**Table ST1** Effect of media types to BSMs production

|  |  |
| --- | --- |
| **Type of medium** | **Inhibition zone (mm)** |
| YMB | 30.08±0.58a |
| TSB | 21.08±0.58d |
| MB | 17.08±0.58e |
| MHB | 0.00±0.00f |
| NB | 0.00±0.00f |
| ISP3 | 25.00±0.00b |
| ISP4 | 16.00±0.00e |
| ISP5 | 23.08±0.58c |
| ISP7 | 20.03±0.03d |

**Note:** The data were presented as mean±SD. Means with a different alphabet in the same column are significantly different (p<0.05).

**Table ST2** Media optimization to potential of BSMs production

|  |  |
| --- | --- |
| **medium** | **Inhibition zone (mm)** |
| YM | 28.00±0.00b |
| YM/2 | 34.00±0.00a |
| YM/3 | 24.08±0.58c |
| YM/4 | 18.08±0.58e |
| YM/5 | 11.65±1.15f |
| YM/6 | 11.33±0.00f |
| ISP3 | 20.65±0.58d |
| ISP3/2 | 26.08±0.58bc |
| ISP3/3 | 13.65±1.15f |
| ISP3/4 | 11.65±1.15f |
| ISP3/5 | 0.00±0.00g |
| ISP3/6 | 0.00±0.00g |

**Note:** The data were presented as mean±SD. Means with a different alphabet in the same column are significantly different (p<0.05).

**Table ST3** Protein secretion to liquid medium

|  |  |  |
| --- | --- | --- |
| **Time (Hours)** | **Dry weight of cell (mg/ml)** | **total protein**  **(μg/200 μl)** |
| 0 | 0.00±0.00l | 0.00±0.00n |
| 4 | 0.12±0.00k | 0.20±0.01m |
| 8 | 0.15±0.03k | 0.30±0.00l |
| 12 | 0.16±0.03k | 0.40±0.00k |
| 16 | 0.28±0.04j | 0.50±0.00j |
| 20 | 0.47±0.05i | 0.60±0.00i |
| 24 | 1.53±0.02h | 0.73±0.00h |
| 48 | 3.41±0.02g | 1.55±0.01g |
| 72 | 6.47±0.02d | 4.90±0.00f |
| 96 | 9.75±0.01a | 8.36±0.01a |
| 120 | 9.75±0.02a | 8.34±0.01a |
| 144 | 9.74±0.05a | 8.34±0.01a |
| 168 | 9.74±0.01a | 7.11±0.01b |
| 192 | 9.74±0.02a | 6.91±0.02c |
| 216 | 7.68±0.02b | 6.42±0.01d |
| 240 | 7.04±0.02c | 6.36±0.01e |
| 264 | 6.02±0.05e | 6.40±0.01d |
| 288 | 5.21±0.02f | 6.40±0.01d |

**Note:** The data were presented as mean±SD. Means with a different alphabet in the same column are significantly different (p<0.05).

**Table ST4** Effect of initial incubation temperature to BSMs production

|  |  |
| --- | --- |
| **temperature (Cº)** | **Inhibition zone (mm)** |
| 10 | 0.00±0.00d |
| 20 | 16.32±0.59b |
| 30 | 28.00±0.00a |
| 40 | 11.74±0.58c |
| 50 | 11.74±0.58c |

**Note:** The data were presented as mean±SD. Means with a different alphabet in the same column are significantly different (p<0.05).

**Table ST5** Effect of incubation period to BSMs production

|  |  |
| --- | --- |
| **Incubation period (days)** | **Inhibition zone (mm)** |
| 1 | 0.00±0.00e |
| 2 | 0.00±0.00e |
| 3 | 16.32±0.58d |
| 4 | 23.32±0.59c |
| 5 | 28.23±0.58a |
| 6 | 28.23±0.58a |
| 7 | 28.00±1.00ab |
| 8 | 26.00±1.00b |
| 9 | 27.39±0.58ab |
| 10 | 27.38±0.58ab |

**Note:** The data were presented as mean±SD. Means with a different alphabet in the same column are significantly different (p<0.05).

**Table ST6** Effect of agitation on BSMs production of *S. hiroshimensis*

|  |  |
| --- | --- |
| **Agitation speed (× 10 rpm)** | **Inhibition zone (mm)** |
| 0 | 0.00±0.00e |
| 100 | 16.32±0.59d |
| 150 | 20.00±0.00c |
| 200 | 35.32±0.58a |
| 250 | 23.34±0.58b |

**Note:** The data were presented as mean±SD. Means with a different alphabet in the same column are significantly different (p<0.05).

**Table ST7** Effect of initial pH of medium on BSMs production of

*S. hiroshimensis*

|  |  |
| --- | --- |
| **pH** | **Inhibition zone (mm)** |
| 3 | 0.00±0.00f |
| 4 | 0.00±0.00f |
| 5 | 14.57±0.58e |
| 6 | 28.37±0.58b |
| 7 | 33.00±0.00a |
| 8 | 27.33±0.58b |
| 9 | 23.00±0.00c |
| 10 | 18.33±0.58d |
| 11 | 15.67±0.58e |
| 12 | 0.00±0.00f |

**Note:** The data were presented as mean±SD. Means with a different alphabet in the same column are significantly different (p<0.05).

**Table ST8** Effect of carbon sources on BCs production of

*S. hiroshimensis*

|  |  |
| --- | --- |
| **Carbon sources (1%)** | **Inhibition zone (mm)** |
| Glucose | 0.00±0.00f |
| Maltose | 15.00±0.58e |
| Sucrose | 17.67±0.00d |
| Glycerol | 20.33±1.00c |
| Starch | 23.00±0.50b |
| unsupplement | 34.33±0.58a |

**Note:** The data were presented as mean±SD. Means with a different alphabet in the same column are significantly different (p<0.05).

**Table ST9** Effect of nitrogen sources on BCs production of   
 *S. hiroshimensis*

|  |  |
| --- | --- |
| **Nitrogen sources (1%)** | **Inhibition zone (mm)** |
| Casein | 22.67±0.00bc |
| Peptone | 21.67±0.51bc |
| Beef extract | 20.67±0.00c |
| Malt extract | 23.33±1.00b |
| Urea | 18.00±0.58d |
| unsupplement | 32.67±0.58a |

**Note:** The data were presented as mean±SD. Means with a different alphabet in the same column are significantly different (p<0.05).

**Table ST10** Effect of trace elements on BCs production of   
*S. hiroshimensis*

|  |  |
| --- | --- |
| **Trace elements (1%)** | **Inhibition zone (mm)** |
| FeSO4 | 0.00±0.00c |
| MgSO4 | 33.67±1.00a |
| CaCO3 | 33.67±0.58a |
| K2HPO4 | 0.00±0.00c |
| KH2PO4 | 19.00±0.58b |
| KCI | 0.00±0.00c |
| KNO3 | 0.00±0.00c |
| unsupplement | 33.67±0.58a |

**Note:** The data were presented as mean±SD. Means with a different alphabet in the same column are significantly different (p<0.05).

**Table ST11 Effect of salt concentration on BSMs production**

|  |  |
| --- | --- |
| **Salt concentration (%)** | **Inhibition zone (mm)** |
| 0.0 | 28.67±0.00b |
| 0.5 | 32.67±0.58a |
| 1.0 | 23.33±1.00c |
| 1.5 | 18.00±0.58d |
| 2.0 | 18.67±0.58d |
| 2.5 | 12.33±0.00e |
| 3.0 | 0.00±0.00f |

**Note:** The data were presented as mean±SD. Means with a different alphabet in the same column are significantly different (p<0.05).