Supporting Information

Constructing a bacterial cellulose-based bacterial sensors platform by enhancing cell affinity via surface-exposed carbohydrate binding module (CBM)

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Table of contents

1. DNA and amino acid sequence of Lpp-OmpA-CBM2a

The following was the optimized DNA sequence of *Lpp-OmpA-CBM2a*. *Nhe*I was inserted into the sequence between *Lpp-OmpA* and *CBM2a* genes.

ATGAAGGCGACCAAACTGGTGCTGGGTGCGGTTATTCTGGGCAGCACCCTGCTG
GCGGGTTGCAGCAGCAACGCGAAAATCGACCAGGGCATTAACCCGTACGTGGGT
TTCGAAATGGGCTATGATTGGCTGGGTCGTATGCCGTACAAGGGTAGCGTGGAG
AACGGCGCGTATAAAGCGCAGGGTGTTCAACTGACCGCGAAGCTGGGCTACCCG
ATCACCGACGATCTGGACATTTATACCCGTCTGGGTGGCATGGTGTGGCGTGCGG
ACACCAAGAGCAACGTTTACGGTAAAAACCACGATACCGGCGTGAGCCCGGTTT
TTGCGGGTGGCGTGGAGTATGCGATCACCCCGGAAATTGCGACCCGTCTGGAGT
ATCAATGGACCAACAACATCGGTGACGCGCACACCATTGGCACCCGTCCGGATA
ACGGTATTCCGGGCGCTAGCTCCGGTCCGGCCGGGTGCCAGGTGCTGTGGGGCG
TCAACCAGTGGAACACCGGCTTCACCGCGAACGTCACCGTGAAGAACACGTCCT
CCGCTCCGGTCGACGGCTGGACGCTCACGTTCAGCTTCCCGTCCGGCCAGCAGGT
CACCCAGGCGTGGAGCTCGACGGTCACGCAGTCCGGCTCGGCCGTGACGGTCCG
CAACGCCCCGTGGAACGGCTCGATCCCGGCGGGCGGCACCGCGCAGTTCGGCTT
CAACGGCTCGCACACGGGCACCAACGCCGCGCCGACGGCGTTCTCGCTCAACGG
CACGCCCTGCACGGTCGGCTGA

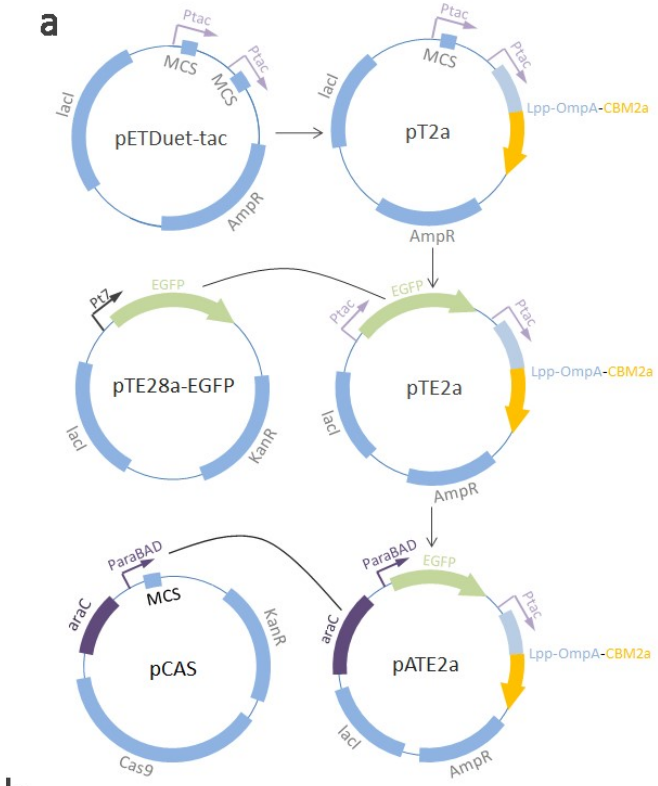
Amino acid sequence of Lpp-OmpA-CBM2a

MKATKLVLGAVILGSTLLAGCSSNAKIDQGINPYVGFEMGYDWLGRMPYKGSVEN
GAYKAQGVQLTAKLGYPITDDLDIYTRLGGMVWRADTKSNVYGKNHDTGVSPVFA
GGVEYAITPEIATRLEYQWTNNIGDAHTIGTRPDNGIPGASSGPAGCQVLWGVNQWN
TGFTANVTVKNTSSAPVDGWTLTFSFPSGQQVTQAWSSTVTQSGSAVTVRNAPWNG
SIPAGGTAQFGFNGSHTGTNAAPTAFSLNGTPCTVG

Table S1. Primers used for construction of the recombinant plasmids

Plasmid	Primer	Sequence (5'-3')	Restriction site
pT2a	P1: OmpA2a-1	GGAATTCCATATGAAGGCGACCAAACTGG	NdeI
	P2: OmpA2a-2	CGGGGTACCTCAGTGGTGATGATGGTGATGG	KpnI
pTE2a	P3: egfp-1	CATGCCATGGGCTCAAAAGGCGAAGAACTGTTTAC	NcoI
	P4: egfp-2	CCGGAATTCTTATTTATACAGTTCATCCATGCCC	EcoRI
pATE2a	P5: pATE2a-Re-1	CAATCGATCTCGATCCTCTACG	Seamless cloning
	P6: pATE2a-Re-2	TTTCACACAGGAAACAGTATC	
	P7: Para-1	TAGAGGATCGAGATCGATTGTTATGACAACTTGACGGC TACATC	
	P8: Para-2	GATACTGTTTCCTGTGTGAAAATGGAGAAACAGTAGAG AGTTGCG	

a



b

Abbreviation of transformant	Plasmid
E. coli-T2a	pT2a
E. coli-TE2a	pTE2a
E. coli-ATE2a	pATE2a

Fig. S1. Construction of the plasmids of pT2a, pTE2a and pATE2a (a) and abbreviations of transformants (b). pT2a contained the *Lpp-OmpA-CBM2a* gene with a *tac* promoter. pTE2a was constructed to express EGFP and Lpp-OmpA-CBM2a simultaneously, with pT2a as editing templates. pATE2a, a form of pTE2a, in which the *tac* promoter regulating EGFP was replaced by *araBAD* promoter; the *araC* in pATE2a was arabinose-inducible transcription factor.

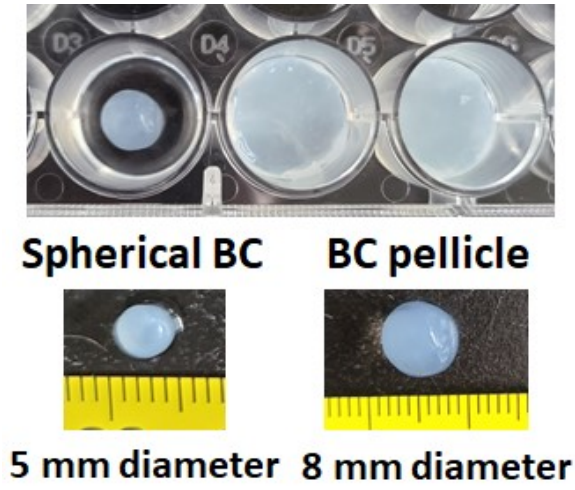


Fig. S2. Photographs of BC pellicle and spherical BC with approximately 5 mm and 8 mm diameters.

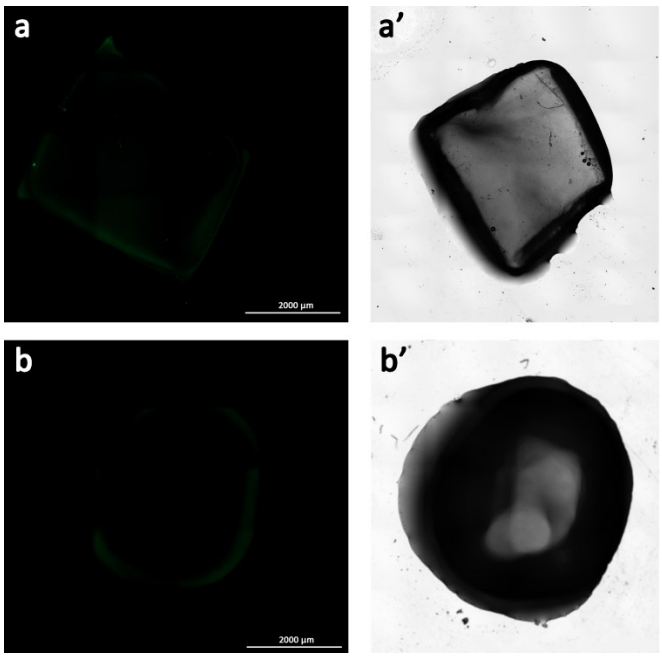


Fig. S3. Fluorescent (a and b) and brightfield (a' and b') images of BC carriers with non-EGFP expressing *E. coli*. All images were taken by Cytation 5 imaging reader.

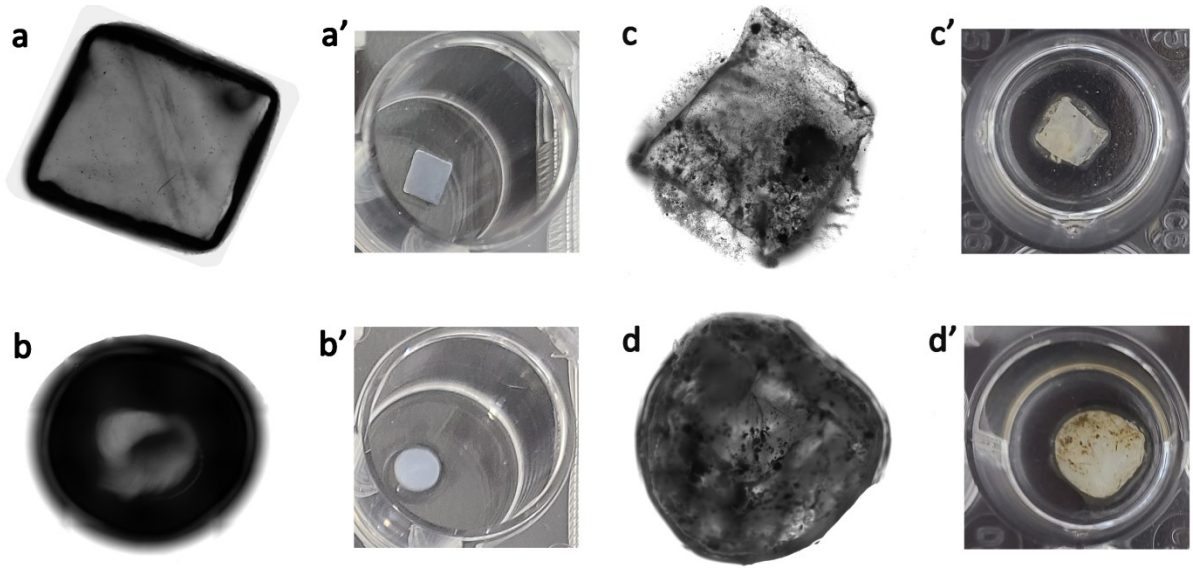


Fig. S4. Brightfield images (a-d) and photographs (a'-d') of BC carriers with *E. coli*-ATE2a for arabinose detection in both aqueous solution and soil. (a-b) and (a'-b') are BC carriers detecting arabinose in aqueous solution; (c-d) and (c'-d') are carriers detecting arabinose buried in soil. Brightfield images were assessed by Cytation 5 Imaging Reader..