

Heterologous expression of xylanases from *Acidothermus cellulolyticus* enhances the hemicellulolytic activity of *Caldicellulosiruptor bescii*

Background

- Members of the genus *Caldicellulosiruptor* use both C5 and C6 sugars simultaneously and have the ability to grow well on xylan, a major component of plant cell walls.
- The sequences of Xyn10A (Acel_0372) and Acel_0180 (Panel A) have very little homology with the GH10 domains present in *C. bescii*.
- Acel_0180 includes a carbohydrate-binding module, CBM2, not present in *C. bescii*.

Approach

- To test whether the addition of these xylanases might enhance the hemicellulolytic activity of *C. bescii* and growth on xylan substrates, the xylanases were expressed in *C. bescii* using new expression vectors (Panels B and C).

Outcome

- Expression of the xylanases in *C. bescii* results in an increase in the activity of the exoproteome on xylan and a dramatic increase in its ability to grow on xylan substrates (histograms).

Significance

- The ability to efficiently use xylan, a major component of plant cell walls for conversion of plant biomass to products of interest, will facilitate the use of renewable, sustainable, and inexpensive plant biomass substrates.

Kim, S.K., Chung, D., Himmel, M.E., Bomble, Y.J., Westpheling, J., "Heterologous expression of family 10 xylanases from *Acidothermus cellulolyticus* enhances the exoproteome of *Caldicellulosiruptor bescii* and growth on xylan substrates," *Biotechnol. Biofuels* 9:176, 2016. doi: 10.1186/s13068-016-0588-9.

