Genetic toolbox for controlled expression of functional proteins in Geobacillus spp. - DTU Orbit (10/08/2019)

Genetic toolbox for controlled expression of functional proteins in Geobacillus spp.
Species of genus Geobacillus are thermophilic bacteria and play an ever increasing role as hosts for biotechnological applications both in academia and industry. Here we screened a number of Geobacillus strains to determine which industrially relevant carbon sources they can utilize. One of the strains, G. thermoglucosidasius C56-YS93, was then chosen to develop a toolbox for controlled gene expression over a wide range of levels. It includes a library of semi-synthetic constitutive promoters (76-fold difference in expression levels) and an inducible promoter from the xylA gene. A library of synthetic in silico designed ribosome binding sites was also created for further tuning of translation. The $P_{xylA}$ was further used to successfully express native and heterologous xylanases in G. thermoglucosidasius. This toolbox enables fine-tuning of gene expression in Geobacillus species for metabolic engineering approaches in production of biochemicals and heterologous proteins.

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