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**Supp. Figure1.** Illustrative scheme of the field trial

**Supp. Table 1.** Fertilization planning of artichoke plants according to the phonological stage and plant development (unit of the element each 100 units of fertilizer)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Week |  N | P | K | Ca |
| 31 | 6.69 | 0.02 | 7.34 | 0.01 |
| 32 | 6.69 | 0.02 | 7.34 | 0.01 |
| 33 | 6.69 | 0.02 | 7.34 | 0.01 |
| 34 | 6.69 | 0.02 | 7.34 | 0.01 |
| 35 | 6.69 | 0.02 | 7.34 | 0.01 |
| 36 | 6.69 | 0.02 | 7.34 | 0.01 |
| 37 | 8.68 | 0.02 | 11.00 | 0.01 |
| 38 | 8.68 | 0.02 | 11.00 | 0.01 |
| 39 | 8.68 | 0.02 | 11.00 | 0.01 |
| 40 | 8.68 | 0.02 | 11.00 | 0.01 |
| 41 | 7.35 | 2.44 | 10.99 | 8.00 |
| 42 | 7.35 | 2.44 | 10.99 | 8.00 |
| 43 | 7.35 | 2.44 | 10.99 | 8.00 |
| 44 | 7.35 | 2.44 | 10.99 | 8.00 |
| 45 | 3.93 | 1.22 | 5.86 | 4.24 |
| 46 | 3.93 | 1.22 | 5.86 | 4.24 |
| 47 | 3.93 | 1.22 | 5.86 | 4.24 |
| 48 | 3.93 | 1.22 | 5.86 | 4.24 |
| 49 | 5.88 | 2.44 | 8.79 | 6.56 |
| 50 | 5.88 | 2.44 | 8.79 | 6.56 |
| 51 | 5.88 | 2.44 | 8.79 | 6.56 |
| 52 | 5.88 | 2.44 | 8.79 | 6.56 |
| 1 | 7.35 | 2.44 | 10.99 | 8.00 |
| 2 | 7.35 | 2.44 | 10.99 | 8.00 |
| 3 | 7.35 | 2.44 | 10.99 | 8.00 |
| 4 | 7.35 | 2.44 | 10.99 | 8.00 |
| 5 | 7.35 | 2.44 | 10.99 | 8.00 |
| 6 | 7.35 | 2.44 | 10.99 | 8.00 |
| 7 | 7.35 | 2.44 | 10.99 | 8.00 |
| 8 | 7.35 | 2.44 | 10.99 | 8.00 |
| 9 | 2.46 | 1.22 | 3.66 | 2.80 |
| 10 | 2.46 | 1.22 | 3.66 | 2.80 |
| 11 | 2.46 | 1.22 | 3.66 | 2.80 |
| 12 | 2.46 | 1.22 | 3.66 | 2.80 |
| TOTAL 212.10 49.03 293.10 150.49 |

**Supl. Table 2.** Conventional fertilization schedule of artichoke plants during the crop cycle.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  | Week fertilization (Kg/ha) |  |  |  |
| Week | **NH4NO3** | **KNO3** | **Ca(NO3)2** | **KH2PO4** | **NOVATEC 21** |
| 31 | 8.00 | 15.92 |  |  | 8.82 |
| 32 | 8.00 | 15.92 |  |  | 8.82 |
| 33 | 8.00 | 15.92 |  |  | 8.82 |
| 34 | 8.00 | 15.92 |  |  | 8.82 |
| 35 | 8.00 | 15.92 |  |  | 8.82 |
| 36 | 8.00 | 15.92 |  |  | 8.82 |
| 37 | 8.00 | 23.88 |  |  | 16.66 |
| 38 | 8.00 | 23.88 |  |  | 16.66 |
| 39 | 8.00 | 23.88 |  |  | 16.66 |
| 40 | 8.00 | 23.88 |  |  | 16.66 |
| 41 |  | 20.35 | 30.19 | 4.79 |  |
| 42 |  | 20.35 | 30.19 | 4.79 |  |
| 43 |  | 20.35 | 30.19 | 4.79 |  |
| 44 |  | 20.35 | 30.19 | 4.79 |  |
| 45 |  | 10.97 | 16.00 | 2.39 |  |
| 46 |  | 10.97 | 16.00 | 2.39 |  |
| 47 |  | 10.97 | 16.00 | 2.39 |  |
| 48 |  | 10.97 | 16.00 | 2.39 |  |
| 49 |  | 15.57 | 24.75 | 4.79 |  |
| 50 |  | 15.57 | 24.75 | 4.79 |  |
| 51 |  | 15.57 | 24.75 | 4.79 |  |
| 52 |  | 15.57 | 24.75 | 4.79 |  |
| 1 |  | 20.35 | 30.19 | 4.79 |  |
| 2 |  | 20.35 | 30.19 | 4.79 |  |
| 3 |  | 20.35 | 30.19 | 4.79 |  |
| 4 |  | 20.35 | 30.19 | 4.79 |  |
| 5 |  | 20.35 | 30.19 | 4.79 |  |
| 6 |  | 20.35 | 30.19 | 4.79 |  |
| 7 |  | 20.35 | 30.19 | 4.79 |  |
| 8 |  | 20.35 | 30.19 | 4.79 |  |
| 9 |  | 6.19 | 10.56 | 2.39 |  |
| 10 |  | 6.19 | 10.56 | 2.39 |  |
| 11 |  | 6.19 | 10.56 | 2.39 |  |
| 12 |  | 6.19 | 10.56 | 2.39 |  |
| TOTAL | 80.05 | 566.12 | 567.49 | 95.74 | 119.57 |

**Supp. Table 4.** Organic fertilization schedule of artichoke plants during the crop cycle.

|  |  |
| --- | --- |
| Week | Organic FertilizerL/ha |
| 31 | 83.01 |
| 32 | 83.01 |
| 33 | 83.01 |
| 34 | 83.01 |
| 35 | 83.01 |
| 36 | 83.01 |
| 37 | 124.61 |
| 38 | 124.61 |
| 39 | 124.61 |
| 40 | 124.61 |
| 41 | 124.61 |
| 42 | 124.61 |
| 43 | 124.61 |
| 44 | 124.61 |
| 45 | 66.41 |
| 46 | 66.41 |
| 47 | 66.41 |
| 48 | 66.41 |
| 49 | 99.61 |
| 50 | 99.61 |
| 51 | 99.61 |
| 52 | 99.61 |
| 1 | 124.61 |
| 2 | 124.61 |
| 3 | 124.61 |
| 4 | 124.61 |
| 5 | 124.61 |
| 6 | 124.61 |
| 7 | 124.61 |
| 8 | 124.61 |
| 9 | 41.41 |
| 10 | 41.41 |
| 11 | 41.41 |
| 12 | 41.41 |
| TOTAL | 3321.5 |

**Suppl. Table 5.** Units of fertilizer (UF) of Nitrogen (N), Phosphorous (P) and Potassium (K) supplied by organic fertilization in artichoke plants.

|  |
| --- |
| UF ORGANIC FERTILIZER |
| WEEK | **N** | **P** | **K** |
| 31 | 3.74 | 0.01 | 1.21 |
| 32 | 3.74 | 0.01 | 1.25 |
| 33 | 3.74 | 0.01 | 1.29 |
| 34 | 3.74 | 0.01 | 1.33 |
| 35 | 3.74 | 0.01 | 1.37 |
| 36 | 3.74 | 0.01 | 1.40 |
| 37 | 5.61 | 0.01 | 1.44 |
| 38 | 5.61 | 0.01 | 1.48 |
| 39 | 5.61 | 0.01 | 1.52 |
| 40 | 5.61 | 0.01 | 1.56 |
| 41 | 5.61 | 0.01 | 1.60 |
| 42 | 5.61 | 0.01 | 1.64 |
| 43 | 5.61 | 0.01 | 1.68 |
| 44 | 5.61 | 0.01 | 1.72 |
| 45 | 2.99 | 0.01 | 1.76 |
| 46 | 2.99 | 0.01 | 1.79 |
| 47 | 2.99 | 0.01 | 1.83 |
| 48 | 2.99 | 0.01 | 1.87 |
| 49 | 4.48 | 0.01 | 1.91 |
| 50 | 4.48 | 0.01 | 1.95 |
| 51 | 4.48 | 0.01 | 1.99 |
| 52 | 4.48 | 0.01 | 2.03 |
| 1 | 5.61 | 0.01 | 0.04 |
| 2 | 5.61 | 0.01 | 0.08 |
| 3 | 5.61 | 0.01 | 0.12 |
| 4 | 5.61 | 0.01 | 0.16 |
| 5 | 5.61 | 0.01 | 0.20 |
| 6 | 5.61 | 0.01 | 0.23 |
| 7 | 5.61 | 0.01 | 0.27 |
| 8 | 5.61 | 0.01 | 0.31 |
| 9 | 1.86 | 0.01 | 0.35 |
| 10 | 1.86 | 0.01 | 0.39 |
| 11 | 1.86 | 0.01 | 0.43 |
| 12 | 1.86 | 0.01 | 0.47 |
| TOTAL | 149.47 | 0.20 | 38.65 |

**Supp. Table 6.** Biochar composition and properties

|  |  |
| --- | --- |
| Material | Untreated log charcoal from sustainable forestry (FSC certified), vinasse, sugar cane molasses |
| Nutrients and secondary components | Total N | 2% |
| Total K2O | 2% |
| Total P2O5 | 0.3% |
| Total S | 0.2% |
| Ca | 0.6% |
| Mg | 0.05% |
| Organic Matter | 73% |
| Immediately available nitrogen content | 20% |
| Available nitrogen content after 3-5 weeks | 80% |
| Analytical Parameters | Carbon in thedry mass of coal | 80% |
| Pollutants (PAHs, ndl-PCB, sl-PCB, dioxins) | All maximum limits of contaminants allowed in the European Union are respected |
| Structure | granular |
| Size | 2-5mm |
| pH | 6.6 |
| Internal surface | >250m2/g |