

INFLUENCE OF DONOR ANIMAL ADAPTATION TO ADDED YEAST CULTURE AND/OR AMAFERM® ON IN VITRO RUMEN FERMENTATION

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AMAFERM is more effective at increasing VFA production than yeast.

SUMMARY

DOSE OF AMAFERM USED

2.63 g/h/d fed to donor cow,
0.053 mg/ml for in vitro
fermentation

In this in vitro study, adaptation to AMAFERM for 21 days slightly increased 24-hour DM disappearance, and increased ammonia nitrogen concentration, total VFA concentration and the acetate:propionate ratio, compared to the unadapted treatment.

VALUE

By increasing the production of VFAs, more energy is available to the animal to be used for maintenance and production, allowing for increased performance.

PROTOCOL

Type of Animals/Experimental Units

- Rumen cannulated heifer, approximately 590kg BW

Number of Animals/Experimental Units

- One heifer as rumen fluid donor

Trial Design

- Completely randomized design, 21-day adaptation prior to rumen collection

PROTOCOL (CONTINUED)

Treatments

1. Control (ad libitum alfalfa hay)
2. Control plus 90 g/h/d yeast culture
3. Control plus 2.63 g/h/d AMAFERM
4. Control plus 90 g/h/d VitaFerm (AMAFERM + yeast culture + vitamins/minerals) for 21 days before rumen fluid collection

NOTE: Yeast culture, AMAFERM and VitaFerm® were added at 1.8, 0.053 and 1.8 mg/ml of the in vitro fermentation solution, respectively.

Diet Information (General)

- Ad libitum alfalfa hay, 100% forage fed to donor cow

Data Collection

- In vitro DM disappearance, ammonia nitrogen, VFA

DISCUSSION OF RESULTS

- Adaptation to AMAFERM significantly increased total VFA concentration compared to the Control or unadapted treatment ($P < 0.05$, Table 1), while adaptation to yeast culture had little effect on total VFA concentration (Table 1)
- Donor adaptation to AMAFERM slightly increased the in vitro DM disappearance by 5.3%, while adaptation to yeast culture had no effect
- 24-hour in vitro DM disappearance was not affected by the addition of yeast culture, AMAFERM or VitaFerm
- Adaptation to both AMAFERM and yeast culture significantly increased ($P < 0.05$) ammonia nitrogen level and branch chain VFA
- The acetate:propionate ratio significantly increased in rumen fluid adapted to AMAFERM compared with Control ($P < 0.05$), but was unaffected by adaptation to yeast

Table 1
Effect of donor adaptation of supplemental fungal cultures on in vitro ammonia nitrogen and VFA concentration

Item	Control	Treatment					
		Yeast Culture		AMAFERM		VitaFerm	
		Unadapted	Adapted	Unadapted	Adapted	Unadapted	Adapted
NH3-H (mg/dl)	18.7 ^{gh}	14.2 ^g	44.6 ^e	15.7 ^h	21.6 ^{fg}	14.7 ^h	24.8 ^f
VFA (μmol/ml)	43.9 ^g	44.1 ^{fg}	47.3 ^{fg}	40.1 ^g	59.6 ^e	41.3 ^g	56.3 ^{ef}
Acetate (molar%)	68.4	66.8	67.9	65.4	70.3	66.6	66.9
Propionate	18.8 ^{ef}	19.4 ^{ef}	17.1 ^{fg}	19.6 ^{ef}	16.0 ^g	20.1 ^e	17.9 ^{efg}
Isobutyrate	0.8	0.9	1.0	1.0	1.0	0.8	0.9
Butyrate	8.7	9.0	9.5	9.9	8.8	8.9	10.0
Isovalerate	1.2 ^f	1.4 ^{ef}	1.5 ^e	1.5 ^{ef}	1.3 ^{ef}	1.2 ^f	1.4 ^{ef}
Valerate	2.2 ^f	2.6 ^{ef}	3.0 ^e	2.6 ^{ef}	2.6 ^{ef}	2.4 ^{ef}	3.0 ^e
A/P ratio	3.6 ^f	3.4 ^f	4.0 ^{ef}	3.3 ^f	4.4 ^e	3.3 ^f	3.7 ^f

^{e,f,g,h} Means in the same row with different superscripts differ ($P < 0.05$)

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