivo de maíz con 6 tratamientos CENAE 2004 (3ra Lectura)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Fuente de Variación** | **Grados de Libertad** | **Suma de cuadrados** | **Cuadrado medio** | **Pr > F** |
| Total | 23 |  |  |  |
| Tratamiento | 5 | 3640.7 | 728.1 | 0.15 N.S |
| Repetición | 3 | 1799.0 | 599.7 | 0.24 N.S |
| Error Experimental | 15 | 5742.1 | 382.8 |  |

Coeficiente de Variación = 14.85%

**Análisis de varianza de altura de planta en el cultivo de maíz con 6 tratamientos CENAE 2004 (4ta Lectura)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Fuente de Variación** | **Grados de Libertad** | **Suma de cuadrados** | **Cuadrado medio** | **Pr > F** |
| Total | 23 |  |  |  |
| Tratamiento | 5 | 1744.0 | 348.8 |  0.09N.S |
| Repetición | 3 | 310.1 | 103.4 | 0.57N.S |
| Error Experimental | 15 | 2220.4 | 148.0 |  |

Coeficiente de Variación = 7.3%

\*\* = Altamente significativo al 5 % de probabilidad

\* = Significativo al 5 % de probabilidad

N.S = No significativo

# APÉNDICE 11

**Análisis de varianza de diámetro del tallo en el cultivo de maíz con 6 tratamientos CENAE 2004 (1ra Lectura)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Fuente de Variación** | **Grados de Libertad** | **Suma de cuadrados** | **Cuadrado medio** | **Pr > F** |
| Total | 23 |  |  |  |
| Tratamiento | 5 | 0.35 | 0.07 | 0.51 N.S |
| Repetición | 3 | 0.30 | 0.10 | 0.32 N.S |
| Error Experimental | 15 | 1.20 | 0.08 |  |

Coeficiente de Variación = 17.34%

\*\* = Altamente significativo al 5 % de probabilidad

\* = Significativo al 5 % de probabilidad

N.S = No significativo

**Análisis de varianza de diámetro del tallo en el cultivo de maíz con 6 tratamientos CENAE 2004 (2da Lectura)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Fuente de Variación** | **Grados de Libertad** | **Suma de cuadrados** | **Cuadrado medio** | **Pr > F** |
| Total | 23 |  |  |  |
| Tratamiento | 5 | 0.23 | 0.05 | 0.38 N.S |
| Repetición | 3 | 0.61 | 0.20 | 0.01 N.S |
| Error Experimental | 15 | 0.61 | 0.04 |  |

Coeficiente de Variación = 9%

\*\* = Altamente significativo al 5 % de probabilidad

\* = Significativo al 5 % de probabilidad

N.S = No significativo

**Análisis de varianza de diámetro del tallo en el cultivo de maíz con 6 tratamientos CENAE 2004 (3ra Lectura)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Fuente de Variación** | **Grados de Libertad** | **Suma de cuadrados** | **Cuadrado medio** | **Pr > F** |
| Total | 23 |  |  |  |
| Tratamiento | 5 | 0.43 | 0.08 | 0.18 N.S |
| Repetición | 3 | 0.03 | 0.01 | 0.89 N.S |
| Error Experimental | 15 | 0.73 | 0.05 |  |

Coeficiente de Variación = 9.3%

\*\* = Altamente significativo al 5 % de probabilidad

\* = Significativo al 5 % de probabilidad

N.S = No significativo

**Análisis de varianza de diámetro del tallo en el cultivo de maíz con 6 tratamientos CENAE 2004 (4ta Lectura)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Fuente de Variación** | **Grados de Libertad** | **Suma de cuadrados** | **Cuadrado medio** | **Pr > F** |
| Total | 23 |  |  |  |
| Tratamiento | 5 | 0.49 | 0.09 | 0.10 N.S |
| Repetición | 3 | 0.07 | 0.02 | 0.67 N.S |
| Error Experimental | 15 | 0.65 | 0.04 |  |

Coeficiente de Variación = 8.3%

\*\* = Altamente significativo al 5 % de probabilidad

\* = Significativo al 5 % de probabilidad

N.S = No significativo

**APÉNDICE 12**

**Análisis de varianza de longitud de la mazorca en el cultivo de maíz en 6 tratamientos CENAE 2004**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Fuente de Variación** | **Grados de Libertad** | **Suma de cuadrados** | **Cuadrado medio** | Pr > F |
| Total | 23 |  |  |  |
| Tratamiento | 5 | 10.51 | 2.10 | 0.24NS |
| Repetición | 3 | 3.86 | 1.28 | 0.45NS |
| Error Experimental | 15 | 20.78 | 1.38 |  |

Coeficiente de Variación = 7.83%

\*\* = Altamente significativo al 5 % de probabilidad

\* = Significativo al 5 % de probabilidad

N.S = No significativo

**APÉNDICE 13**

**Análisis de varianza de diámetro de la mazorca en el cultivo de maíz en 6 tratamientos CENAE 2004**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Fuente de Variación** | **Grados de Libertad** | **Suma de cuadrados** | **Cuadrado medio** | Pr > F |
| Total | 23 |  |  |  |
| Tratamiento | 5 | 0.04 | 0.008 | 0.96N.S |
| Repetición | 3 | 0.08 | 0.028 | 0.63N.S |
| Error Experimental | 15 | 0.71 | 0.047 |  |

Coeficiente de Variación = 4.97%

\*\* = Altamente significativo al 5 % de probabilidad

\* = Significativo al 5 % de probabilidad

N.S = No significativo

**APÉNDICE 14**

**Análisis de varianza de número de granos por mazorca en el cultivo de maíz en 6 tratamientos CENAE 2004**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Fuente de Variación** | **Grados de Libertad** | **Suma de cuadrados** | **Cuadrado medio** | Pr > F |
| Total | 23 |  |  |  |
| Tratamiento | 5 | 17659.03 | 3531.81 | 0.06N.S |
| Repetición | 3 | 3510.04 | 1170.01 | 0.47N.S |
| Error Experimental | 15 | 19823.73 | 1321.58 |  |

Coeficiente de Variación = 10.07%

\*\* = Altamente significativo al 5 % de probabilidad

\* = Significativo al 5 % de probabilidad

N.S = No significativo

**APÉNDICE 15**

**Análisis de varianza de peso de las mazorcas en el cultivo de maíz en 6 tratamientos CENAE 2004**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Fuente de Variación** | **Grados de Libertad** | **Suma de cuadrados** | **Cuadrado medio** | Pr > F |
| Total | 23 |  |  |  |
| Tratamiento | 5 | 4070.73 | 814.15 | 0.36N.S |
| Repetición | 3 | 1028.14 | 342.71 | 0.69N.S |
| Error Experimental | 15 | 10269.38 | 684.62 |  |

Coeficiente de Variación = 18.61%

\*\* = Altamente significativo al 5 % de probabilidad

\* = Significativo al 5 % de probabilidad

N.S = No significativo

**APÉNDICE 16**

**Análisis de varianza de peso de granos por mazorca en el cultivo de maíz en 6 tratamientos CENAE 2004**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Fuente de Variación** | **Grados de Libertad** | **Suma de cuadrados** | **Cuadrado medio** | Pr > F |
| Total | 23 |  |  |  |
| Tratamiento | 5 | 1640.62 | 328.12 | 0.20N.S |
| Repetición | 3 | 440.87 | 146.96 | 0.54N.S |
| Error Experimental | 15 | 2951.81 | 196.79 |  |

Coeficiente de Variación = 15.02%

\*\* = Altamente significativo al 5 % de probabilidad

\* = Significativo al 5 % de probabilidad

N.S = No significativo

**APÉNDICE 17**

**Análisis de varianza de peso seco del follaje en el cultivo de maíz en 6 tratamientos CENAE 2004**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Fuente de Variación** | **Grados de Libertad** | **Suma de cuadrados** | **Cuadrado medio** | Pr > F |
| Total | 23 |  |  |  |
| Tratamiento | 5 | 3.72 | 0.74 | 0.36N.S |
| Repetición | 3 | 0.60 | 0.20 | 0.81N.S |
| Error Experimental | 15 | 9.41 | 0.62 |  |

Coeficiente de Variación = 25.70%

\*\* = Altamente significativo al 5 % de probabilidad

\* = Significativo al 5 % de probabilidad

N.S = No significativo

# APÉNDICE 18

**PRESUPUESTO PARCIAL DEL ENSAYO EFECTO DE LAS ZEOLITAS NATURALES EN EL CULTIVO DE MAIZ. CENAE 2004**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **T1****Urea** | **T2****U+Z** | **T3****Humus** | **T4****H+Z** | **T5****Zeolita** | **T6****Testigo** |
| Rendimiento (Kg/ha) | 5.980 | 5.344 | 3.693 | 4.291 | 4.920 | 4.333 |
| Rendimiento ajustado (Kg/ha) | 5.681 | 5.077 | 3.508 | 4.076 | 4.674 | 4.116 |
| Precio maíz Kg/$ | 0.19 | 0.19 | 0.19 | 0.19 | 0.19 | 0.19 |
| **Beneficio bruto $** | **1,124.9** | **1,005.3** | **694.6** | **807.1** | **925.5** | **815.0** |
| Costo urea ($/ha) | 65.7 | 52.6 | 0 | 0 | 0 | 0 |
| Costo zeolita ($/ha) | 0 | 3.5 | 0 | 256 | 175.2 | 0 |
| Costo humus ($/ha) | 0 | 0 | 2,400 | 1,920 | 0 | 0 |
|  |  |  |  |  |  |  |
| Costo aplicación ($/ha) | 5 | 5 | 5 | 10 | 5 | 0 |
| **Total de costos que varían ($/ha)** | **70.7** | **61.1** | **2,405.0** | **2,186.0** | **180.2** | **0** |
| **Beneficio neto $** | **1,054.2** | **944.2** | **-1,710.4** | **-1,379.0** | **745.3** | **815.0** |

# APÉNDICE 19

# ANÁLISIS DE DOMINANCIA

|  |  |  |  |
| --- | --- | --- | --- |
| Tratamiento | **Costos que varían** | **Beneficio neto** | **Dominancia** |
| 6 (testigo) | 0 | 815.0 | No dominado |
| 2 (urea + zeolita) | 61.1 | 944.2 | No dominado |
| 1 (urea) | 70.7 | 1,054.2 | No dominado |
| 5 (zeolita) | 180.2 | 754.3 | Dominado |
| 4(humus+ zeolita) | 2,186.0 | -1,379.0 | Dominado |
| 3 (humus) | 2,405.0 | -1,710.4 | Dominado |

# APÉNDICE 20

**ANÁLISIS MARGINAL DE LOS TRATAMIENTOS NO DOMINADOS**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Tratamiento** | **Beneficio neto****$** | **Beneficio marginal****$** | **Costos que varían****$** | **Costos marginales****$** | **Tasa de retorno marginal** |
| 6 (testigo) | 815.0 | 129.2 | 0.0 | 61.1 | 211% |
| 2 (urea+zeolita) | 944.2 | 239.2 | 61.1 | 70.7 | 338% |
| 1 (urea) | 1,054.2 |  | 70.7 |  |  |

# APÉNDICE 21

**ANÁLISIS DE SUELO EN LA ETAPA INTERMEDIA DEL ENSAYO**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **T1B1****urea** | **T2B1****u + z** | **T3B1****humus** | **T4B1****h + z** | **T5B1****zeolita** | **T6B1****testigo** | **T1B2****urea** | **T2B2****u + z** | **T3B2****humus** | **T4B2****h + z** | **T5B2****zeolita** | **T6B2****testigo** |
| **Salinidad (mS/cm)** | 0.13 | 0.10 | 0.07 | 0.10 | 0.07 | 0.05 | 0.06 | 0.06 | 0.04 | 0.08 | 0.06 | 0.11 |
| **pH** | 7.2 | 7.1 | 7.1 | 7.1 | 7.0 | 7.2 | 7.0 | 7.2 | 7.0 | 7.2 | 7.1 | 7.1 |
| Acidez meq/100g | 0.3 | 0.2 | 0.2 | 0.2 | 0.2 | 0.3 | 0.2 | 0.2 | 0.2 | 0.2 | 0.3 | 0.3 |
| **Nitrógeno (ppm)** | 9.2 | 7.6 | 6.0 | 7.0 | 6.0 | 4.0 | 5.6 | 5.0 | 5.0 | 4.0 | 4.6 | 7.2 |
| **Fósforo (mg/l)** | 7.7 | 18.1 | 10.9 | 9.9 | 12.9 | 8.6 | 6.9 | 12.5 | 7.7 | 8.2 | 7.7 | 71.3 |
| **Calcio+Magnesio****(meq/100g)** | 58.5 | 53.5 | 63.0 | 51.5 | 56.0 | 58.0 | 53.0 | 61.0 | 57.0 | 55.0 | 52.5 | 56.0 |
| **Potasio****(meq/100g)** | 0.22 | 0.22 | 0.22 | 0.22 | 0.22 | 0.22 | 0.22 | 0.22 | 0.22 | 0.22 | 0.22 | 0.22 |
| **Sodio (meq/100g)** | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 14.8 | 8.9 | 14.8 | 0.96 | 17.8 | 12.8 |
| **CIC (meq/100g)** | 74.3 | 69.3 | 79.0 | 67.3 | 71.8 | 73.8 | 82.6 | 84.7 | 86.6 | 71.0 | 85.1 | 83.7 |

**Parámetros normales**

|  |  |  |  |
| --- | --- | --- | --- |
| **Elemento** | **Bajo** | **Medio** | **Alto** |
|  **N (ppm)** | < 31.0 | 31.0 – 40.0 | > 40.0 |
| **P (mg/l)** | < 8.0 | 8.0 – 14.0 | > 14.0 |
| **K (meq/100g)** | < 2.0 | 2.0 – 3.8 | > 3.8 |
| **Ca+Mg (meq/100g)** | < 51.0 | 51.0 – 89.0 | >89.0 |

Fuente: INIAP, 2005

# APÉNDICE 22

**ANÁLISIS DE SUELO EN LA ETAPA FINAL DEL ENSAYO**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **T1B1****urea** | **T2B1****u + z** | **T3B1****humus** | **T4B1****h + z** | **T5B1****zeolita** | **T6B1****testigo** | **T1B2****urea** | **T2B2****u + z** | **T3B2****humus** | **T4B2****h + z** | **T5B2****zeolita** | **T6B2****testigo** |
| **Salinidad****(mS/cm)** | 0.06 | 0.05 | 0.06 | 0.05 | 0.05 | 0.05 | 0.06 | 0.05 | 0.05 | 0.04 | 0.07 | 0.06 |
| **pH** | 6.2 | 6.1 | 6.1 | 6.4 | 6.2 | 6.0 | 6.2 | 6.4 | 6.0 | 6.1 | 6.4 | 6.3 |
| Acidez meq/100g | 0.4 | 0.2 | 0.3 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| **Nitrógeno (ppm)** | 10.0 | 7.67 | 10.0 | 9.7 | 5 | 6.7 | 31.3 | 8.3 | 9.3 | 6.3 | 16 | 9.3 |
| **Fósforo (mg/l)** | 4.4 | 5.5 | 9.9 | 4.4 | 9.9 | 8.8 | 6.1 | 8.8 | 6.1 | 7.7 | 14.3 | 8.8 |
| **Calcio+Magnesio****(meq/100g)** | 50.0 | 49.0 | 57.5 | 58.0 | 54.5 | 52.5 | 56.5 | 52.0 | 59.0 | 49.5 | 52.5 | 57.0 |
| **Potasio****(meq/100g)** | 0.22 | 0.22 | 0.22 | 0.22 | 0.22 | 0.22 | 0.22 | 0.22 | 0.22 | 0.22 | 0.22 | 0.22 |
| **Sodio (meq/100g)** | 17.8 | 16.8 | 12.8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **CIC (meq/100g)** | 81.0 | 78.8 | 83.4 | 72.6 | 68.7 | 66.7 | 70.7 | 66.4 | 72.8 | 63.3 | 67.1 | 71.4 |

**Parámetros normales**

|  |  |  |  |
| --- | --- | --- | --- |
| **Elemento** | **Bajo** | **Medio** | **Alto** |
| **N (ppm)** | < 31.0 | 31.0 – 40.0 | > 40.0 |
| **P (mg/l)** | < 8.0 | 8.0 – 14.0 | > 14.0 |
| **K (meq/100g)** | < 2.0 | 2.0 – 3.8 | > 3.8 |
| **Ca+Mg (meq/100g)** | < 51.0 | 51.0 – 89.0 | >89.0 |

Fuente: INIAP, 2005

**APENDICE 23**

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