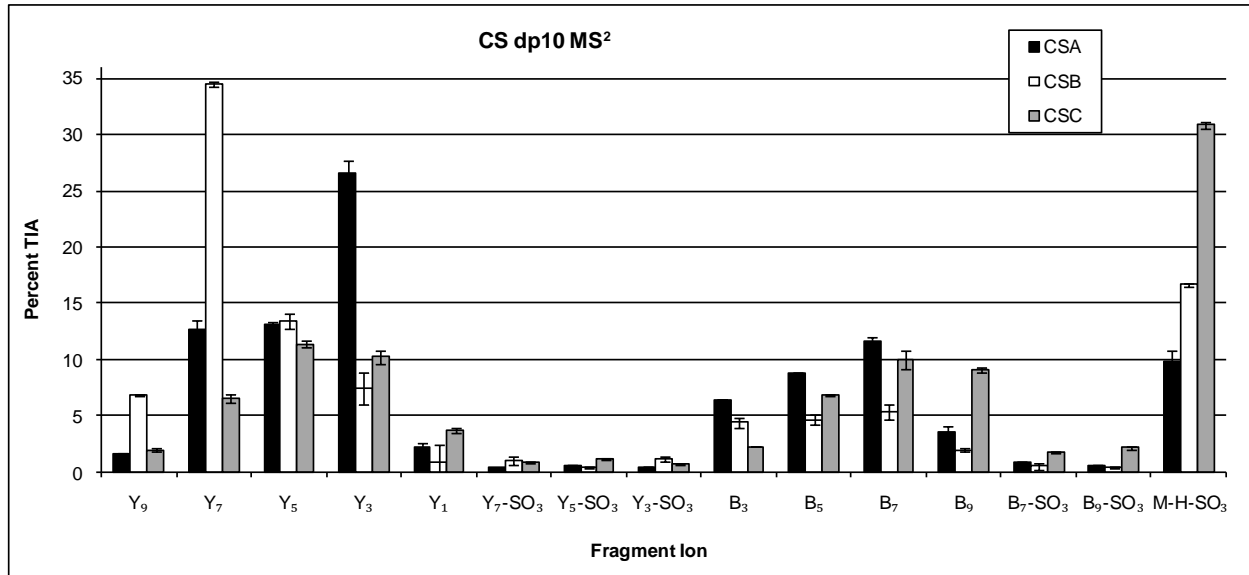
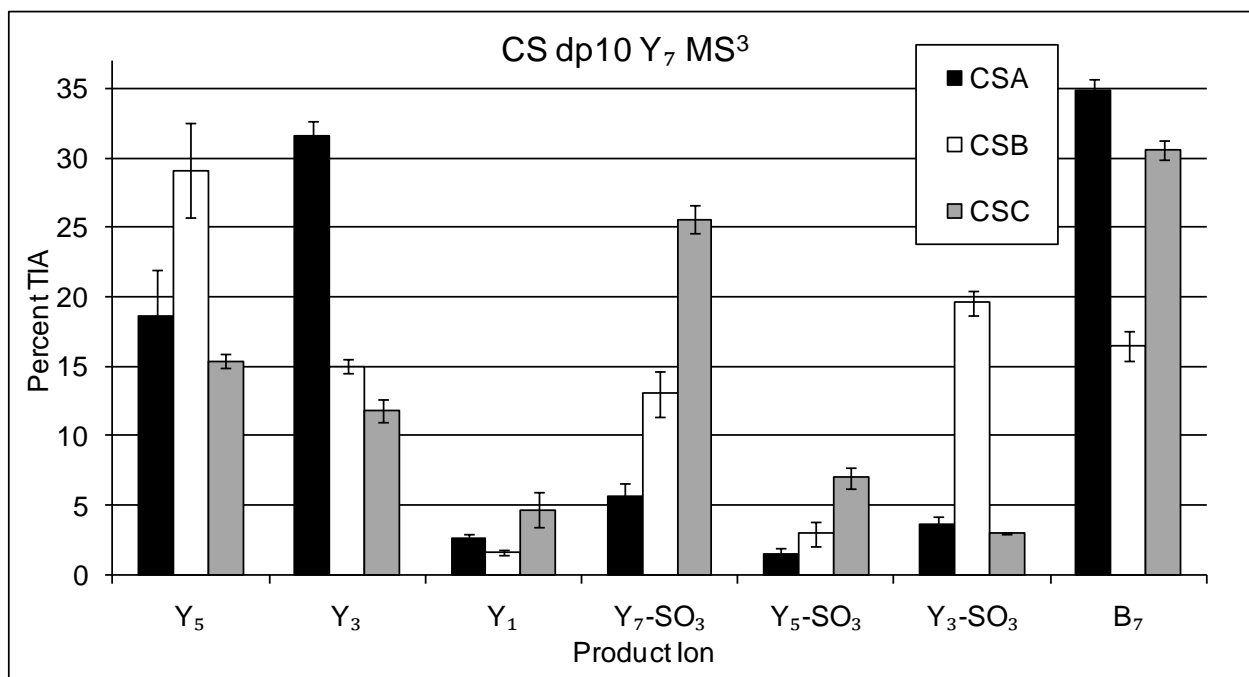


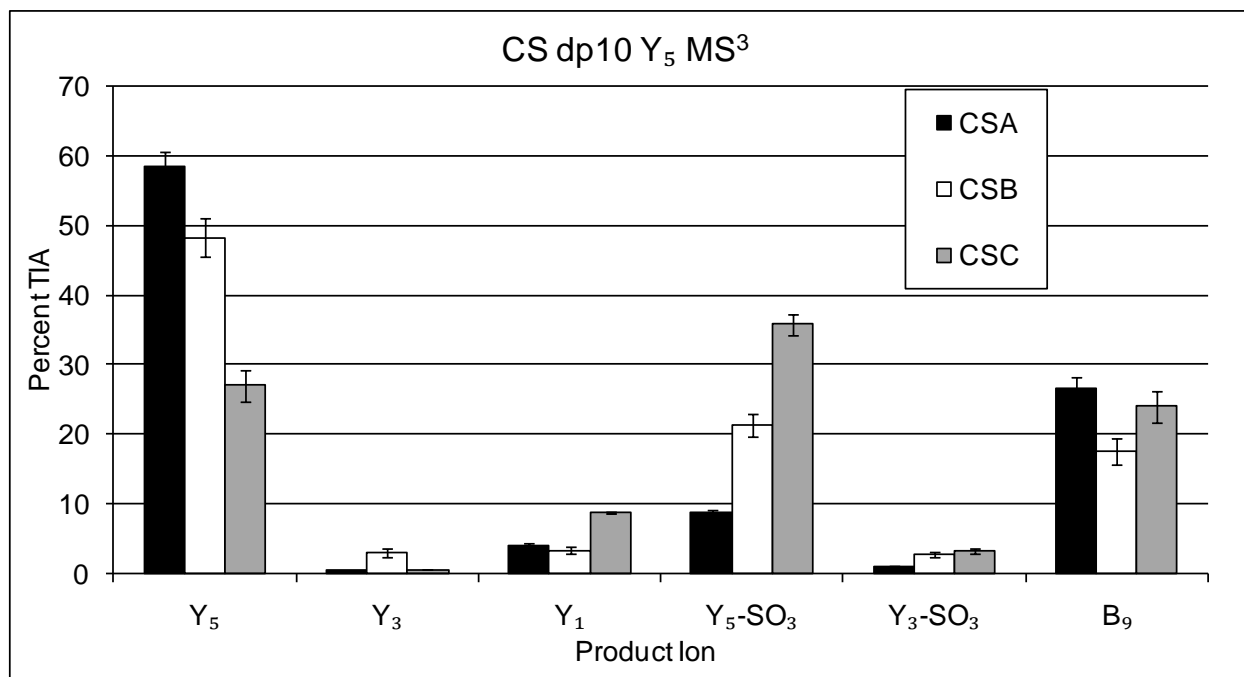
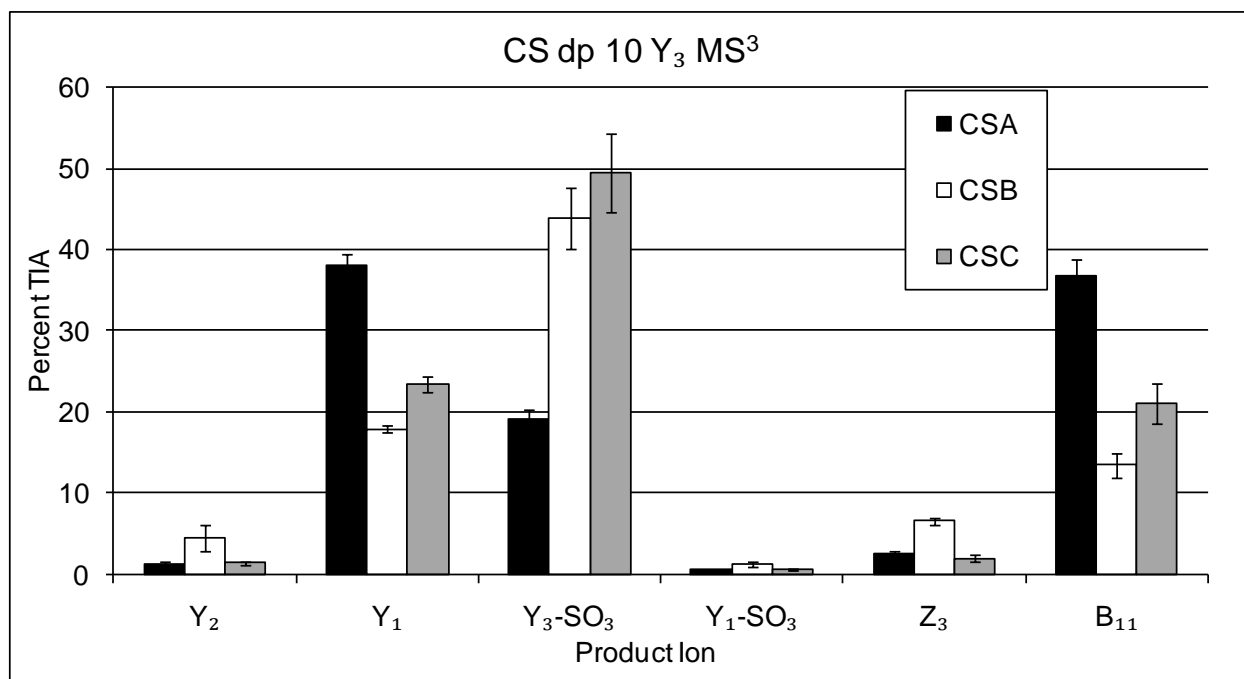
## Supplementary Figures

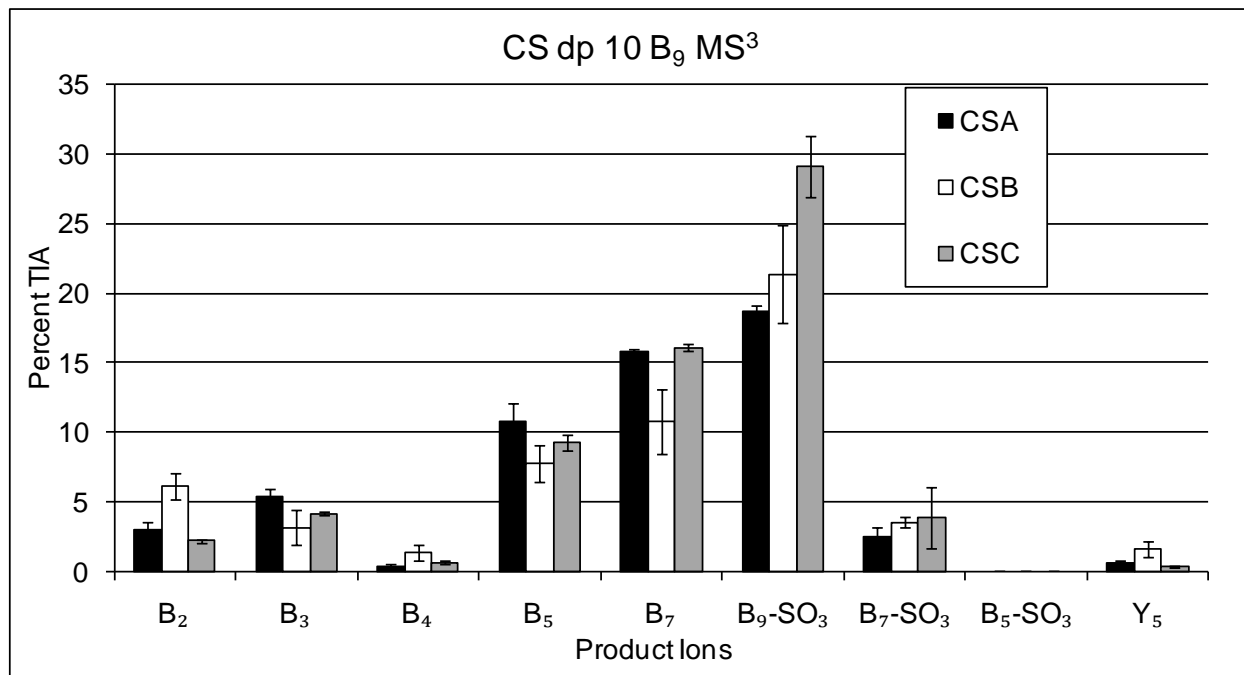
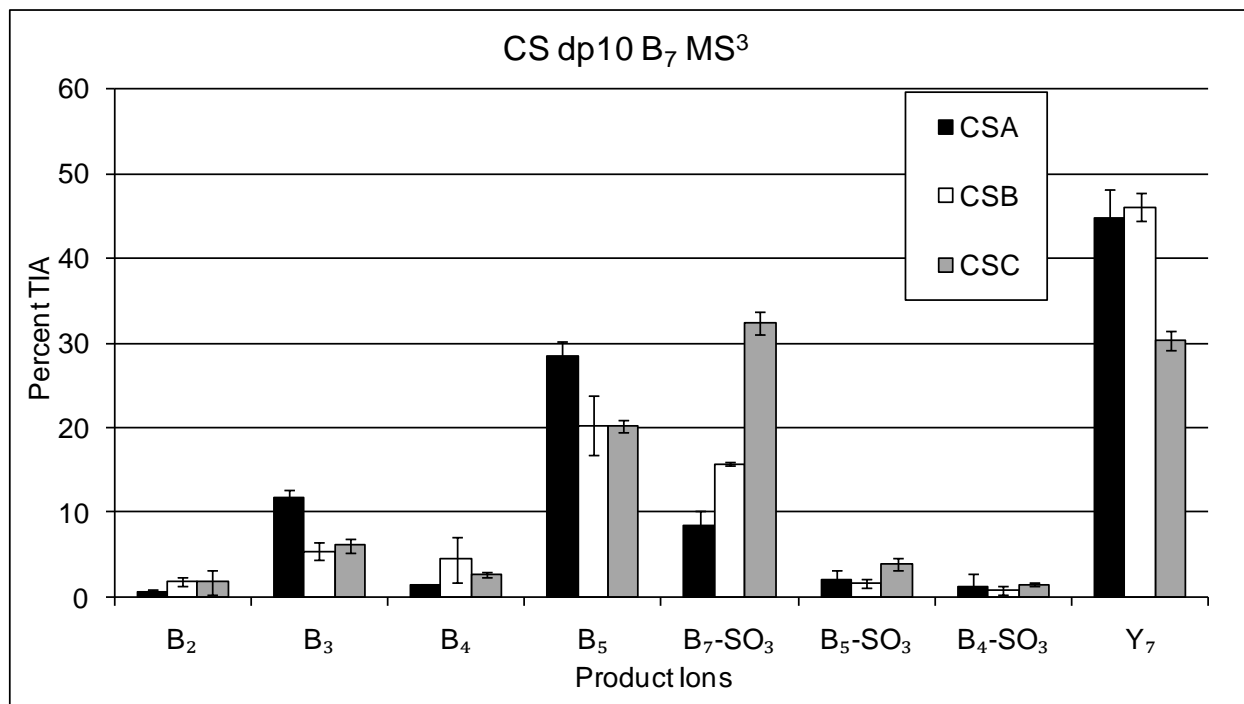
Supplementary Figure 1. Comparison of MS<sup>2</sup> product ion abundances for CS Δdp10 oligosaccharides for CSA, CSB, and CSC.

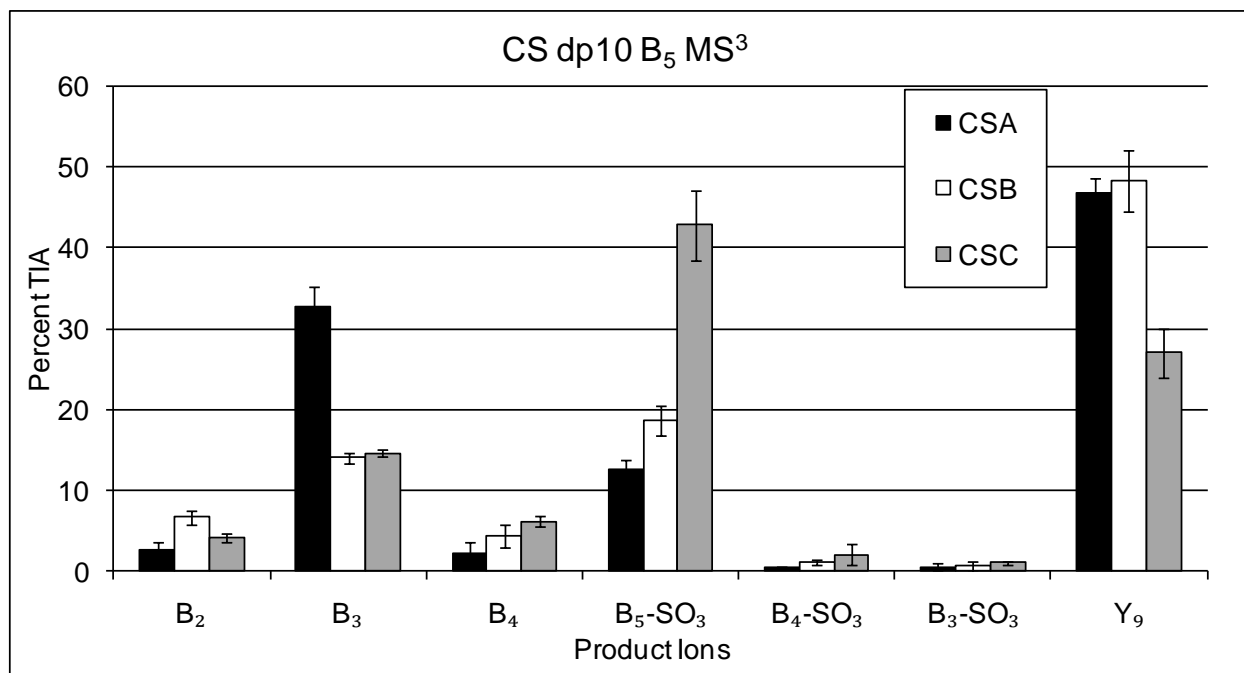
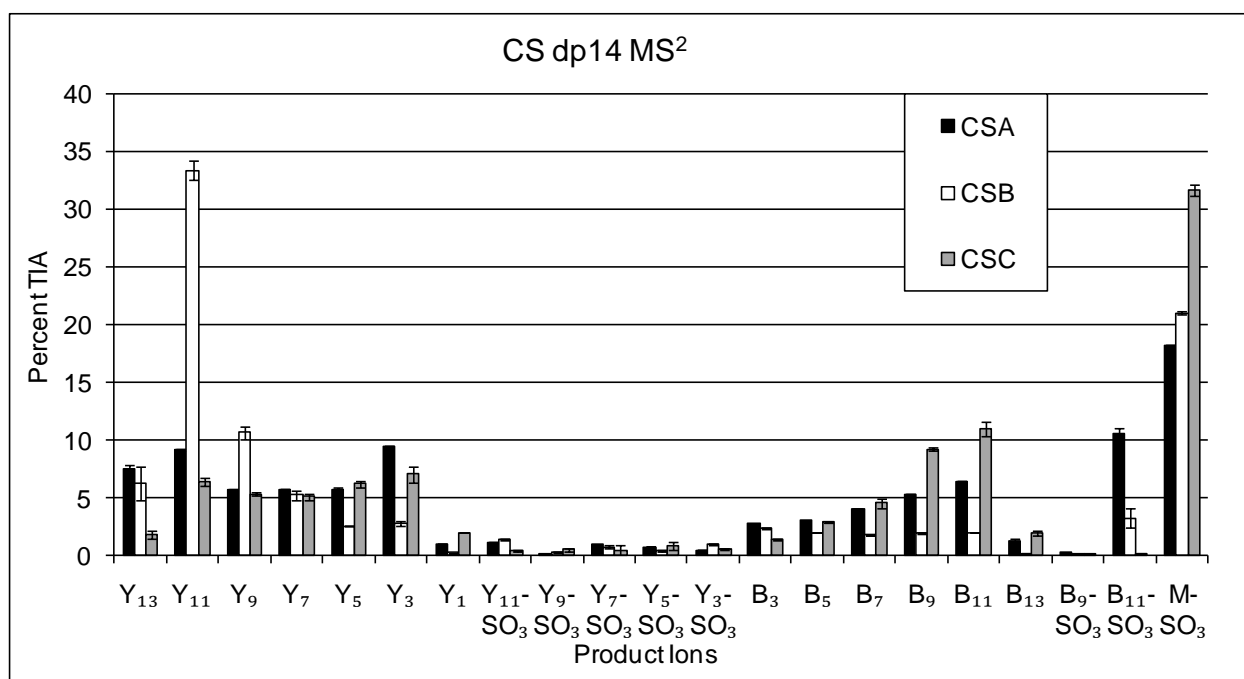


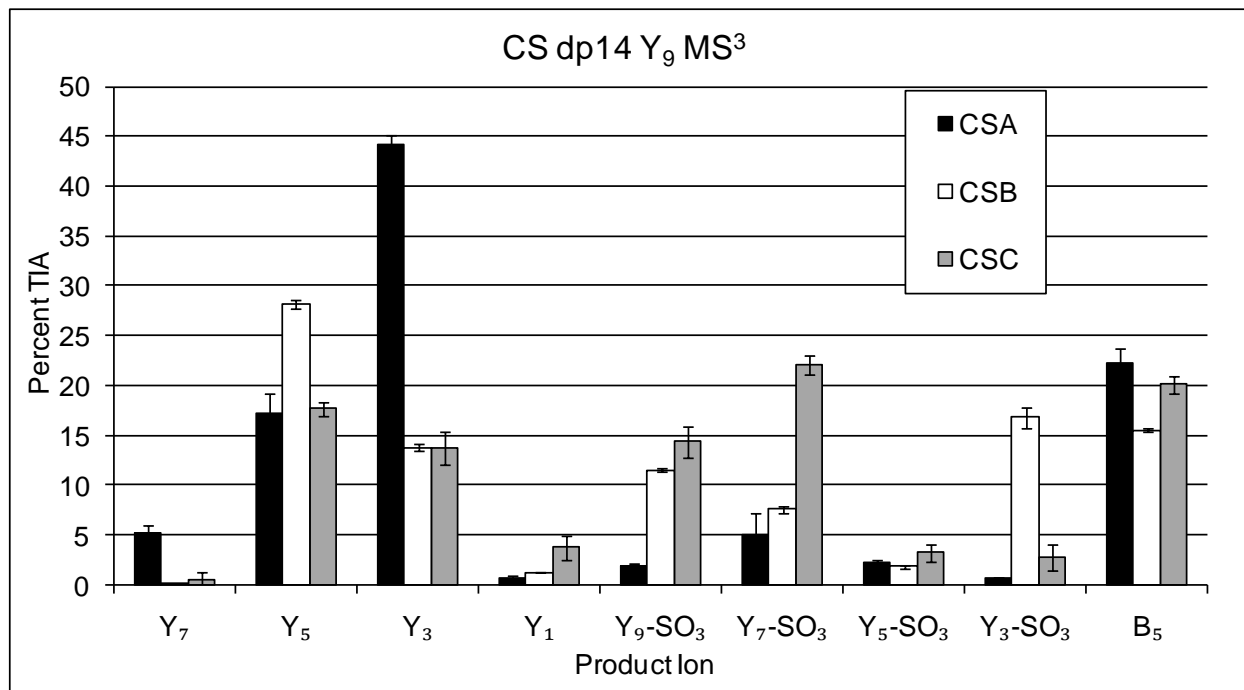
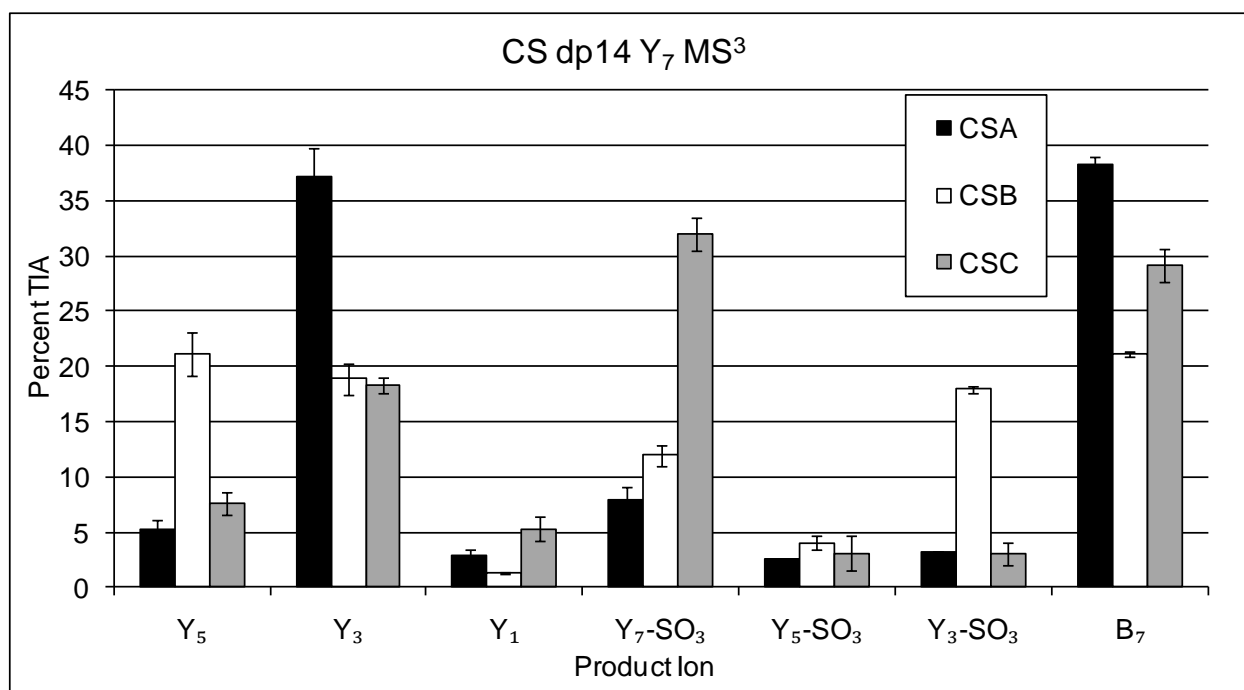
Supplementary Figure 2. Comparison of MS<sup>3</sup> product ion abundances for CS Δdp10. (A) Y<sub>7</sub>→

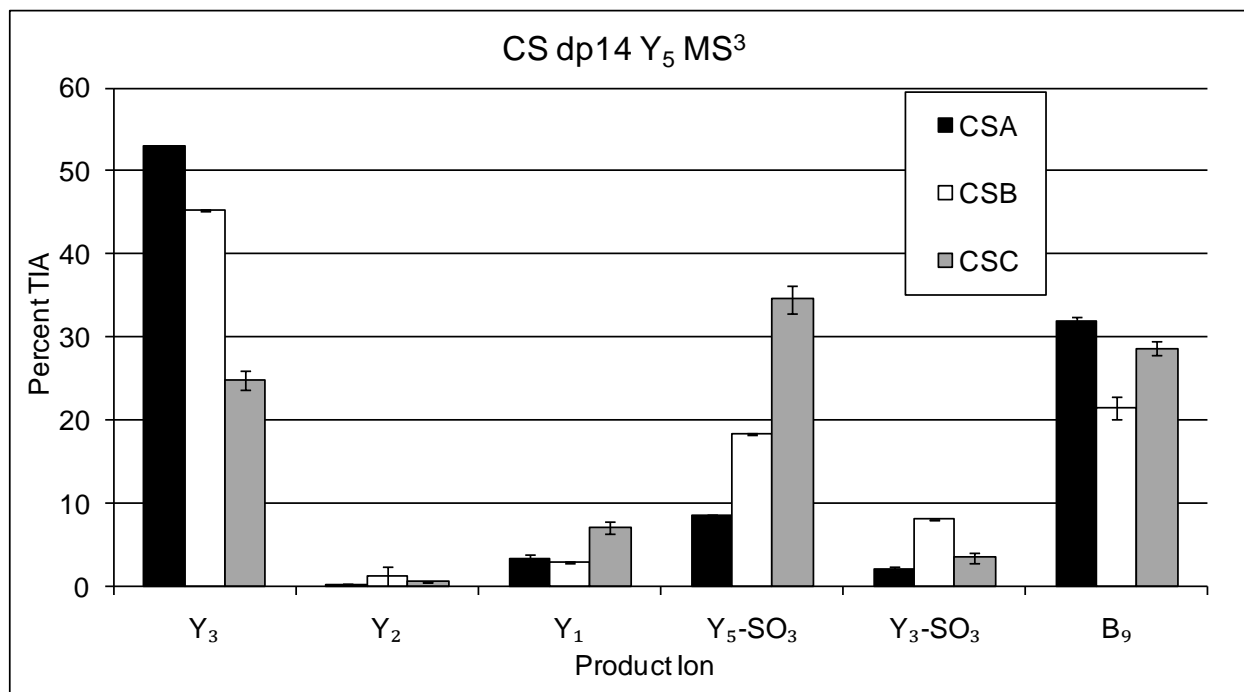
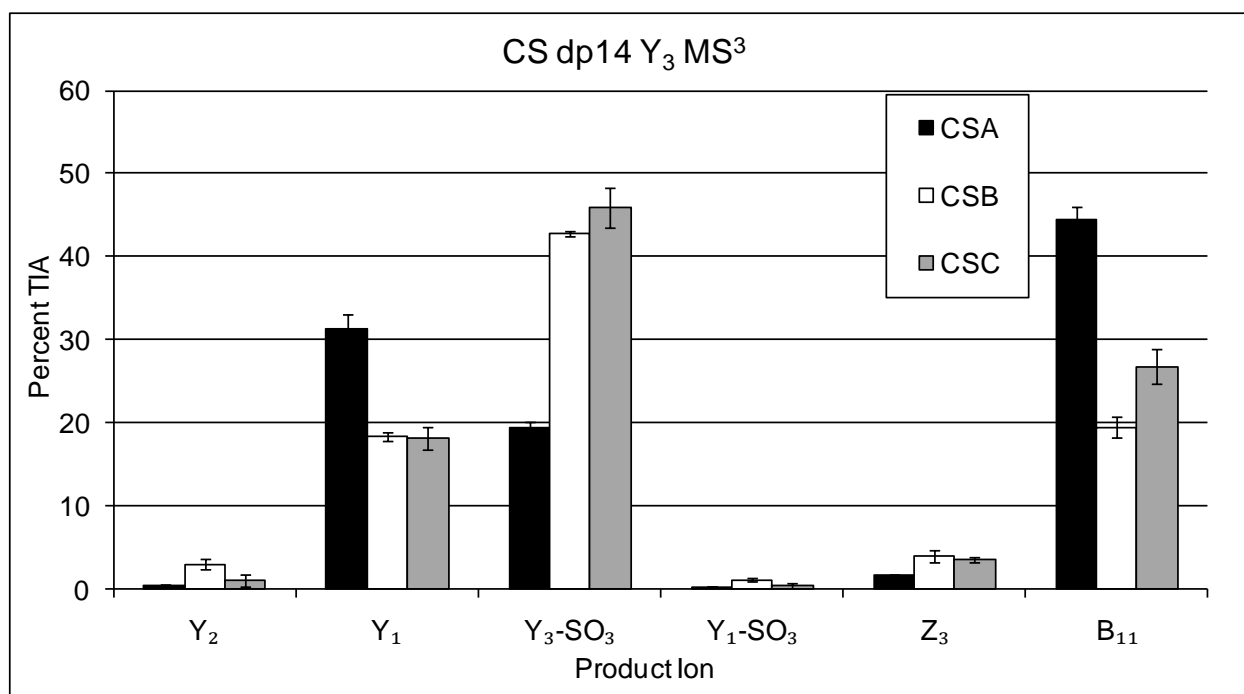


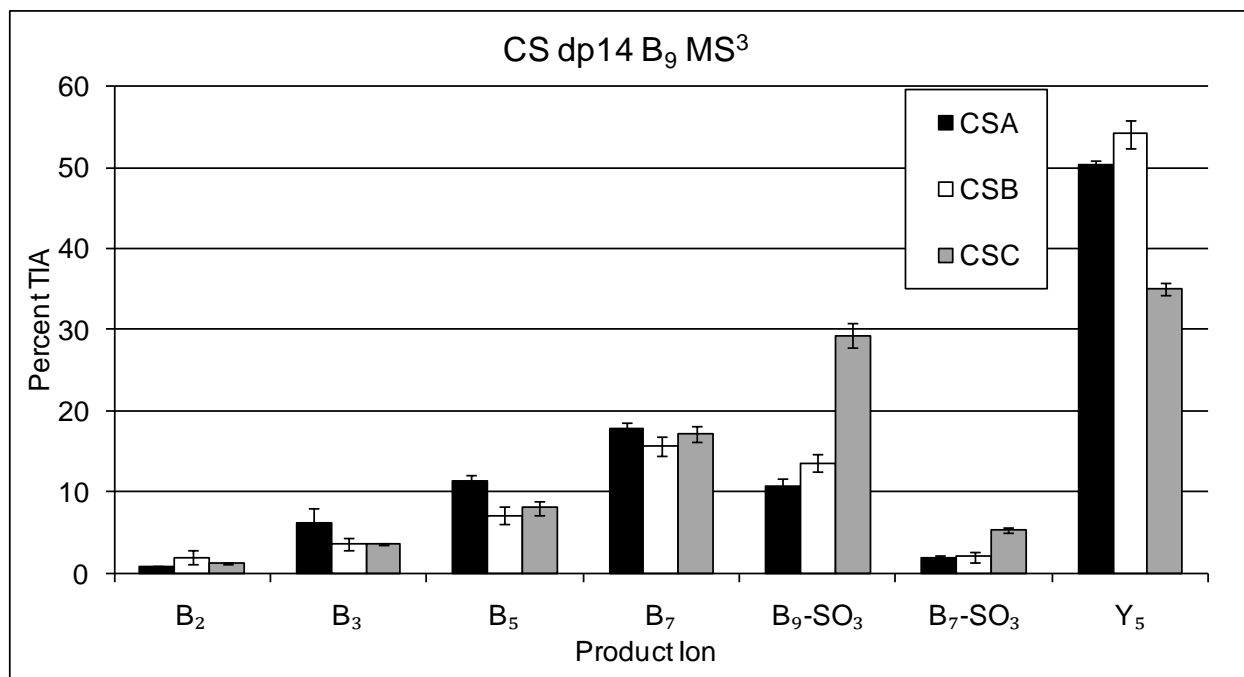
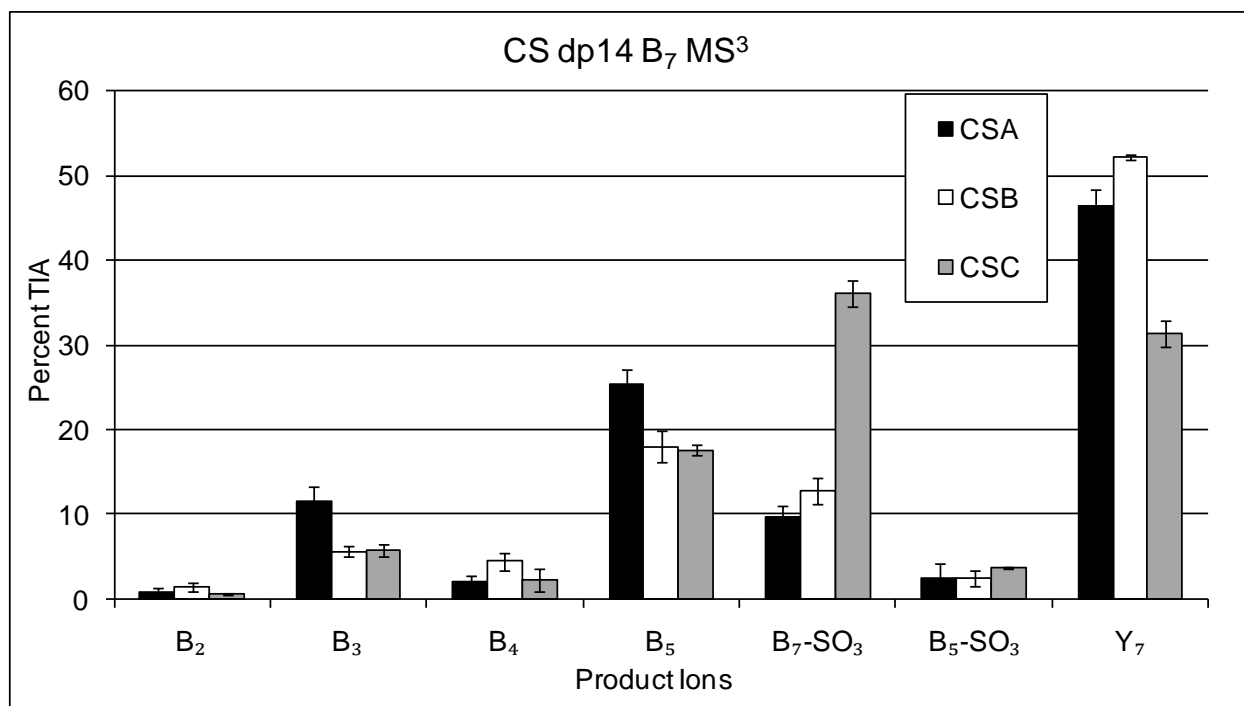
Supplementary Figure 2 (B)  $Y_5 \rightarrow$ Supplementary Figure 2 (C)  $Y_3 \rightarrow$ 

Supplementary Figure 2 (D) B<sub>9</sub>→Supplementary Figure 2 (E) B<sub>7</sub>→

Supplementary Figure 2 (F)  $B_5 \rightarrow$ Supplementary Figure 3. Comparison of MS<sup>2</sup> product ion abundances for CS  $\Delta$ dp14 oligosaccharides for CSA, CSB, and CSC.

Supplementary Figure 4. Comparison of MS<sup>3</sup> product ion abundances for CS  $\Delta$ dp14oligosaccharides from CSA, CSB and CSC (A) Y<sub>9</sub>→Supplementary Figure 4 (B) Y<sub>7</sub>→

Supplementary Figure 4 (C)  $Y_5 \rightarrow$ Supplementary Figure 4 (D)  $Y_3 \rightarrow$ 

Supplementary Figure 4 (E)  $B_9 \rightarrow$ Supplementary Figure 4 (F)  $B_7 \rightarrow$ 

Supplementary Figure 4 (G) B<sub>5</sub>→