SUPPLEMENTARY MATERIALS

Degradation of a leather-dye by the combination of depolymerised wood-chip biochar adsorption and solid-state fermentation with *Trametes villosa* SCS-10

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| Table 1 Physical and chemical characteristics of the leather-dye AB161 |
| Dye (CI)a | CAS number a | λMax (nm) b | MW (g mol-1) c  | Chemical structure |
| Acid Blue 161 (C.I. 15706) | 12392-64-2 | 578 | 394.40 | C20H13N2O5SNaCrx |
| a Colour Index International Classification, b CAS: Chemical Abstracts Service number; c Wavelength of maximum absorbance; d Molecular weight |

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| Table 2. Analyse of Variance (ANOVA) of the obtained model for dye removal. |
| Source | Sum of Squares | df | Mean square | F value | p-value | Significance |
| Model | 4081.32 | 9 | 453.48 | 1729.90 | < 0.0001 | \* |
| X1 – pH  | 147.92 | 1 | 147.92 | 564.27 | < 0.0001 | \* |
| X2 – Dye concentration | 3026.42 | 1 | 3026.42 | 11544.93 | < 0.0001 | \*  |
| X3 – Sorbent dosage | 38.72 | 1 | 38.72 | 147.71 | < 0.0001 | \* |
| X1X2 | 54.02 | 1 | 54.02 | 206.08 | < 0.0001 | \* |
| X1X3 | 12.60 | 1 | 12.60 | 48.07 | 0.0002 | – |
| X2X3 | 1.82 | 1 | 1.82 | 6.95 | 0.0336 | – |
| X12 | 44.13 | 1 | 44.13 | 168.35 | < 0.0001 | \* |
| X22 | 646.11 | 1 | 646.11 | 2464.71 | < 0.0001 | \*  |
| X32 | 58.82 | 1 | 58.82 | 224.37 | < 0.0001 | \* |
| Residual | 1.83 | 7 | 0.26 |   |   | – |
| Lack of Fit | 1.49 | 3 | 0.50 | 5.86 | 0.0602 |  |
| Pure Error | 0.34 | 4 | 0.09 |   |   |  |
| Cor Total | 4083.16 | 16 |   |   |   |  |
| (\*) Significant; (–) Not significant. |

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| Table 3. ANOVA and Duncan's multiple range test for dye removal by adsorption |
| Treatments: (4) AC, KWB, NWB, WB |
| Source | Sum of Squares | df | Mean Square | F Value | Pr > F |
| Model | 0.11627833 | 3 | 0.03875944 | 484.63 | <.0001 |
| Error | 0.00063982 | 8 | 0.00007998 |  |  |
| Corrected Total | 0.11691816 | 11 |  |  |  |
| R-Square | 0.994528 |  |  |
|  |
| Source | Type  | df  | Mean Square | F Value | Pr > F |
| Treatments | Type I: 0.11627833 | 3 | 0.03875944 | 484.63 | <.0001 |
| Type III: 0.11627833 | 3 | 0.03875944 | 484.63 | <.0001 |
|  |
| Level of treatment  | N | Mean (Response) | Std Dev |
| AC | 3 | 0.47925463 | 0.01493833 |
| KWB | 3 | 0.43886977 | 0.00367603 |
| NWB | 3 | 0.30493719 | 0.00793799 |
| WB | 3 | 0.23599899 | 0.00449805 |
| Alpha  | 0.05 |  |
| Error Degrees of Freedom | 8 |
| Error Mean Square | 0.00008 |

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| Table 4. ANOVA and Duncan's multiple range test for desorption assays |
| Treatments: (7) CH3COOH, Ethanol, HCl, Methanol, NaCl, NaOH and Water |
| Source | Sum of Squares | df | Mean Square | F Value | Pr > F |
| Model | 0.61609128 | 6 | 0.10268188 | 151.34 | <.0001 |
| Error | 0.00949899 | 14 | 0.00067850 |  |  |
| Corrected Total | 0.62559027 | 20 |  |  |  |
| R-Square | 0.984816 |  |  |
|  |
| Source | Type  | df  | Mean Square | F Value | Pr > F |
| Treatments | Type I: 0.61609128 | 6 | 0.10268188 | 151.34 | <.0001 |
| Type III: 0.61609128 | 6 | 0.10268188 | 151.34 | <.0001 |
|  |
| Level of treatment  | N | Mean (Response) | Std Dev |
| CH3COOH | 6 | 0.04198430 | 0.00990222 |
| Ethanol | 6 | 0.49294566 | 0.04789024 |
| HCl | 6 | 0.02586378 | 0.00246508 |
| Methaol | 6 | 0.37836050 | 0.04005863 |
| NaCl | 6 | 0.18794901 | 0.00924390 |
| NaOH | 6 | 0.21207961 | 0.02543235 |
| Water | 6 | 0.02003271 | 0.00386553 |
| Alpha  | 0.05 |  |
| Error Degrees of Freedom | 14 |
| Error Mean Square | 0.000678 |

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| Table 5. ANOVA and Duncan's multiple range test for fungal growthTreatments: (4) T1, T2, T3 and T4 |
| Source | Sum of Squares | df | Mean Square | F Value | Pr > F |
| Model | 1.00992710 | 3 | 0.33664237 | 4122.42 | <.0001 |
| Error | 0.00065329 | 8 | 0.00008166 |  |  |
| Corrected Total | 1.01058039 | 11 |  |  |  |
| R-Square | 0.999354 |  |  |
|  |
| Source | Type  | df  | Mean Square | F Value | Pr > F |
| Treatments | Type I: 1.00992710 | 3 | 0.33664237 | 4122.42 | <.0001 |
| Type III: 1.00992710 | 3 | 0.33664237 | 4122.42 | <.0001 |
|  |
| Level of treatment  | N | Mean (Response) | Std Dev |
| T1 | 3 | 0.90134962 | 0.00397649 |
| T2 | 3 | 0.86761648 | 0.00760943 |
| T3 | 3 | 0.52659507 | 0.01222805 |
| T4 | 3 | 0.18704728 | 0.01016880 |
| Alpha  | 0.1 |  |
| Error Degrees of Freedom | 8 |
| Error Mean Square | 0.000082 |

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| Table 6. ANOVA and Duncan's multiple range test for laccase activity.Treatments: (4) T1, T2, T3 and T4 |
| Source | Sum of Squares | df | Mean Square | F Value | Pr > F |
| Model | 469462.4228 | 3 | 156487.4743 | 80.30 | <.0001 |
| Error | 15590.3292 | 8 | 1948.7912 |  |  |
| Corrected Total | 485052.7521 | 11 |  |  |  |
| R-Square | 0.967858 |  |  |
|  |
| Source | Type  | df  | Mean Square | F Value | Pr > F |
| Treatments | Type I: 469462.4228 | 3 | 156487.4743 | 80.30 | <.0001 |
| Type III: 469462.4228 | 3 | 156487.4743 | 80.30 | <.0001 |
|  |
| Level of treatment  | N | Mean (Response) | Std Dev |
| T1 | 3 | 621.851852 | 62.2751098 |
| T2 | 3 | 758.703704 | 51.7005066 |
| T3 | 3 | 466.296296 | 16.4835621 |
| T4 | 3 | 226.296296 | 31.1821280 |
| Alpha  | 0.1 |  |
| Error Degrees of Freedom | 8 |
| Error Mean Square | 1948.791 |

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| **A close up of a white wall  Description automatically generated** |
| Figure 1.Calibration curve: absorbance *vs.* concentration of AB161 |

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