Supplementary Information

EtBr assay

In order to determine the amount of the lysed bacteria by the presented method, the EtBr assay was employed as described in the previous study [1]. The EtBr assay can be used to quantify dsDNA lysed from the cell due to the intercalating properties of EtBr dye. Two hundred μL of supernatant from the bead beating reaction was transferred to 96-well black plate and 5 μL of EtBr (40 ng/μL) was added to each well with a gentle pipetting. The fluorescence of EtBr was detected at λex = 530 nm and λem = 602 nm using the SpectraMax® M2 microplate reader. Negative control was used to normalize the fluorescence of the sample. The negative control, indicating no lysis, was prepared from the *Pseudomonas putida* (*P. putida*) culture. In parallel, the positive control as a 100% cell lysis was prepared by bead beating. One thousand μL of *P. putida* cells in PB was treated with bead beating using 500 mg of 0.1 mm glass beads at 2500 rpm for 10 minutes.

Optimum centrifugation duration was determined to minimize interferences from the residual solid materials. The fluorescence of EtBr was measured after each centrifugation time (0, 0.5, 1, 4, 5 minutes) of lysed samples. The fluorescence indicates the amount of EtBr dye bound with the lysed DNA. Lower fluorescence indicates the inhibition of soil particles to EtBr as they still reside in the supernantant, therefore it requires more centrifugation to spin down the soil particles. As shown in the Figure S1, as centrifugation time increases, the fluorescence signal was increased. After 3 minutes, there was no remarkable increase in the fluorescence. It was concluded that 3 minutes of centrifugation is sufficient to settle down solid residues. As a result, 1000 μL of intact *P. putida* cells in the PB was centrifuged at 5000 rpm for 3 minutes. Subsequently, 200 μL of supernatant was subject to the fluorescence measurement.

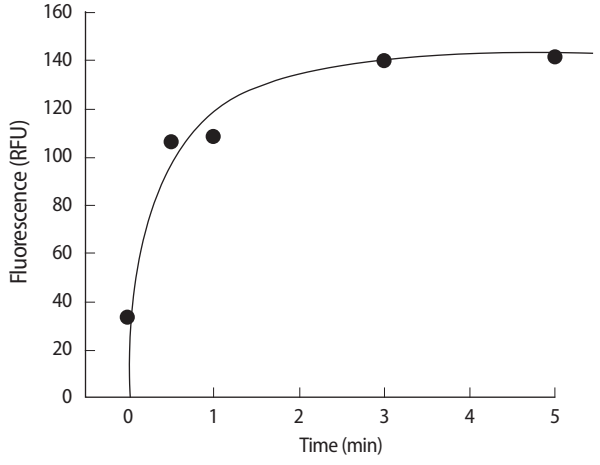

Figure S1. The fluorescence of EtBr bound with DNAs in the lysates after centrifugation.

Normalized percent lysis

The normalized percent lysis of each condition was calculated based on the following equation.

$$\text{The normalized \% lysis} = \frac{F_S - F_{0\%}}{F(100\%) - F(0\%)} \times 100 \quad \text{(Equation S1)}$$

Where *Fs* is the sample fluorescence determined by the EtBr assay after the bead beating treatment. *F0%* means the fluorescence of lysates without pretreatment as a negative control and *F100%* represents the fluorescence of lysates after a harsh physical disruption using bead beating method as a positive control.

Reference

1. Wang X, Lee BT, Son A. Physical lysis only (PLO) methods suitable as rapid sample pretreatment for qPCR assay. Appl Microbiol Biotechnol 2014;98(20):8719-8728.