The Effect of Different Herbage Allowances on Dry Matter Intake and Digestibility in Grazing Horses

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Introduction

- Optimising a horse's daily herbage allowance
  - essential for peak performance
  - health and welfare
- Forage is an essential component of horse diets
  - Minimum daily intake - 2% BW (NRC, 2007)
  - Maintenance or light work - 100% of daily intake

Grass Intake and Markers

- Grass intake in grazing animals
  - Plant biomass
  - Animal parameters

- Naturally occurring internal markers were explored
  - Acid insoluble ash (AIA)
  - Acid detergent insoluble ash (ADIA)
  - Acid detergent lignin (ADL)

- Repeatability

Objectives

1. To determine daily dry matter intake (DMI) of grazing horses with varying daily herbage allowance (DHA)

2. To examine the effect of daily herbage allowance (DHA)
    I. Grass dry matter Intake (GDMI)
    II. Dry matter digestibility (DMD)

3. To establish optimal daily herbage allowance for horses

Materials and Methods

- Site 2.6 ha permanent pasture Limerick, Ireland
- Predominant perennial ryegrass sward
- Experimental design – 3 x 3 double Latin-Square
  - 3 measurement periods – 16 days
  - 10 days adaptation - 6 days measurement
- Six Irish sport horses
  - Age 4 – 10 years, BW 590 ± 64kgs

Treatments

- Three levels of daily herbage allowance (DHA)
  - 2% BW
  - 3% BW
  - 4% BW

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Measurements

- Grass dry matter intake (GDMI)
  - Herbage mass disappeared

- Faecal output
  - Individualised
- Dry matter digestibility (DMD)
  - Apparent dry matter
  - Naturally occurring internal markers
    - AIA
    - ADIA
    - ADL

Measurements

Compositional Analysis

	%
DM	**20.1**
Ash	**6.7**
OM	**93.3**
CP	**8.0**
NDF	**58.3**
ADF	**30.3**
ADL	**3.5**
DE MJ/kg *(Estimated)*	**8.6**

- Statistical analysis – SPSS
  - t-Tests, One and two way ANOVA's
  - (P <0.05)

Results

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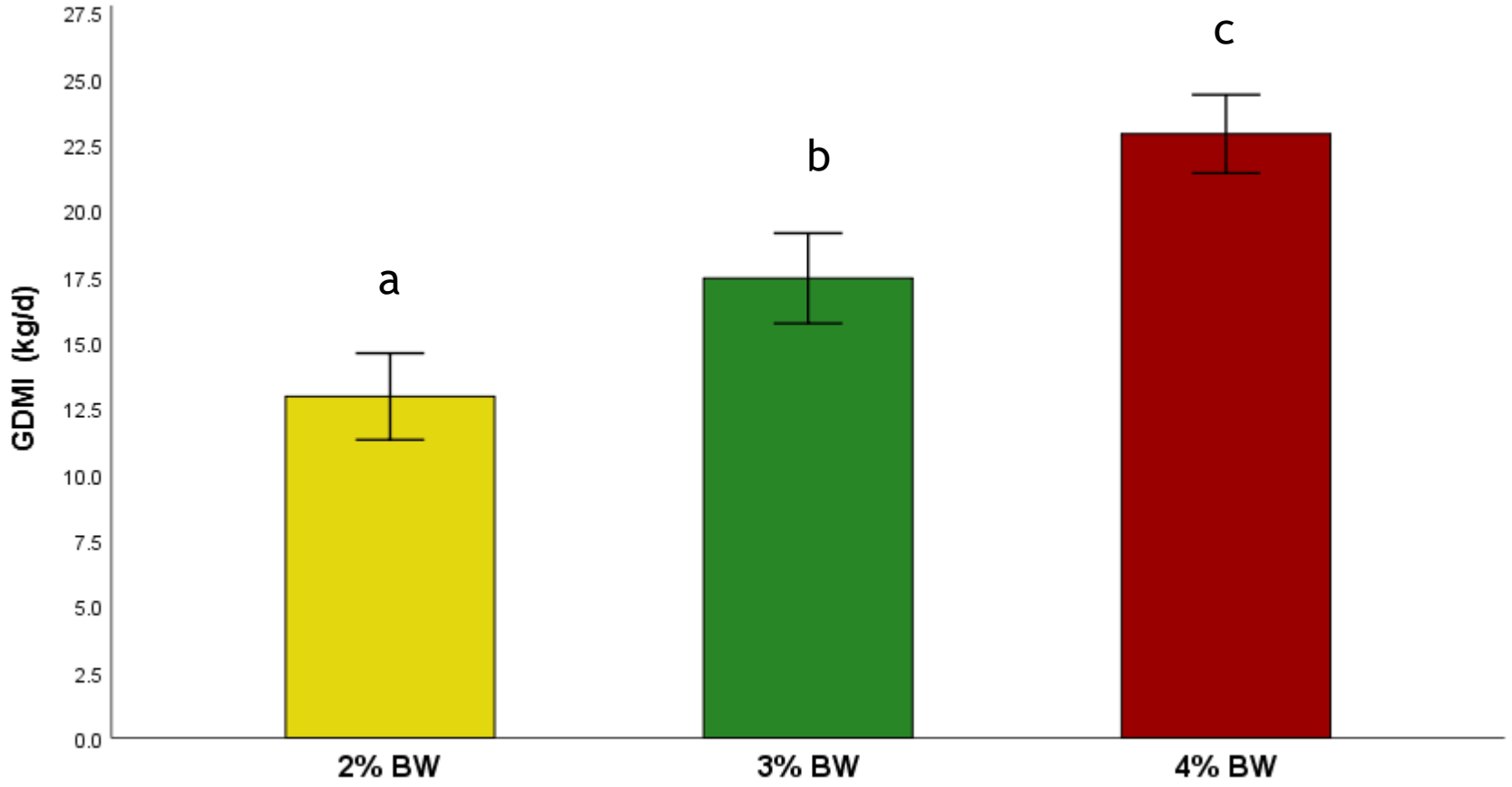
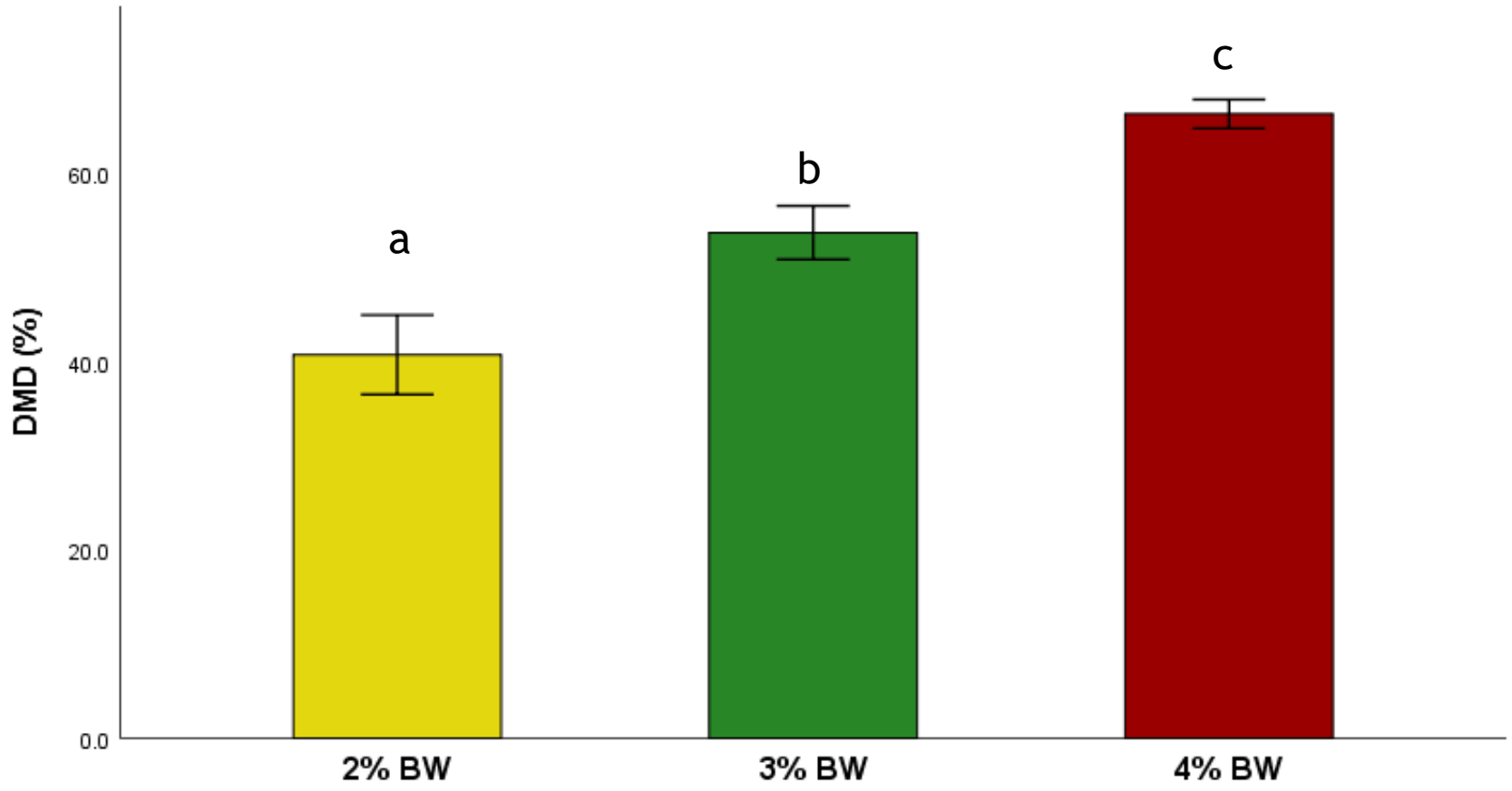
Effect of DHA on GDMI

P <0.05



Effect of DHA on Apparent DMD (%)

P <0.05



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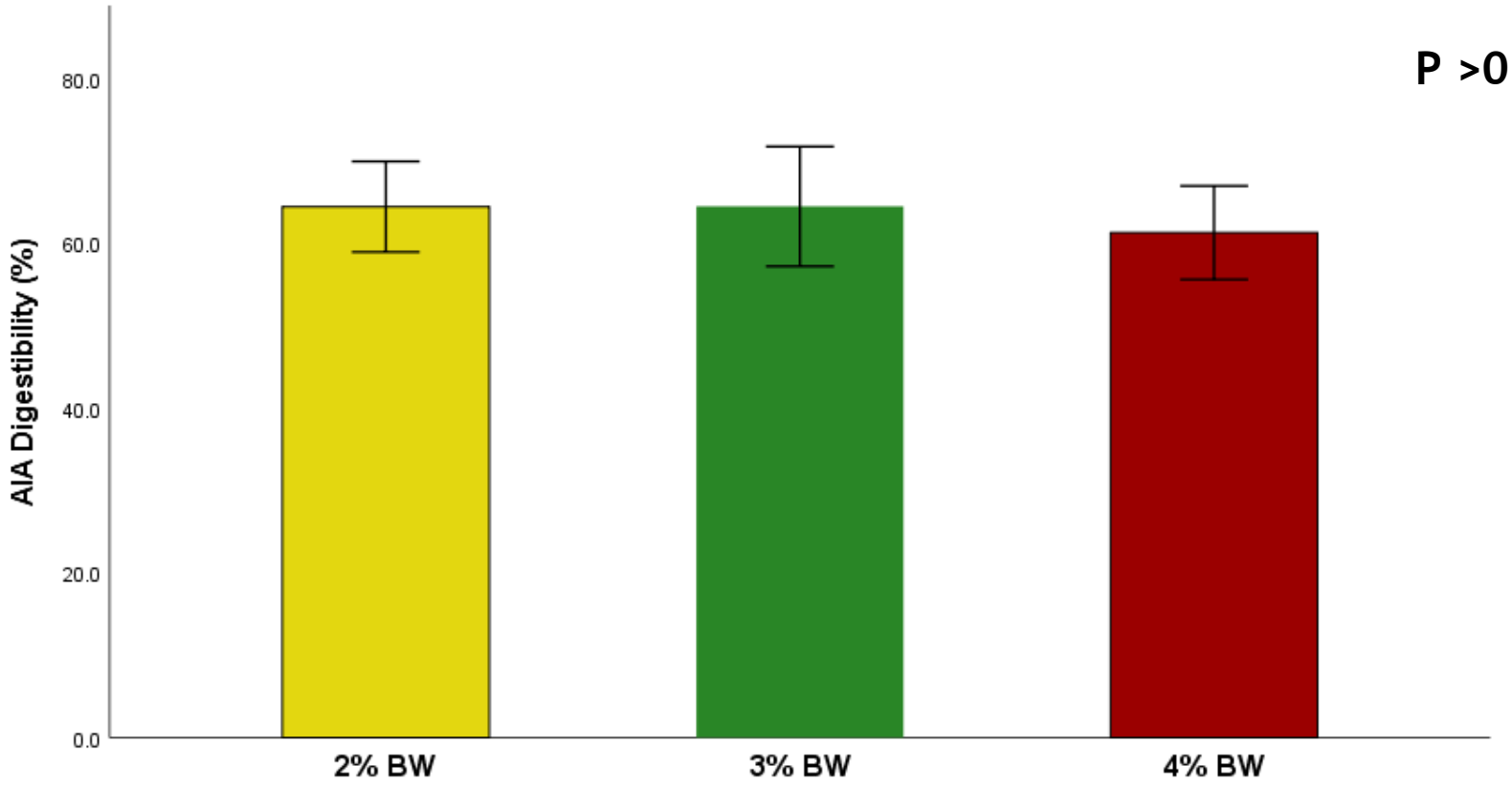
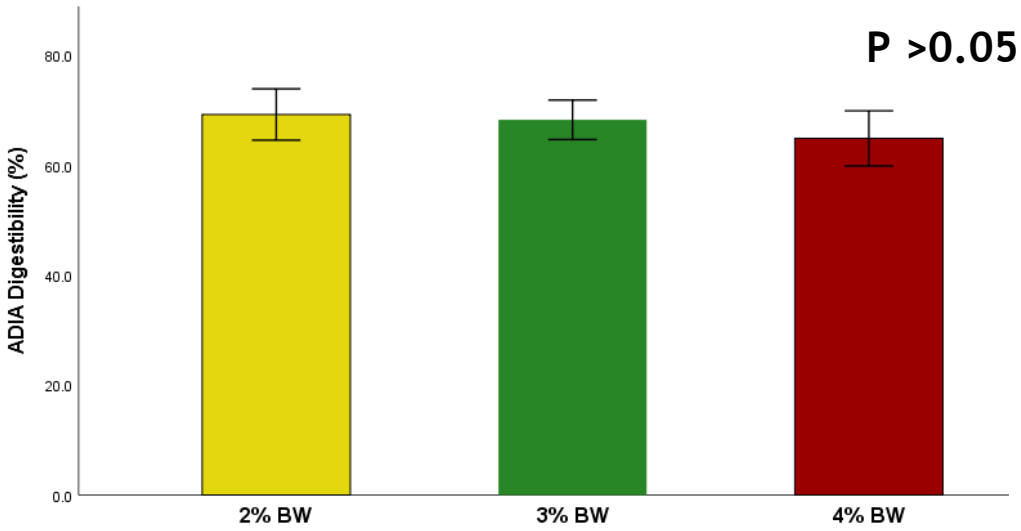
Digestibility Coefficient (%) -AIA

Digestibility Coefficient = 100 – [100*(M_{grass} / M_{faeces})]



P >0.05

Digestibility Coefficients (%) ADIA and ADL



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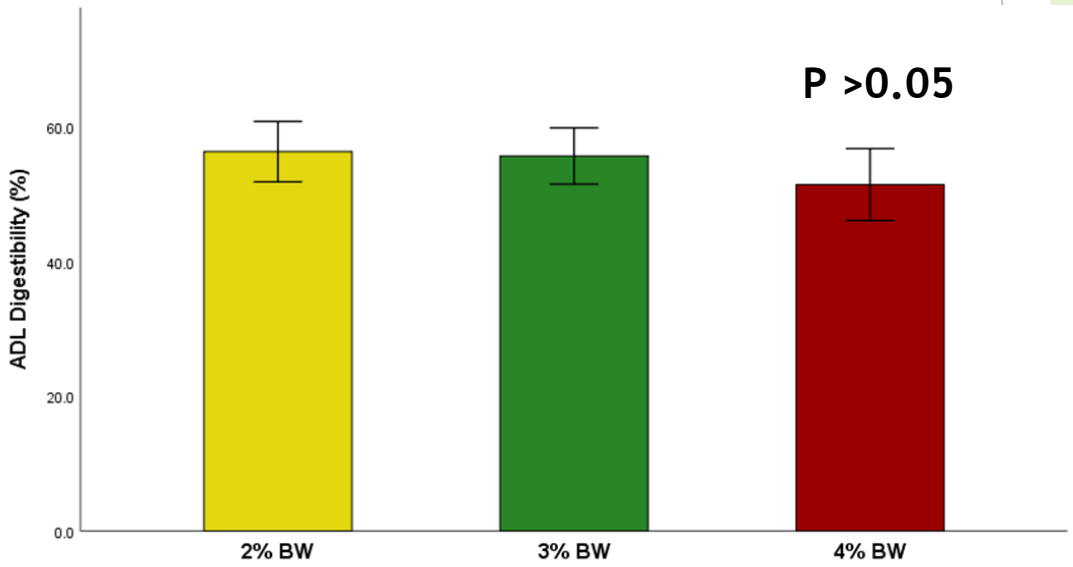
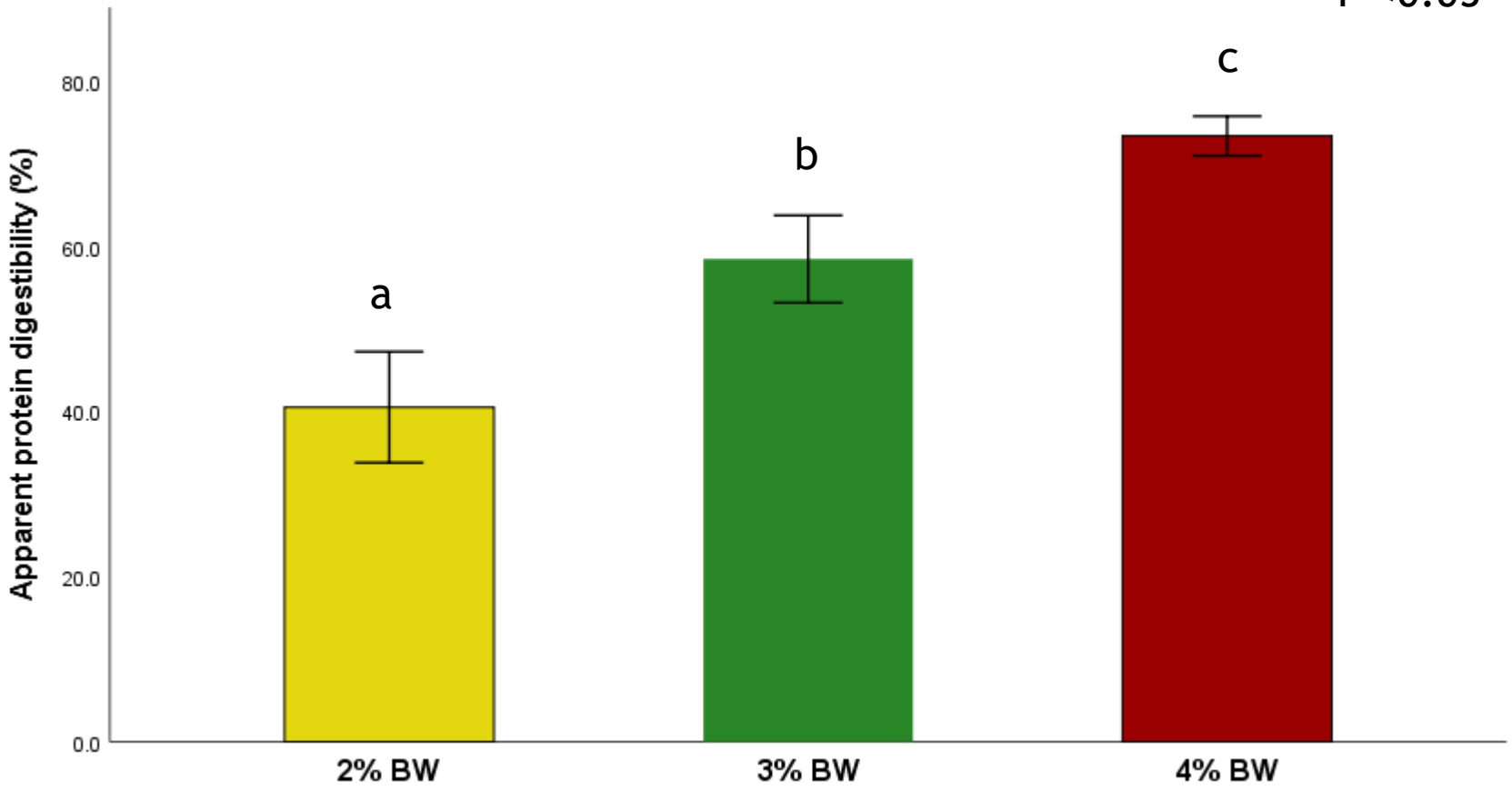


P >0.05

Effect of DHA on Apparent Protein Digestibility (%)

P <0.05



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Protein Digestibility (%) determined using AIA, ADIA and ADL

	2% BW	3% BW	4% BW	*P* - value
AIA	64.4	63.9	61.3	0.42
ADIA	69.2	68.2	64.9	0.06
ADL	58.8	54.3	50.5	0.08

Conclusions

- Naturally occurring markers AIA, ADIA and ADL have potential to determine the digestibility of grass for horses.
- Apparent dry matter digestibility overestimated grass digestibility in comparison to all the naturally occurring markers used in this study.
- Grass dry matter digestibility determined using naturally occurring markers is not affected by grass dry matter intake.
  - Grass digestibility coefficients measured using the naturally occurring markers showed slight variation.
- Protein digestibility reduced with increasing intake using naturally occurring markers.

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