Synthetic tools for the genetic engineering of Methylomonas sp. DH-1

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Genetic engineering is a fundamental technology to engineer living systems. There are no such technologies for newly identified bacterial species, which dampers down the advance of bacterial cell factory construction. Here, we developed several technologies to support the engineering of Methylomonas sp. DH-1, that has been recently identified from soil. For the introduction of bacterial plasmids, it is essential to develop a transformation method. For rapid and easy use, we developed a physicochemical transformation method that is applicable to to a wide variety of bacterial species including Gram positive bacteria. Optimization of the method showed over 1e5 CFU/ug of DNA in Methylomonas sp. DH-1 and comparable efficiency in other bacterial species. For the fine-optimization of protein expression, here we identified > 100 promoters showing a different strength in Methylomonas sp. DH-1.