

Development of an efficient Bio-indigo production system

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Abstract

In the previous study, we have cloned a recombinant *E. coli* harboring flavin-containing monooxygenase gene. We cultivated the recombinant cells in the 5L bioreactor containing tryptophan medium (2g tryptophan, 10g NaCl, 5g yeast extract, and 50 g ampicillin per liter) at 30°C. In the batch reaction, the recombinant *E. coli* produced 0.82 g/L of Bio-indigo for 20 h cultivation. To enhance indigo production, we constructed a novel medium concentration system. The cultivated medium containing indigo was transferred to the bottle and mixed with diphenylmethane. Next the mixture was applied to the cylindrical column (3 X 30 cm) filled with diphenylmethane, and indigo was moved into the diphenylmethane layer. The isolated medium was circulated into the bioreactor. In the continuous system, 1.4 g/L of indigo was produced from the medium containing 3 g /L of tryptophan.

References

1. Doukyu, RW., Arai, T., Aono, R. Effects of organic solvents on indigo formation by *Pseudomonas* sp. strain ST-200 grown with high levels of indole. (1998) *Biosci. Biotechnol. Biochem.* 62, 1075-1080.
2. Doukyu, R. W., Nakano, T., Okuyama, Y., Aono, R. Isolation of an *Acinetobacter* sp. ST-550 which produces a high level of indigo in a water-organic solvent two-phase system containing high levels of indole. (2002) *Appl. Microbiol. Biotechnol.* 58, 543-546.
3. Ensley, B. D., Ratzkin, B. J., Osslund, T. D., Simon, M. J., Wackett, L. P., Gibson, D. T. Expression of naphthalene oxidation in *Escherichia coli* results the biosynthesis of indigo. (1983) *Science*, 222, 167-169.