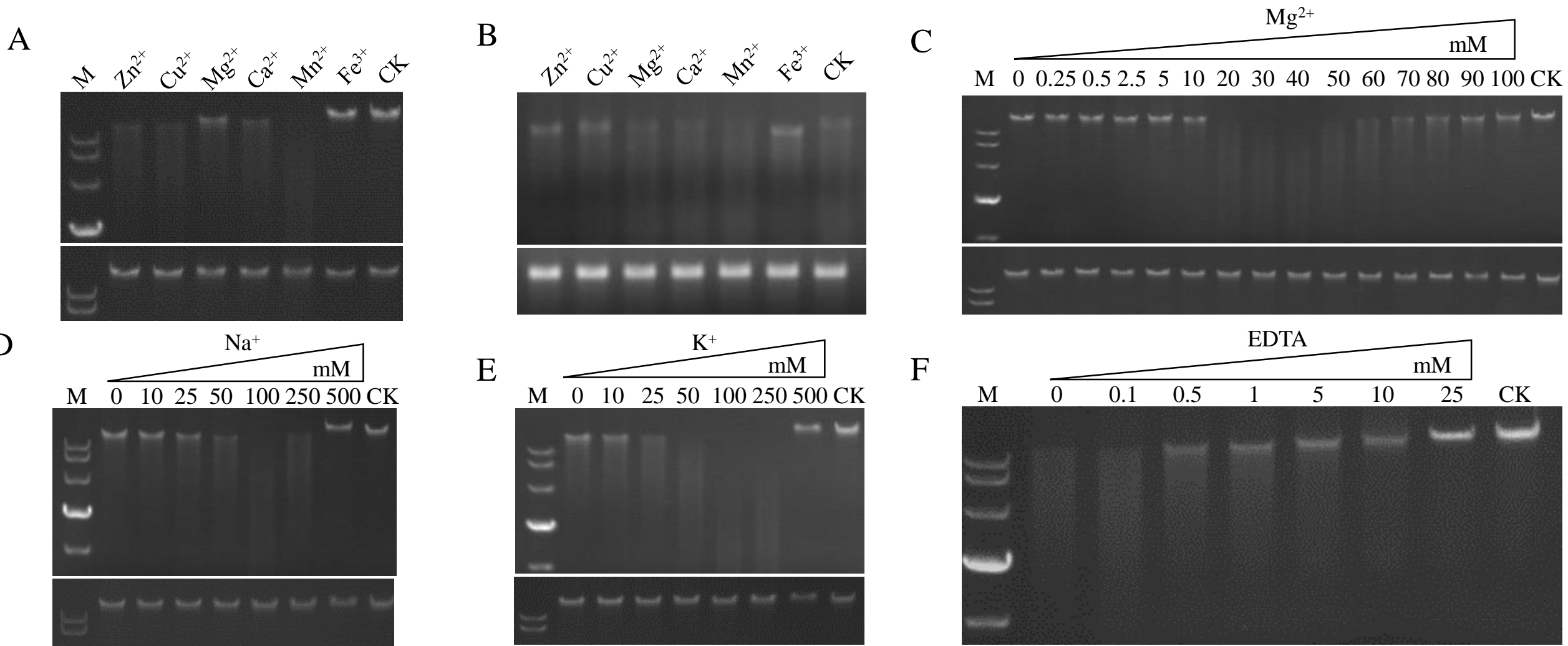


**Supplementary Fig. 1. Mutant Yb2 $\Delta$ 02955 and cYb2 $\Delta$ 02955 (complementation) strain identification.** (A) PCR amplification. Lane M, DL2000 plus DNA marker (Vazyme, Nanjing, China). Lanes 1–4, products amplified using AS87\_RS02955-F/AS87\_RS02955-R primer pairs; lanes 5–8, products amplified using Erm-F/Erm-R primer pairs; lanes 9–12, products amplified using 16S rRNA-F/16S rRNA-R primer pairs. Lanes 1, 5, and 9, wild-type Yb2 strain; lanes 2, 6, and 10, mutant Yb2 $\Delta$ 02955 strain; lanes 3, 7, and 11, complementation cYb2 $\Delta$ 02955 strain; lanes 4, 8, and 12, negative controls. (B) SDS-PAGE analysis of rAS87\_RS00980 expression. Lane M, PageRuler pre-stained protein ladder (Thermo Scientific, Waltham, MA, USA); lane 1, *E. coli* BL21 (DE3) cells transformed with pCold I and induced by IPTG; lane 2, *E. coli* BL21 (DE3) culture supernatants transformed with pCold I-AS87\_RS02955 and induced by IPTG; lane 3, purified recombinant AS87\_RS02955; lane 4, second-time-purified recombinant AS87\_RS02955.



**Supplementary Fig. 2. Agarose gels analysis of effect of metal cations on cleavage activity of rAS87\_RS02955.** (A) Mental cations optimization toward  $\lambda$  DNA. (B) Mental cations optimization toward MS2 RNA. Various metal cation regimes, including Zn<sup>2+</sup>, Cu<sup>2+</sup>, Mg<sup>2+</sup>, Ca<sup>2+</sup>, Mn<sup>2+</sup>, and Fe<sup>3+</sup> at the same concentrations were added to the cleavage reactions with rAS87\_RS02955 and substrate, respectively. CK was the reaction without the metal cation. The gel below was a negative control containing the purified pCold I with substrate incubated at the same metal cation regimes as the rAS87\_RS02955. (C) Mg<sup>2+</sup> optimization. (D) Na<sup>+</sup> optimization. (E) K<sup>+</sup> optimization. Different concentrations of metal cation regimes were added to the reactions with rAS87\_RS02955 and  $\lambda$  DNA, respectively. CK was the reaction without the Mg<sup>2+</sup>. The gels below were a negative control containing the purified pCold I with substrate incubated at the same conditions as the rAS87\_RS02955. (F) Effect of EDTA. Different concentrations of EDTA regimes were added to the reactions with rAS87\_RS02955 and substrate, respectively. CK was the reaction without the metal cation and EDTA.