

**Supplementary Table S2.** Binding and effect of bivalent manganese and cobalt ions on Cel12E in the presence and absence of EDTA. Experiments were performed with 0.05  $\mu$ g purified enzyme Cel12E against 2 % (w/v) carboxymethyl cellulose at 92 °C using 50 mM MES buffer (pH 5.5). Values are shown as relative activity values from duplicate measurements  $\pm$  standard deviations.

Order of additive supplementation	EDTA	CoCl <sub>2</sub>	MnCl <sub>2</sub>	Relative activity (%)
No addition	-	-	-	100.0 $\pm$ 9.2
10 mM EDTA only	+	-	-	88.5 $\pm$ 2.2
1 mM CoCl <sub>2</sub> only	-	+	-	186.1 $\pm$ 2.5
1 mM MnCl <sub>2</sub> only	-	-	+	178.4 $\pm$ 1.5
Addition of metal ions first:				
1 mM CoCl <sub>2</sub> + 10 mM EDTA	+	+	-	107.7 $\pm$ 7.8
1 mM MnCl <sub>2</sub> + 10 mM EDTA	+	-	+	82.9 $\pm$ 0.2
Addition of EDTA first:				
10 mM EDTA + 1 mM CoCl <sub>2</sub>	+	+	-	102.2 $\pm$ 2.2
10 mM EDTA + 1 mM MnCl <sub>2</sub>	+	-	+	106.9 $\pm$ 13.0