**Table S1:** Experimental matrices of the full factorial design for CRPM

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Factor 1** | **Factor**  **2** | **Factor 3** | **Factor**  **4** | **Response**  **1** |
| **Run** | **A:pH** | **B:Humidity** | **C:C/N** | **D:CE** | **Organic Matter** |
| **Unity** | **-** | **%** | **-** | **(mS/cm)** | **%** |
| 1 | 6 | 37 | 13 | 0.6 | 19.87 |
| 2 | 8.5 | 12 | 0 | 600 | 17.98 |
| 3 | 6 | 37 | 0 | 600 | 24.78 |
| 4 | 8.5 | 37 | 13 | 600 | 24.27 |
| 5 | 8.5 | 12 | 13 | 0.6 | 17.87 |
| 6 | 8.5 | 37 | 0 | 0.6 | 15.95 |
| 7 | 6 | 12 | 0 | 0.6 | 13.48 |
| 8 | 6 | 12 | 13 | 600 | 14.75 |

**Table S2:** Experimental matrices of the full factorial design for CF

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Factor 1 | Factor  2 | Factor 3 | Factor 4 | Response 2 |
| Run | **A:pH** | **B:Humidity** | **C:C/N** | **D:CE** | **Organic Matter** |
|  | - | % |  | mS/cm | % |
| 1 | 6 | 37 | 0 | 900 | 13.09 |
| 2 | 6 | 12 | 13 | 900 | 16.65 |
| 3 | 8.5 | 37 | 13 | 900 | 15.67 |
| 4 | 8.5 | 37 | 0 | 0.6 | 17.81 |
| 5 | 8.5 | 12 | 0 | 900 | 14.18 |
| 6 | 6 | 37 | 13 | 0.6 | 11.37 |
| 7 | 6 | 12 | 0 | 0.6 | 15.19 |
| 8 | 8.5 | 12 | 13 | 0.6 | 16.36 |

**Table S3:** ANOVA analysis for CRPM

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Source** | | | | | **Sum of Squares** | | **df** | **Mean Square** | **F-value** | **p-value** |  |
| **Model** | | | | | 116.41 | | 4 | 29.10 | 19.34 | 0.0176 | significant |
| B-Humidity | | | | | 54.03 | | 1 | 54.03 | 35.90 | 0.0093 |  |
| D-CE | | | | | 26.68 | | 1 | 26.68 | 17.73 | 0.0245 |  |
| AB | | | | | 18.15 | | 1 | 18.15 | 12.06 | 0.0403 |  |
| AC | | | | | 17.55 | | 1 | 17.55 | 11.66 | 0.0420 |  |
| BD | | | | | 0.0000 | | 0 |  |  |  |  |
| CD | | | | | 0.0000 | | 0 |  |  |  |  |
| ABC | | | | | 0.0000 | | 0 |  |  |  |  |
| **Residual** | | | | | 4.52 | | 3 | 1.51 |  |  |  |
| **Cor Total** | | | | | 120.93 | | 7 |  |  |  |  |
| **Std. Dev.** | 1.23 |  | **R²** | 0.9627 | |
| **Mean** | 18.62 |  | **Adjusted R²** | 0.9129 | |
| **C.V. %** | 6.59 |  | **Predicted R²** | 0.7345 | |
|  |  |  | **Adeq Precision** | 12.2306 | |

**Tableau S4:** ANOVA Analysis for Manure

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Source** | **Sum of Squares** | | **df** | **Mean Square** | **F-value** | **p-value** |  |
| **Model** | 30.43 | | 6 | 5.07 | 450.76 | 0.0360 | significant |
| A-pH | 7.45 | | 1 | 7.45 | 662.20 | 0.0247 |  |
| B-Humidity | 2.46 | | 1 | 2.46 | 219.04 | 0.0429 |  |
| C-C/N | 0.0061 | | 1 | 0.0061 | 0.5378 | 0.5972 |  |
| D-CE | 0.1625 | | 1 | 0.1625 | 14.44 | 0.1638 |  |
| AB | 13.31 | | 1 | 13.31 | 1183.36 | 0.0185 |  |
| AD | 7.03 | | 1 | 7.03 | 625.00 | 0.0255 |  |
| CD | 0.0000 | | 0 |  |  |  |  |
| **Residual** | 0.0113 | | 1 | 0.0113 |  |  |  |
| **Cor Total** | 30.44 | | 7 |  |  |  |  |
| **Std. Dev.** | 0.1061 | **R²** | | 0.9996 |
| **Mean** | 15.04 | **Adjusted R²** | | 0.9974 |
| **C.V. %** | 0.7052 | **Predicted R²** | | 0.9763 |
|  |  | **Adeq Precision** | | 64.9091 |