Supplement 1. Effects of glucoamylase on *in vitro* gas production at 0, 2, 4, 7, and 12 h incubation durations using different substrates

		Substrates[1)]													p-values[2)]		
		MS		WS		WB		SFB		DRC		SFC		SEM	S	A	S×A
		CON	AMY[3)]	CON	AMY	CON	AMY	CON	AMY	CON	AMY	CON	AMY				
Gas production (mL)	0	4.57	4.50	4.70	4.53	4.54	4.47	4.62	4.73	4.85	4.71	4.63	4.66	0.98	0.12	<0.01	0.15
	2	15.1^{b}	16.7^{a}	9.05^{e}	8.73^{e}	9.48^{de}	10.7^{cd}	8.88^{e}	11.3^{c}	8.20^{e}	8.80^{e}	8.61^{e}	12.1^{c}	0.98	<0.01	<0.01	<0.01
	4	23.3^{b}	26.0^{a}	13.4^{ef}	13.6^{ef}	14.8^{de}	16.6^{d}	15.1^{de}	19.5^{c}	12.4^{f}	13.8^{ef}	14.5^{def}	21.0^{c}	0.98	<0.01	<0.01	<0.01
	7	33.3^{b}	37.9^{a}	22.3^{e}	22.8^{e}	25.3^{cde}	27.7^{c}	26.3^{cd}	33.3^{b}	23.6^{de}	25.2^{cde}	23.9^{de}	36.2^{ab}	0.98	<0.01	<0.01	<0.01
	12	48.8^{b}	55.0^{a}	35.6^{g}	36.8^{fg}	42.4^{cd}	46.0^{bc}	40.6^{def}	54.9^{a}	38.3^{efg}	42.1^{cde}	38.8^{defg}	58.6^{a}	0.98	<0.01	<0.01	<0.01

[1)] Micronized Sorghum (MS), Whole Sorghum (WS), Whole Barley (WB), Steam-flaked Barley (SFB), Dry-rolled Corn (DRC), Steam-flaked Corn (SFC).

[2)] Substrate (S), Amylase (A), and Substrate×Amylase (S×A).

[3)] Exogenous glucoamylase from *Trichoderma reesei* was applied to each substrate at 0.25 mg/g DM.

[a–g] Mean values in the same row with different superscripts differ according to the p-value for the interaction effect for each time point.