

**Table 1** Changes in short-chain fatty acid (SCFA) in batch faecal fermentation

	Incubation time (h)	Cellulose	Native HAS	ERF-HAS
		μmol/mL		
Acetate	0	3.40 ± 0.50	3.90 ± 0.50	5.00 ± 1.10
	12	15.5 ± 0.1	23.6 ± 2.7	29.1 ± 5.1
	24	26.2 ± 0.8	41.1 ± 4.7	42.2 ± 10.5
	48	48.5 ± 2.7	82.4 ± 12.7	88.4 ± 20.8
Propionate	0	1.50 ± 0.20	1.60 ± 0.10	2.40 ± 0.7
	12	9.60 ± 0.40 <sup>b</sup>	19.4 ± 1.2 <sup>ab</sup>	27.3 ± 4.0 <sup>a</sup>
	24	10.5 ± 0.4 <sup>b</sup>	28.6 ± 1.2 <sup>a</sup>	32.9 ± 6.5 <sup>a</sup>
	48	22.4 ± 1.2	48.9 ± 4.3	60.8 ± 15.7
<i>n</i> -Butyrate	0	0.30 ± 0.20	0.40 ± 0.00	0.40 ± 0.20
	12	2.50 ± 0.40	2.30 ± 0.70	2.20 ± 0.90
	24	5.10 ± 0.60	5.20 ± 0.50	7.00 ± 2.30
	48	8.00 ± 0.10 <sup>b</sup>	11.0 ± 1.10 <sup>b</sup>	20.7 ± 3.40 <sup>a</sup>
Total SCFA	0	5.20 ± 0.80	6.00 ± 0.60	7.80 ± 1.9
	12	27.5 ± 0.5 <sup>b</sup>	45.2 ± 4.5 <sup>ab</sup>	58.6 ± 10.0 <sup>a</sup>
	24	41.8 ± 1.6	74.8 ± 6.2	82.2 ± 19.2
	48	78.9 ± 2.9	142 ± 17	170 ± 39

Each value represents the mean and standard error ( $n = 3$ ). The concentration of all materials in the working volume was 3.0% ( $w/v$ ), respectively. Mean values (a,b,c) with unlike letters within the same time point are significantly different ( $P < 0.05$ ), as determined by ANOVA with the Tukey's test.

**Table 2** Fermentation rate for total SCFA production in batch fecal fermentation

	Cellulose	HAS	EST	Main effects ( <i>P</i> -value)	
	Fermentation rate ( $\mu\text{mol/h/mL}$ )			Period (0.018)	Group (< 0.001)
Initial (0–12 h)	1.67 $\pm$ 0.13	3.99 $\pm$ 0.77	5.50 $\pm$ 0.40	Initial <sup>a</sup>	Cellulose <sup>b</sup>
Mid-term (12–24 h)	0.90 $\pm$ 0.40	1.91 $\pm$ 1.46	3.17 $\pm$ 0.11	Middle <sup>b</sup>	HAS <sup>ab</sup>
End-stage (24–48 h)	1.20 $\pm$ 0.22	3.30 $\pm$ 0.51	4.66 $\pm$ 0.09	Final <sup>ab</sup>	EST <sup>a</sup>

Each value represents the mean and standard error ( $n = 3$ ). The significant of main effects were determined by two-ANOVA. Main effects (period and group) with unlike letters (a,b) are significantly different at  $p < 0.05$ .