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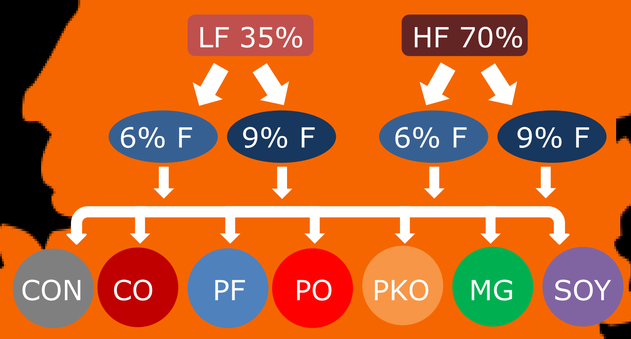
Introduction

- **Nutrition** determines dairy heifer growth and efficiency, affecting time that is necessary for the animal to attain an optimal size, mammary gland development and costs.
- Feed costs represent up to **60%** of total expenses of raising dairy heifer.
- Controlling feed costs **by** controlling **DMI** is significant to reducing total costs.
- **Fat** inclusion can increase energy density of diets, thus further decrease in **DMI**.
- **The objective**: Determine the effects of including different types of unsaturated fats to high and low forage diets in vitro digestibility and fermentation.

Materials & Methods

- An experiment was conducted using an in vitro gas production system (GP; Figure 1).
- Modules (GP) were randomly assigned to treatments in a 2×2×7 factorial design (Figure 2).



(Low Forage, LF; High Forage, HF; Fat, F; Control, CON; Coconut Oil, CO; Poultry Fat, PF; Palm Oil, PO; Palm Kernel Oil, PKO; Ca Salt, MG; Soybean Oil, SOY).

- A randomized complete block design with 4 Replicates/Trt and 2 runs was used.
- Data analyzed using MIXED procedure of SAS.

Figure 1. Gas production module has a sensor sending signals to the computer

Figure 2. Water baths and shakers to incubate the modules in 39ºC for 24 h

Results

- The CO had the highest DM apparent digestibility (AD) followed by SOY and PF (Table 1).
- Final pH was not affected by treatments. Final NH_3N concentration was greater in HF and 9% fat (Table 2).
- Cumulative GP followed the same pattern as DM AD (Figure 3).

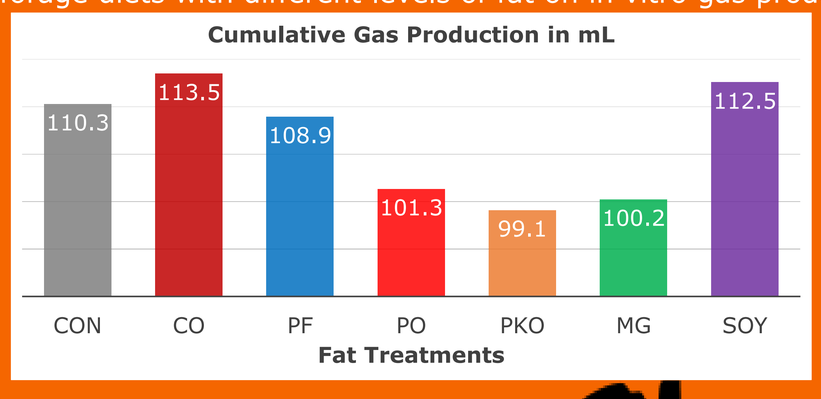
Table 1. Effects of unsaturated fat sources included to low and high forage diets with different levels of fat on in vitro digestibility

	Fat Treatments							Forage		Fat%			*P*-Value			
Item	**CON**	**CO**	**PF**	**PO**	**PKO**	**MG**	**SOY**	**LF**	**HF**	**6%**	**9%**	**SE**	**F:C**	**Fat**	**Type**	**F:C*F*T**
DM	50.6	54.5	50.6	49.5	50.1	49.7	51.8	54.6	47.3	51.2	50.8	0.5	<.01	0.09	<.01	<.01
TDM	72.7	76.8	73.0	72.9	71.2	74.5	73.6	80.3	66.7	73.4	73.6	1.9	<.01	0.31	<.01	0.03
OM	71.0	75.4	71.2	71.2	69.4	72.7	71.8	79.0	64.7	71.7	71.9	0.4	<.01	0.21	<.01	0.05
NDF	58.1	59.2	58.0	59.7	52.2	60.8	58.9	66.3	50.0	58.1	58.2	1.4	<.01	0.78	<.01	0.05
ADF	53.1	53.6	53.1	54.4	45.7	55.0	53.5	62.7	42.6	53.1	52.2	1.1	<.01	0.17	<.01	0.04

Table 2. Effects of unsaturated fat sources included to low and high forage diets with different levels of fat on in vitro pH and ammonia concentrations

	Fat Treatments							Forage		Fat%			*P*-Value			
Item	**CON**	**CO**	**PF**	**PO**	**PKO**	**MG**	**SOY**	**LF**	**HF**	**6%**	**9%**	**SE**	**F:C**	**Fat**	**Type**	**F:C*F*T**
pH	6.56	6.62	6.63	6.61	6.62	6.59	6.61	6.60	6.61	6.62	6.59	5.8	0.83	0.01	0.29	0.57
NH_3N	10.6	10.8	9.7	10.2	10.3	11.6	10.2	8.7	12.3	10.1	10.9	0.4	<.01	0.03	0.01	<.01

Figure 3. Effects of unsaturated fat sources included to low and high forage diets with different levels of fat on in vitro gas production



Conclusion

The results of the current study suggest:

- The low forage diets with high dietary fat concentration can be utilized.
- Different types of fat sources may improve DM and fiber rumen digestibility.
- The by-product poultry fat can be a good dietary fat source for growing dairy heifers diets.
- Also, could help reducing the feed costs and an expensive fat sources included in the dairy heifers diets.

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