DISP

Directional Intelligent Screening Platform

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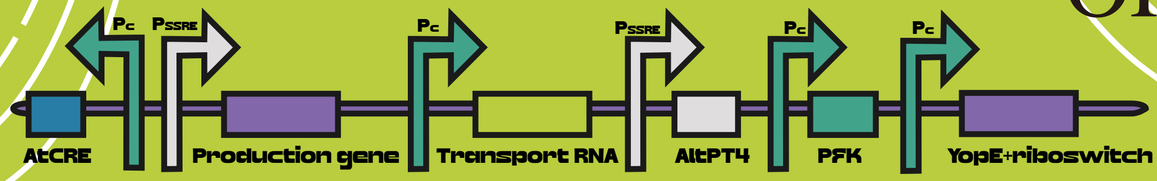
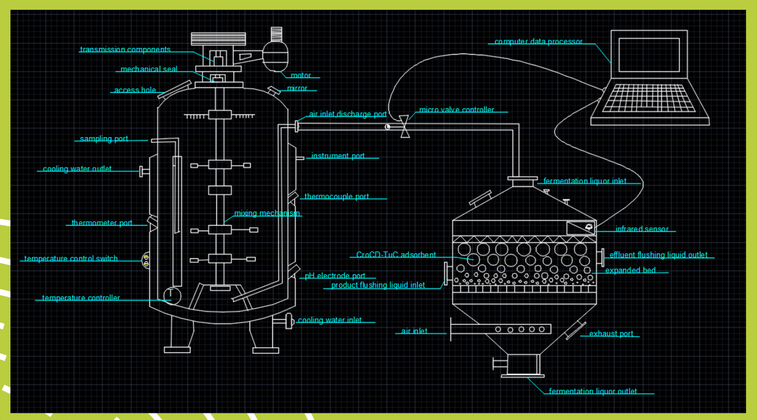


Introduction

To solve the problems that fermentation engineering is facing: 1. Plasmid degradation, resulting in reduced production.
2. The product cannot be transported, which increases the cost. We designed an Directional Intelligent Screening Platform to solve this problem.

Hardware



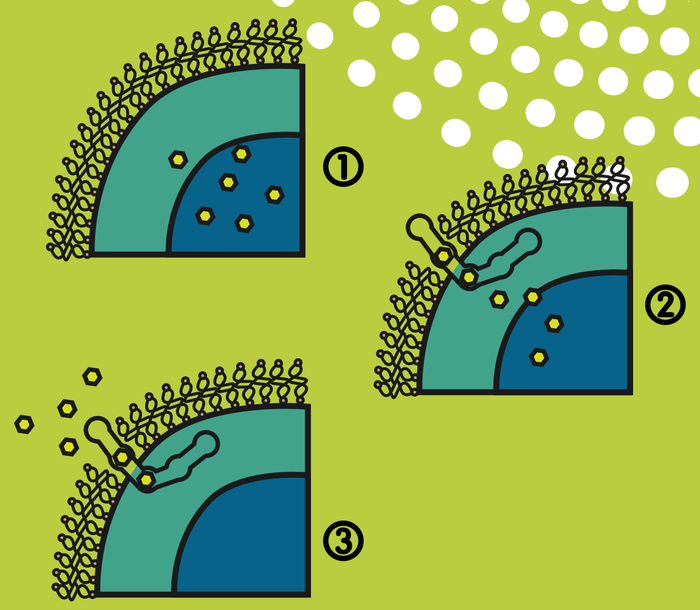
Aureobasidium pullulans are placed in fermenters with a temperature control device for proliferation and fermentation, cultured at 24 °C, and isolated and purified during 30°C proliferation of our strains. An expansion bed containing a CroCD-TuC3 adsorbent is used for adsorption. The infrared sensors and computational processors are designed to maintain a constant expansion rate throughout the adsorption process, thus maintaining a constant metabolite flow rate. The products are then eluted with an eluate (Zhao 2014).

Quorum sensing

To increase the competitiveness with wild-type, we build an quorum sensing system which can up or down regulate the SSRE-promoter depending on the concentration of IP (Yang et al. 2021). The engineering bacteria can only produce when the it reaches a certain level.

Weak Promoter

To keep the plasmid copy-number at high level in cell, we knockout an essential gene and insert it after a weak-expressed promoter. The strain will die when the copy number decrease to a certain level.



Transporter adapter

In order to solve the problem that the production can not be transported to extracellular, we insert the binding domain of the production-aptamer to an aptamer that can target to membrane to transport the production specifically (Boussebayle et al. 2019).

Kill switch

To prevent our strains from escaping into the environment, and as a mean for us to control production. We built an riboswitch which is regulated by an specific aptamer (Leadsham et al. 2009), the YopE will be transcribed to kill the strain when the production is low enough.

References

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