



# In vitro fermentation parameters of defatted hemp samples at different levels of irrigation

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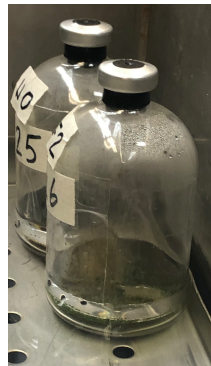
## BACKGROUND

Within the United States, interest in cannabidiol oil from hemp (*Cannabis sativa*) as a natural therapy for several diseases has grown in recent years. However, the suitability and potential of the whole-plant byproduct as a feedstuff in ruminant diets has not been thoroughly investigated. Thus, the objective of this study was to determine the influence of defatted hemp under three irrigation regimes (0, 100, and 200 mm: DF0, DF1, and DF2 respectively) on in vitro fermentation parameters relative to alfalfa (*Medicago sativa*).

## METHODOLOGY

In vitro gas production technique:

- Two cannulated Angus steers;
- 160-mL serum bottles;
- Gas measurements: 0, 3, 6, 12, and 48-h post incubation;
- After 48h: In vitro true digestibility of dry matter (IVTDMD) and organic matter (IVTOMD), total gas production (TGP), metabolizable energy (ME) and total volatile fatty acids (VFA);
- GLIMMIX procedure of SAS (version 9.4) with treatment as fixed effect and run as a random.



## RESULTS

Table 1: In vitro fermentation parameters of alfalfa and hemp samples at different levels of irrigation.

Item <sup>1</sup>	Treatments <sup>2</sup>					SEM <sup>3</sup>	P-value STD vs DF <sup>4</sup>
	STD	DF0	DF1	DF2	DF		
TGP, mL	27.47 <sup>a</sup>	31.82 <sup>b</sup>	31.59 <sup>bc</sup>	29.92 <sup>c</sup>	31.11	1.14	< 0.001
TGP/200 mg DM inc.	29.81 <sup>a</sup>	32.01 <sup>b</sup>	31.74 <sup>b</sup>	29.89 <sup>a</sup>	30.88	1.15	0.054
TGP/200 mg OM inc.	32.72 <sup>a</sup>	37.24 <sup>b</sup>	36.89 <sup>b</sup>	35.32 <sup>b</sup>	36.48	1.33	< 0.001
IVTDMD, %	70.24 <sup>a</sup>	76.40 <sup>b</sup>	78.21 <sup>b</sup>	78.50 <sup>b</sup>	77.70	1.92	< 0.001
IVTOMD, %	73.94 <sup>a</sup>	80.36 <sup>b</sup>	82.26 <sup>b</sup>	82.51 <sup>b</sup>	81.73	1.96	0.001
ME, Mcal/kg	1.54 <sup>a</sup>	1.61 <sup>b</sup>	1.60 <sup>b</sup>	1.55 <sup>a</sup>	1.59	0.03	0.039
Total VFA, mmol/L	63.52	65.76	61.07	58.25	61.69	4.70	0.623
Total VFA/ 200mg DM inc.	68.96 <sup>a</sup>	66.14 <sup>ab</sup>	61.35 <sup>ab</sup>	58.20 <sup>b</sup>	61.90	4.86	0.092
Total VFA/ 200mg OM inc.	75.70	76.95	71.30	68.76	72.34	5.57	0.452

<sup>1</sup>IVTDMD: in vitro true dry matter digestibility; IVTOMD: in vitro true organic matter digestibility; TGP: total gas production; TGP/200 mg DM inc.: total gas production per 200 mg of dry matter incubated; TGP/200 mg OM inc.: total gas production per 200 mg of organic matter incubated; ME: Metabolizable energy; Total VFA: total volatile fatty acids; Total VFA/200 mg DM inc.: total volatile fatty acids per 200 mg of dry matter incubated; Total VFA/200 mg OM inc.: total volatile fatty acids per 200 mg of organic matter incubated;

<sup>2</sup>STD: Alfalfa; DF0: Defatted hemp at level 0 of irrigation; DF1: Defatted hemp at level 100 of irrigation; DF2: Defatted hemp at level 200 of irrigation; DF: average of DF treatments.

<sup>3</sup>Standard error of the means

<sup>4</sup>Contrast among alfalfa and hemp samples at different levels of irrigation.

a,b,c Values followed by different superscript letters within rows indicate significant difference ( $P \leq 0.05$ ).

### Hemp vs Alfalfa

- Hemp displayed increased TGP, IVTDMD and IVTOMD.
- Hemp yielded slightly higher ME;
- Equivalent total VFA production.

### Irrigation levels

- 200 mm decreased TGP and fermentability of fat-extracted hemp.
- Higher irrigation levels are detrimental to the availability of ME for rumen microbes.

## CONCLUSION

Defatted hemp samples appear to have greater digestibility and ME with equivalent VFA production relative to alfalfa.