**Supplementary Data 1: Results for screening process of cultural conditions using FFD**

**Table SD1(a):** Diagnostics case statistics of the xylanase activity

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Standard  Order | Actual  Value | Predicted  Value | Residual | Student  Residual | Cook's  Distance | Outlier  t |
| 1  2  3  4  5  6  7  8  9  10  11  12  13  14  15  16  17  18  19  20  21  22  23  24  25  26  27  28  29  30  31  32  33  34  35  36  37  38  39  40  41  42  43  44  45  46  47  48  49  50  51  52  53  54  55  56  57  58  59  60  61  62  63  64  65  66  67 | 0.13  0.14  0.068  0.086  0.16  0.14  0.081  0.041  0.12  0.079  0.055  0.043  0.094  0.054  0.059  0.065  0.14  0.13  0.071  0.056  0.100  0.12  0.059  0.077  0.064  0.12  0.030  0.060  0.051  0.10  0.093  0.032  0.12  0.15  0.048  0.052  0.14  0.11  0.073  0.069  0.20  0.18  0.047  0.051  0.13  0.049  0.082  0.049  0.13  0.12  0.041  0.073  0.12  0.090  0.097  0.11  0.084  0.10  0.070  0.053  0.11  0.11  0.054  0.049  0.051  0.039  0.070 | 0.11  0.11  0.062  0.062  0.11  0.11  0.062  0.062  0.11  0.11  0.062  0.062  0.11  0.11  0.062  0.062  0.11  0.11  0.062  0.062  0.11  0.11  0.062  0.062  0.11  0.11  0.062  0.062  0.11  0.11  0.062  0.062  0.11  0.11  0.062  0.062  0.11  0.11  0.062  0.062  0.11  0.11  0.062  0.062  0.11  0.11  0.062  0.062  0.11  0.11  0.062  0.062  0.11  0.11  0.062  0.062  0.11  0.11  0.062  0.062  0.11  0.11  0.062  0.062  0.053  0.053  0.053 | 0.016  0.022  6.037E-003  0.024  0.048  0.021  0.019  -0.021  3.873E-003  -0.036  -7.433E-003  -0.019  -0.021  -0.060  -2.844E-003  2.967E-003  0.028  0.017  9.160E-003  -5.843E-003  -0.014  3.113E-003  -3.142E-003  0.015  -0.051  1.068E-003  -0.033  -1.993E-003  -0.064  -0.010  0.031  -0.030  3.269E-003  0.038  -0.014  -0.010  0.023  -6.560E-003  0.011  6.401E-003 0.081  0.061  -0.015  -0.011  0.017  -0.066  0.020  -0.013  0.011  8.884E-003  -0.022  0.011  3.749E-003  -0.024  0.034  0.043  -0.030  -0.010  7.790E-003  -9.264E-003  -7.520E-003  -7.475E-003  -7.953E-003  -0.014  -2.108E-003  -0.015  0.017 | 0.591  0.840  0.226  0.899  1.810  0.781  0.712  -0.800  0.145  -1.334  -0.279  -0.728  -0.778  -2.257  -0.107  0.111  1.060  0.646  0.344  -0.219  -0.544  0.117  -0.118  0.556  -1.905  0.040  -1.224  -0.075  -2.396  -0.383  1.167  -1.119  0.123  1.433  -0.532  -0.375  0.861  -0.246  0.412  0.240 3.050  2.293  -0.563  -0.428  0.631  -2.472  0.751  -0.488  0.417  0.333  -0.813  0.402  0.141  -0.902  1.293  1.617  -1.141  -0.393  0.292  -0.347  -0.282  -0.280  -0.298  -0.510  -0.095  -0.674  0.769 | 0.004  0.008  0.001  0.009  0.035  0.007  0.005  0.007  0.000  0.019  0.001  0.006  0.007  0.055  0.000  0.000  0.012  0.004  0.001  0.001  0.003  0.000  0.000  0.003  0.039  0.000  0.016  0.000  0.062  0.002  0.015  0.013  0.000  0.022  0.003  0.002  0.008  0.001  0.002  0.001  0.100  0.057  0.003  0.002  0.004  0.066  0.006  0.003  0.002  0.001  0.007  0.002  0.000  0.009  0.018  0.028  0.014  0.002  0.001  0.001  0.001  0.001  0.001  0.003  0.002  0.076  0.099 | 0.588  0.838  0.225  0.897  1.843  0.779  0.709  -0.798  0.144  -1.342  -0.277  -0.725  -0.776  -2.334  -0.106  0.110  1.061  0.643  0.341  -0.218  -0.541  0.116  -0.117  0.553  -1.946  0.040  -1.229  -0.074  -2.492  -0.380  1.171  -1.121  0.122  1.445  -0.529  -0.373  0.859  -0.244  0.409  0.238 3.273  2.375  -0.560  -0.425  0.628  -2.579  0.748  -0.485  0.415  0.331  -0.811  0.399  0.140  -0.900  1.300  1.638  -1.143  -0.390  0.290  -0.345  -0.280  -0.278  -0.296  -0.507  -0.095  -0.671  0.767 |

**Table SD1(b):** Diagnostics case statistics of the β-galactosidase activity

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Standard  Order | Actual  Value | Predicted  Value | Residual | Student  Residual | Cook's  Distance | Outlier  t |
| 1  2  3  4  5  6  7  8  9  10  11  12  13  14  15  16  17  18  19  20  21  22  23  24  25  26  27  28  29  30  31  32  33  34  35  36  37  38  39  40  41  42  43  44  45  46  47  48  49  50  51  52  53  54  55  56  57  58  59  60  61  62  63  64  65  66  67 | 0.070  0.37  0.41  0.20  0.12  0.025  0.059  0.010  0.17  0.15  0.11  0.17  0.081  0.15  0.11  0.12  0.042  0.044  0.11  0.097  0.012  0.042  0.072  0.77  0.067  0.044  0.011  0.24  0.047  0.031  0.027  0.012  0.010  0.54  0.065  0.23  0.17  0.058  0.11  0.025  2.56  1.22  0.49  0.30  0.093  0.15  0.26  0.95  0.15  0.12  0.15  0.095  0.043  0.043  0.017  0.015  0.047  0.028  0.011  0.22  0.061  0.046  0.035  0.033  0.71  0.58  0.56 | 0.30  0.30  0.30  0.30  0.30  0.30  0.30  0.30  0.30  0.30  0.30  0.30  0.30  0.30  0.30  0.30  0.087  0.087  0.087  0.087  0.087  0.087  0.087  0.087  0.087  0.087  0.087  0.087  0.087  0.087  0.087  0.087  0.30  0.30  0.30  0.30  0.30  0.30  0.30  0.30  0.30  0.30  0.30 0.30  0.30  0.30  0.30  0.30  0.087  0.087  0.087  0.087  0.087  0.087  0.087  0.087  0.087  0.087  0.087  0.087  0.087  0.087  0.087  0.087  0.61  0.61  0.61 | -0.23  0.074  0.11  -0.098  -0.17  -0.27  -0.24  -0.29  -0.13  -0.15  -0.19  -0.13  -0.22  -0.15  -0.19  -0.18  -0.045  -0.043  0.022  9.957E-003  -0.075  -0.045  -0.015  0.68  -0.019  -0.043  -0.076  0.15  -0.040  -0.056  -0.060  -0.075  -0.29  0.24  -0.23  -0.073  -0.12  -0.24  -0.19  -0.27  2.26  0.92  0.20  1.093E-003  -0.21  -0.15  -0.036  0.66  0.064  0.036  0.065  7.751E-003  -0.044  -0.043  -0.069  -0.072  -0.040  -0.058  -0.075  0.13  -0.026  -0.041  -0.052  -0.054  0.096  -0.037  -0.059 | -0.656  0.211  0.308  -0.282  -0.499  -0.785  -0.689  -0.827  -0.381  -0.418  -0.536  -0.382  -0.623  -0.418  -0.548  -0.525  -0.130  -0.123  0.063  0.029  -0.215  -0.129  -0.043  1.956  -0.056  -0.123  -0.218  0.437  -0.114  -0.162  -0.171  -0.214  -0.828  0.687  -0.670  -0.209  -0.356  -0.691  -0.542  -0.785  6.483  2.642  0.564  0.003  -0.591  -0.440  -0.105  1.886  0.184  0.104  0.187  0.022  -0.127  -0.124  -0.200  -0.207  -0.114  -0.168  -0.217  0.369  -0.076  -0.117  -0.149  -0.154  0.333  -0.129  -0.204 | 0.005  0.000  0.001  0.001  0.003  0.007  0.005  0.007  0.002  0.002  0.003  0.002  0.004  0.002  0.003  0.003  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.041  0.000  0.000  0.001  0.002  0.000  0.000  0.000  0.000  0.007  0.005  0.005  0.000  0.001  0.005  0.003  0.007  0.452  0.075  0.003 0.000  0.004  0.002  0.000  0.038  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.001  0.001  0.000  0.000  0.000  0.000  0.018  0.003  0.007 | -0.653  0.210  0.306  -0.280  -0.496  -0.783  -0.686  -0.825  -0.378  -0.415  -0.533  -0.379  -0.620  -0.415  -0.545  -0.522  -0.129  -0.123  0.063  0.028  -0.213  -0.128  -0.043  2.002  -0.055  -0.123  -0.216  0.434  -0.114  -0.160  -0.170  -0.212  -0.826  0.684  -0.668  -0.207  -0.354  -0.688  -0.539  -0.782  10.977 \*  2.777  0.561 0.003  -0.588  -0.437  -0.104  1.926  0.183  0.103  0.186  0.022  -0.126  -0.123  -0.198  -0.205  -0.114  -0.167  -0.215  0.367  -0.075  -0.116  -0.148  -0.153  0.331  -0.128  -0.203 |

**Supplementary Data 2: Experimental design and results of FFD.**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Run | Actual Value | | | | | | Response | |
|  | *x1* | *x2* | *x3* | *x4* | *x5* | *x6* | Xylanase excretion (U/ml) | β-galactosidase activity (U/ml) |
| 1 | 0.01 | 20 | 6 | 250.0 | 9 | 25.0 | 0.1069 | 0.0605 |
| 2 | 0.50 | 40 | 2 | 50.00 | 5 | 5.00 | 0.0861 | 0.2001 |
| 3 | 0.50 | 20 | 6 | 50.00 | 9 | 25.0 | 0.0904 | 0.0434 |
| 4 | 0.01 | 20 | 2 | 50.00 | 5 | 5.00 | 0.1302 | 0.0699 |
| 5 | 0.50 | 40 | 2 | 250.0 | 9 | 5.00 | 0.0602 | 0.2388 |
| 6 | 0.01 | 20 | 6 | 50.00 | 9 | 5.00 | 0.0999 | 0.0119 |
| 7 | 0.01 | 20 | 6 | 250.0 | 5 | 25.0 | 0.1313 | 0.0926 |
| 8 | 0.01 | 20 | 6 | 50.00 | 9 | 25.0 | 0.1182 | 0.0425 |
| 9 | 0.01 | 20 | 2 | 50.00 | 5 | 25.0 | 0.1177 | 0.0100 |
| 10 | 0.01 | 40 | 6 | 50.00 | 9 | 25.0 | 0.0967 | 0.0173 |
| 11 | 0.50 | 20 | 2 | 50.00 | 5 | 25.0 | 0.1527 | 0.5373 |
| 12 | 0.26 | 30 | 4 | 150.0 | 7 | 15.0 | 0.0513 | 0.7110 |
| 13 | 0.01 | 20 | 6 | 50.00 | 5 | 25.0 | 0.1374 | 0.1742 |
| 15 | 0.50 | 20 | 6 | 250.0 | 9 | 5.00 | 0.1042 | 0.0305 |
| 16 | 0.01 | 40 | 2 | 50.00 | 5 | 5.00 | 0.0682 | 0.4056 |
| 17 | 0.50 | 20 | 6 | 250.0 | 9 | 25.0 | 0.1070 | 0.0460 |
| 18 | 0.50 | 40 | 6 | 50.00 | 5 | 25.0 | 0.0686 | 0.0252 |
| 19 | 0.01 | 20 | 2 | 250.0 | 5 | 5.00 | 0.1183 | 0.1657 |
| 20 | 0.50 | 40 | 2 | 50.00 | 5 | 25.0 | 0.0522 | 0.2256 |
| 21 | 0.01 | 40 | 2 | 250.0 | 9 | 25.0 | 0.0700 | 0.0113 |
| 22 | 0.50 | 20 | 2 | 250.0 | 9 | 25.0 | 0.1040 | 0.0283 |
| 23 | 0.50 | 40 | 2 | 50.00 | 9 | 5.00 | 0.0563 | 0.0967 |
| 24 | 0.01 | 40 | 2 | 50.00 | 5 | 25.0 | 0.0480 | 0.0649 |
| 25 | 0.50 | 20 | 2 | 250.0 | 5 | 25.0 | 0.1756 | 1.2181 |
| 26 | 0.01 | 40 | 6 | 250.0 | 5 | 5.00 | 0.0593 | 0.1074 |
| 27 | 0.01 | 20 | 2 | 250.0 | 5 | 25.0 | 0.1958 | 2.5550 |
| 28 | 0.01 | 20 | 6 | 50.00 | 5 | 5.00 | 0.1627 | 0.1244 |
| 29 | 0.50 | 20 | 6 | 50.00 | 5 | 25.0 | 0.1079 | 0.0576 |
| 30 | 0.50 | 20 | 2 | 250.0 | 9 | 5.00 | 0.1155 | 0.0438 |
| 31 | 0.50 | 20 | 6 | 50.00 | 5 | 5.00 | 0.1353 | 0.0248 |
| 32 | 0.01 | 40 | 6 | 50.00 | 5 | 25.0 | 0.0732 | 0.1096 |
| 33 | 0.50 | 20 | 6 | 50.00 | 9 | 5.00 | 0.1176 | 0.0419 |
| 34 | 0.50 | 40 | 2 | 250.0 | 5 | 5.00 | 0.0428 | 0.1654 |
| 35 | 0.01 | 40 | 2 | 250.0 | 9 | 5.00 | 0.0296 | 0.0110 |
| 36 | 0.50 | 40 | 6 | 250.0 | 9 | 5.00 | 0.0324 | 0.0122 |
| 37 | 0.50 | 20 | 6 | 250.0 | 5 | 25.0 | 0.0485 | 0.1452 |
| 38 | 0.50 | 40 | 6 | 250.0 | 5 | 5.00 | 0.0652 | 0.1156 |
| 39 | 0.50 | 40 | 6 | 50.00 | 9 | 5.00 | 0.0770 | 0.7677 |
| 40 | 0.50 | 40 | 6 | 250.0 | 9 | 25.0 | 0.0486 | 0.0330 |
| 41 | 0.01 | 20 | 6 | 250.0 | 9 | 5.00 | 0.0506 | 0.0469 |
| 42 | 0.50 | 20 | 2 | 50.00 | 9 | 5.00 | 0.1317 | 0.0438 |
| 43 | 0.01 | 20 | 2 | 50.00 | 9 | 25.0 | 0.1256 | 0.1509 |
| 44 | 0.50 | 20 | 2 | 50.00 | 9 | 25.0 | 0.1233 | 0.1229 |
| 45 | 0.50 | 40 | 6 | 250.0 | 5 | 25.0 | 0.0492 | 0.9549 |
| 47 | 0.01 | 20 | 2 | 250.0 | 9 | 25.0 | 0.0840 | 0.0469 |
| 48 | 0.01 | 40 | 6 | 250.0 | 5 | 25.0 | 0.0822 | 0.2619 |
| 49 | 0.50 | 20 | 2 | 250.0 | 5 | 5.00 | 0.0789 | 0.1528 |
| 50 | 0.50 | 20 | 6 | 250.0 | 5 | 5.00 | 0.0543 | 0.1528 |
| 51 | 0.50 | 40 | 6 | 50.00 | 9 | 25.0 | 0.1053 | 0.0148 |
| 52 | 0.01 | 40 | 2 | 50.00 | 9 | 5.00 | 0.0713 | 0.1087 |
| 53 | 0.50 | 40 | 2 | 250.0 | 5 | 25.0 | 0.0508 | 0.2994 |
| 54 | 0.01 | 40 | 6 | 50.00 | 9 | 5.00 | 0.0590 | 0.0718 |
| 55 | 0.01 | 20 | 2 | 50.00 | 9 | 5.00 | 0.1427 | 0.0416 |
| 56 | 0.50 | 40 | 2 | 250.0 | 9 | 25.0 | 0.0529 | 0.2152 |
| 57 | 0.01 | 40 | 6 | 250.0 | 9 | 25.0 | 0.0542 | 0.0349 |
| 58 | 0.01 | 40 | 2 | 250.0 | 5 | 5.00 | 0.0548 | 0.1118 |
| 59 | 0.01 | 40 | 2 | 250.0 | 5 | 25.0 | 0.0472 | 0.4944 |
| 60 | 0.26 | 30 | 4 | 150.0 | 7 | 15.0 | 0.0385 | 0.5776 |
| 61 | 0.50 | 40 | 2 | 50.00 | 9 | 25.0 | 0.0729 | 0.0945 |
| 62 | 0.01 | 40 | 6 | 250.0 | 9 | 5.00 | 0.0933 | 0.0271 |
| 63 | 0.01 | 40 | 2 | 50.00 | 9 | 25.0 | 0.0405 | 0.1519 |
| 64 | 0.50 | 20 | 2 | 50.00 | 5 | 5.00 | 0.1368 | 0.3718 |
| 65 | 0.01 | 20 | 2 | 250.0 | 9 | 5.00 | 0.0637 | 0.0674 |
| 66 | 0.26 | 30 | 4 | 150.0 | 7 | 15.0 | 0.0704 | 0.5559 |
| 67 | 0.50 | 40 | 6 | 50.00 | 5 | 5.00 | 0.0409 | 0.0104 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Source | Sum of  Squares | DF | Mean  Square | *F*-value | \**P*-value |  |
| Model | 0.044 | 1 | 0.044 | 59.56 | < 0.0001 | significant |
| *x2*:  Post induction temperature (°C) | 0.044 | 1 | 0.044 | 59.56 | < 0.0001 |  |
| Curvature | 3.492 x10-3 | 1 | 3.492 x10-3 | 4.76 | 0.0328 | significant |
| Residual | 0.047 | 64 | 7.338 x10-4 |  |  |  |
| Lack of Fit | 0.046 | 62 | 7.491 x10-4 | 2.90 | 0.2902 | not Significant |

**Supplementary Data 3**:Analysis of variance for selected factorial model of xylanase excretion

\**P*-value which is less than 0.05 indicates that the model terms are significant

**Supplementary Data 4**:Analysis of variance for selected factorial model of β-galactosidase activity

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Source | Sum of  Squares | DF | Mean  Square | *F*-value | \**P*-value |  |
| Model | 0.72 | 1 | 0.72 | 5.72 | 0.0197 | significant |
| *x5*:  pH | 0.72 | 1 | 0.72 | 5.72 | 0.0197 |  |
| Curvature | 0.51 | 1 | 0.51 | 4.09 | 0.0474 | significant |
| Residual | 8.01 | 64 | 0.13 |  |  |  |
| Lack of Fit | 7.99 | 62 | 0.13 | 18.29 | 0.0532 | not Significant |

\**P*-value which is less than 0.05 indicates that the model terms are significant

**Supplementary Data 5**:Statistical analysis for xylanase excretion and β-galactosidase activity

|  |  |  |
| --- | --- | --- |
|  | Responses | |
| xylanase excretion | β-galactosidase activity |
| R2 | 0.8203 | 0.8821 |
| Adjusted R2 | 0.7392 | 0.6770 |
| Predicted R2 | 0.6207 | 0.7425 |
| Adequate precision | 10.649 | 7.0567 |

**Supplementary Data 6**:Analysis of variance for response surface quadratic model for xylanase excretion. Where, *x1*: IPTG concentration (mM); *x2*: Post induction temperature (°C); *x3*: Post induction time (h); *x4*: Agitation rate (rpm); *x5*: pH; *x6*: Inoculum size (%).

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Source | Sum of  Squares | DF | Mean  Square | *F*-value | *P*-value |
| Block | 0.620 | 1 | 0.620 |  |  |
| Model | 9.850 | 27 | 0.360 | 4.030 | < 0.0001 |
| *x1* | 0.052 | 1 | 0.052 | 0.570 | 0.4521 |
| *x2* | 5.440 | 1 | 5.440 | 60.12 | < 0.0001 |
| *x3* | 2.476 x10-3 | 1 | 2.476 x10-3 | 0.027 | 0.8693 |
| *x4* | 0.820 | 1 | 0.820 | 9.070 | 0.0040 |
| *x5* | 0.160 | 1 | 0.160 | 1.810 | 0.1837 |
| *x6* | 0.031 | 1 | 0.031 | 0.350 | 0.5586 |
| *x12* | 0.047 | 1 | 0.047 | 0.520 | 0.4743 |
| *x22* | 0.160 | 1 | 0.160 | 1.820 | 0.1829 |
| *x32* | 0.320 | 1 | 0.320 | 3.580 | 0.0638 |
| *x42* | 0.200 | 1 | 0.200 | 2.170 | 0.1469 |
| *x52* | 0.610 | 1 | 0.610 | 6.720 | 0.0123 |
| *x62* | 0.160 | 1 | 0.160 | 1.740 | 0.1933 |
| *x1 x2* | 7.432 x10-4 | 1 | 7.432 x10-4 | 8.211 x10-3 | 0.9281 |
| *x1 x3* | 0.360 | 1 | 0.360 | 3.920 | 0.0527 |
| *x1 x4* | 0.051 | 1 | 0.051 | 0.560 | 0.4581 |
| *x1 x5* | 0.310 | 1 | 0.310 | 3.480 | 0.0676 |
| *x1 x6* | 7.356 x10-3 | 1 | 7.356 x10-3 | 0.081 | 0.7767 |
| *x2 x3* | 0.540 | 1 | 0.540 | 5.950 | 0.0180 |
| *x2 x4* | 0.022 | 1 | 0.022 | 0.240 | 0.6277 |
| *x2 x5* | 0.085 | 1 | 0.085 | 0.940 | 0.3373 |
| *x2 x6* | 0.018 | 1 | 0.018 | 0.200 | 0.6560 |
| *x3 x4* | 0.051 | 1 | 0.051 | 0.560 | 0.4568 |
| *x3 x5* | 0.049 | 1 | 0.049 | 0.540 | 0.4652 |
| *x3 x6* | 8.817 x10-3 | 1 | 8.817 x10-3 | 0.097 | 0.7562 |
| *x4 x5* | 0.025 | 1 | 0.025 | 0.270 | 0.6033 |
| *x4 x6* | 0.220 | 1 | 0.220 | 2.430 | 0.1248 |
| *x5 x6* | 0.015 | 1 | 0.015 | 0.170 | 0.6847 |
| Residual | 4.890 | 54 | 0.091 |  |  |
| Lack of Fit | 4.620 | 49 | 0.094 | 1.790 | 0.2688 |

\*The response of xylanase excretion have been transformed according to the requirement of the statistical analysis

**Supplementary Data 7**:Analysis of variance for response surface quadratic model for β-galactosidase activity. Where, *x1*: IPTG concentration (mM); *x2*: Post induction temperature (°C); *x3*: Post induction time (h); *x4*: Agitation rate (rpm); *x5*: pH; *x6*: Inoculum size (%).

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Source | Sum of  Squares | DF | Mean  Square | *F*-value | *P*-value |
| Block | 14.98 | 1 | 14.98 |  |  |
| Model | 87.55 | 27 | 3.240 | 1.930 | 0.0198 |
| *x1* | 2.190 | 1 | 2.190 | 1.300 | 0.2586 |
| *x2* | 0.057 | 1 | 0.057 | 0.034 | 0.8542 |
| *x3* | 7.910 | 1 | 7.910 | 4.710 | 0.0344 |
| *x4* | 3.420 | 1 | 3.420 | 2.040 | 0.1592 |
| *x5* | 11.59 | 1 | 11.59 | 6.910 | 0.0111 |
| *x6* | 4.530 | 1 | 4.530 | 2.700 | 0.1062 |
| *x12* | 1.320 | 1 | 1.320 | 0.780 | 0.3798 |
| *x22* | 14.98 | 1 | 14.98 | 8.930 | 0.0042 |
| *x32* | 1.170 | 1 | 1.170 | 0.690 | 0.4083 |
| *x42* | 5.230 | 1 | 5.230 | 3.120 | 0.0831 |
| *x52* | 2.650 | 1 | 2.650 | 1.580 | 0.2140 |
| *x62* | 9.860 | 1 | 9.860 | 5.880 | 0.0187 |
| *x1 x2* | 0.120 | 1 | 0.120 | 0.069 | 0.7941 |
| *x1 x3* | 1.930 | 1 | 1.930 | 1.150 | 0.2879 |
| *x1 x4* | 0.065 | 1 | 0.065 | 0.039 | 0.8449 |
| *x1 x5* | 0.310 | 1 | 0.310 | 0.190 | 0.6666 |
| *x1 x6* | 0.011 | 1 | 0.011 | 6.266 x10-3 | 0.9372 |
| *x2 x3* | 2.140 x10-3 | 1 | 2.140 x10-3 | 1.276 x10-3 | 0.9716 |
| *x2 x4* | 0.510 | 1 | 0.510 | 0.300 | 0.5831 |
| *x2 x5* | 0.200 | 1 | 0.200 | 0.120 | 0.7298 |
| *x2 x6* | 0.770 | 1 | 0.770 | 0.460 | 0.5023 |
| *x3 x4* | 0.420 | 1 | 0.420 | 0.250 | 0.6177 |
| *x3 x5* | 0.450 | 1 | 0.450 | 0.270 | 0.6086 |
| *x3 x6* | 0.048 | 1 | 0.048 | 0.029 | 0.8661 |
| *x4 x5* | 8.860 | 1 | 8.860 | 5.280 | 0.0254 |
| *x4 x6* | 2.650 | 1 | 2.650 | 1.580 | 0.2139 |
| *x5 x6* | 1.490 | 1 | 1.490 | 0.890 | 0.3496 |
| Residual | 90.59 | 54 | 1.680 |  |  |
| Lack of Fit | 83.21 | 49 | 1.700 | 1.150 | 0.4911 |

\*The response of β-galactosidase activity have been transformed according to the requirement of the statistical analysis