**Supplementary material**

Table S1. Box-Behnken design (BBD) and analysis of variance (ANOVA) for experimental results.

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Run | Variables | | | | Yield  mg glucose/g DW | ANOVA | | | | | |
| A1(W) | A2(°C) | A3(min) | A4(mL/g) | Source | Sum of squares | DF | Mean square | *F* value | *P* value |
| 1 | -1(180) | 0(60) | 0(60) | -1(20) | 60.70±0.91 | Model | 12.38 | 14 | 0.88 | 11.05 | <0.0001\*\*\* |
| 2 | -1(180) | 0(60) | 1(70) | 0(25) | 76.60±1.70 | A1 | 1.81 | 1 | 1.81 | 22.61 | 0.0003\*\*\* |
| 3 | -1(180) | 0(60) | 0(60) | 1(30) | 81.80±0.70 | A2 | 1.20E-003 | 1 | 1.20E-003 | 0.02 | 0.9043 |
| 4 | -1(180) | 0(60) | -1(50) | 0(25) | 76.70±1.20 | A3 | 0.45 | 1 | 0.45 | 5.60 | 0.0329\* |
| 5 | -1(180) | 1(70) | 0(60) | 0(25) | 70.60±1.20 | A4 | 1.02 | 1 | 1.02 | 12.76 | 0.0031\*\* |
| 6 | -1(180) | -1(50) | 0(60) | 0(25) | 79.80±0.60 | A1A2 | 0.024 | 1 | 0.024 | 0.30 | 0.5924 |
| 7 | 1(240) | -1(50) | 1(70) | 0(25) | 74.10±0.40 | A1A3 | 1.06 | 1 | 1.06 | 13.26 | 0.0027\*\* |
| 8 | 1(240) | 0(60) | 0(60) | 0(25) | 85.50±0.10 | A1A4 | 1.45 | 1 | 1.45 | 17.14 | 0.0008\*\*\* |
| 9 | 1(240) | 0(60) | -1(50) | -1(20) | 84.20±0.90 | A2A3 | 1.13 | 1 | 1.13 | 14.17 | 0.0021\*\* |
| 10 | 1(240) | 0(60) | 0(60) | 0(25) | 82.50±0.90 | A2A4 | 0.76 | 1 | 0.76 | 9.46 | 0.0082\*\* |
| 11 | 1(240) | 0(60) | 0(60) | 1(30) | 81.10±1.30 | A3A4 | 0.38 | 1 | 0.38 | 4.73 | 0.0474\* |
| 12 | 1(240) | 1(70) | 1(70) | 0(25) | 85.50±1.40 | A12 | 0.67 | 1 | 0.67 | 8.33 | 0.0120\* |
| 13 | 0(210) | -1(50) | 1(70) | 0(25) | 75.90±0.90 | A22 | 0.19 | 11 | 0.19 | 2.43 | 0.1417 |
| 14 | 0(210) | 0(60) | 1(70) | 1(30) | 69.30±0.50 | A32 | 2.15 | 1 | 2.15 | 26.84 | 0.0001\*\*\* |
| 15 | 0(210) | 0(60) | 1(70) | 1(30) | 82.50±1.00 | A42 | 2.81 | 1 | 2.81 | 35.09 | <0.0001\*\*\* |
| 16 | 0(210) | 1(70) | 0(60) | 0(25) | 87.10±1.10 | Residual | 1.12 | 14 | 0.08 |  |  |
| 17 | 0(210) | 0(60) | 0(60) | 0(25) | 84.80±0.60 | Lack of fit | 0.84 | 10 | 0.08 | 1.2 | 0.47 |
| 18 | 0(210) | 0(60) | 0(60) | 0(25) | 85.00±1.70 | Pure error | 0.28 | 4 | 0.07 |  |  |
| 19 | 0(210) | 1(70) | 0(60) | 1(30) | 71.80±0.40 | Cor total | 13.50 | 28 |  |  |  |
| 20 | 0(210) | 1(70) | 0(60) | 1(30) | 82.00±0.90 | R2 | 0.92 |  |  |  |  |
| 21 | 0(210) | 0(60) | 0(60) | 0(25) | 83.30±0.40 | Adj R2 | 0.83 |  |  |  |  |
| 22 | 0(210) | -1(50) | 0(60) | 1(30) | 75.80±0.20 | Pred R2 | 0.61 |  |  |  |  |
| 23 | 0(210) | -1(50) | 0(60) | 1(30) | 83.00±0.40 |  |  |  |  |  |  |
| 24 | 0(210) | 0(60) | 0(60) | 0(25) | 89.90±0.60 |  |  |  |  |  |  |
| 25 | 0(210) | 0(60) | 0(60) | 0(25) | 87.80±1.40 |  |  |  |  |  |  |
| 26 | 0(210) | 0(60) | -1(50) | 1(30) | 70.40±0.70 |  |  |  |  |  |  |
| 27 | 0(210) | 1(70) | -1(50) | 0(25) | 71.90±0.90 |  |  |  |  |  |  |
| 28 | 0(210) | -1(50) | -1(50) | 0(25) | 82.10±1.80 |  |  |  |  |  |  |
| 29 | 0(210) | 0(60) | -1(50) | 1(30) | 69.50±0.70 |  |  |  |  |  |  |

A1, ultrasonic power; A2, time; A3, temperature; A4, the ratio of liquid to solid. (\*is significant at the 0.05 level, \*\* is significant at the 0.01 level, \*\*\* is significant at the 0.001 level).

Table S2. Primer information

|  |  |  |
| --- | --- | --- |
| Gene | Forward (5’-3’) | Reverse (5’-3’) |
| *Aβ1-42* | CCGACATGACTCAGGATATGAAGT | CACCATGAGTCCAATGATTGCA |
| *jnk-1* | ACACTCTGCTCGCATCCTCCTC | CAGCCAATTCCCAACGGACTCG |
| *daf-16* | CCACCACCATCATACCACGAGTTG | CATTGGCTTGAAGTTAGTGCTTGGC |
| *act-1* | ATGGTAAGATGCCTTCAGTGGACAAC | CATACCGACCATGACTCCTTGA |

Fig. S1. Influences of different factors on the CBP yield (mg glucose/g DW). (A) Ultrasonic power. (B) extraction time. (C) extraction temperature. (D) liquid to solid ratio.



Fig. S2. Response surface plots for the interaction of any two variables on CBP yield. (A) the power of ultrasonic and extraction time. (B) the power of ultrasonic and extraction temperature. (C) the power of ultrasonic and the ratio of liquid-solid. (D) extraction time and extraction temperature. (E) extraction time and the ratio of liquid-solid. (F) extraction temperature and the ratio of liquid-solid.



Fig. S3. Purification of CBP50-1. (A) Fractioned by DEAE-52. (B) Purified by G-200.



Fig. S4. High-performance Gel Chromatography of CBP50-1

