Pelleted Products Based on Combination of Co-Products Carinata Meal/Canola Meal, Pea Screenings and Lignosulfonate at Different Levels for Dairy Cattle

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7th Annual Dairy Info Day

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SK Ministry of Agriculture Strategic Research Chair: Feeds

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Government of Saskatchewan

I. **Research Motivation & Originality**

II. Objectives

III. Studies and Results

IV. Conclusions and Applications

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I. Research Motivation & Originality:

- Recently, a **Relatively New Co-Product** (Carinata meal) from **Bio-Fuel Processing** of Carinata seed has become available *(Xin and Yu, 2013).*

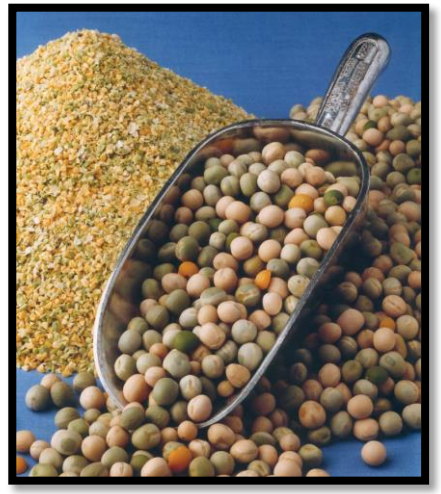
- This **New Co-Product** has **NOT** been fully understood and registered as an animal feed for all species at CFIA, (beef cattle) *(John McKinnon's work).*

- **Little Info** is available on **Bioactive Compounds** such as **Glucosinolates.**

- **Little Info** is available on **Amino Acids Profiles** as well as other chemical and nutrient profiles for animals.

I. Research Motivation & Originality

Pea Screenings



- Pulse processing industry often produces **Low Grade of Peas** (*Pisum sativum*) or **Pea Screenings** (“**byproduct**”).
- These pea screenings still contain high **Starch** ↑ content and thus are **a good energy source** *(NDSU, 2002).*
- But the **Degradation in the Rumen** in this byproduct is **very** ↑ *(Goelema et al., 1998; Mustafa et al., 2000)* , causing **nutrient loss** and **digestive disorder** too.
- In order to use it more efficiently, the degradation **has to be decreased**.

I. Research Motivation & Originality

Impact of Feed Processing & Feed Additive

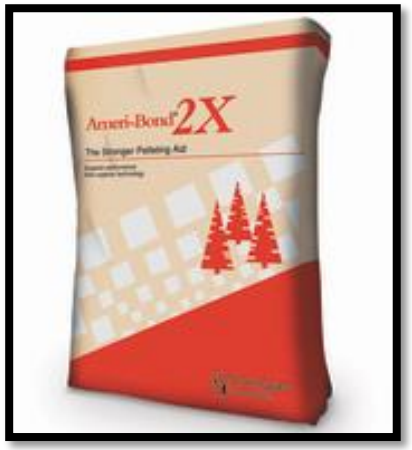
- Rapid feed rumen degradation (rate & extent) can be reduced

- Suitable feed processing: Pelleting

(Yu et al., 2002)

- Addition of a feed additive: Lignosulfonate

(McAllister et al., 1993)



I. Research Motivation & Originality

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II. Objectives

- To develop and test pelleted products based on optimal combination of new carinata meal, pea screenings and lignosulfonate compound for dairy cattle.

- **Comparisons will be made:**
  - Pelleted products based on carinata meal vs. pelleted products based on canola meal.
  - No addition vs. addition of lignosulfonate.
  - Level of inclusion of co-products

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III. Results

PHASE 1

Develop and Test Valued Added Blend Pelleted Products

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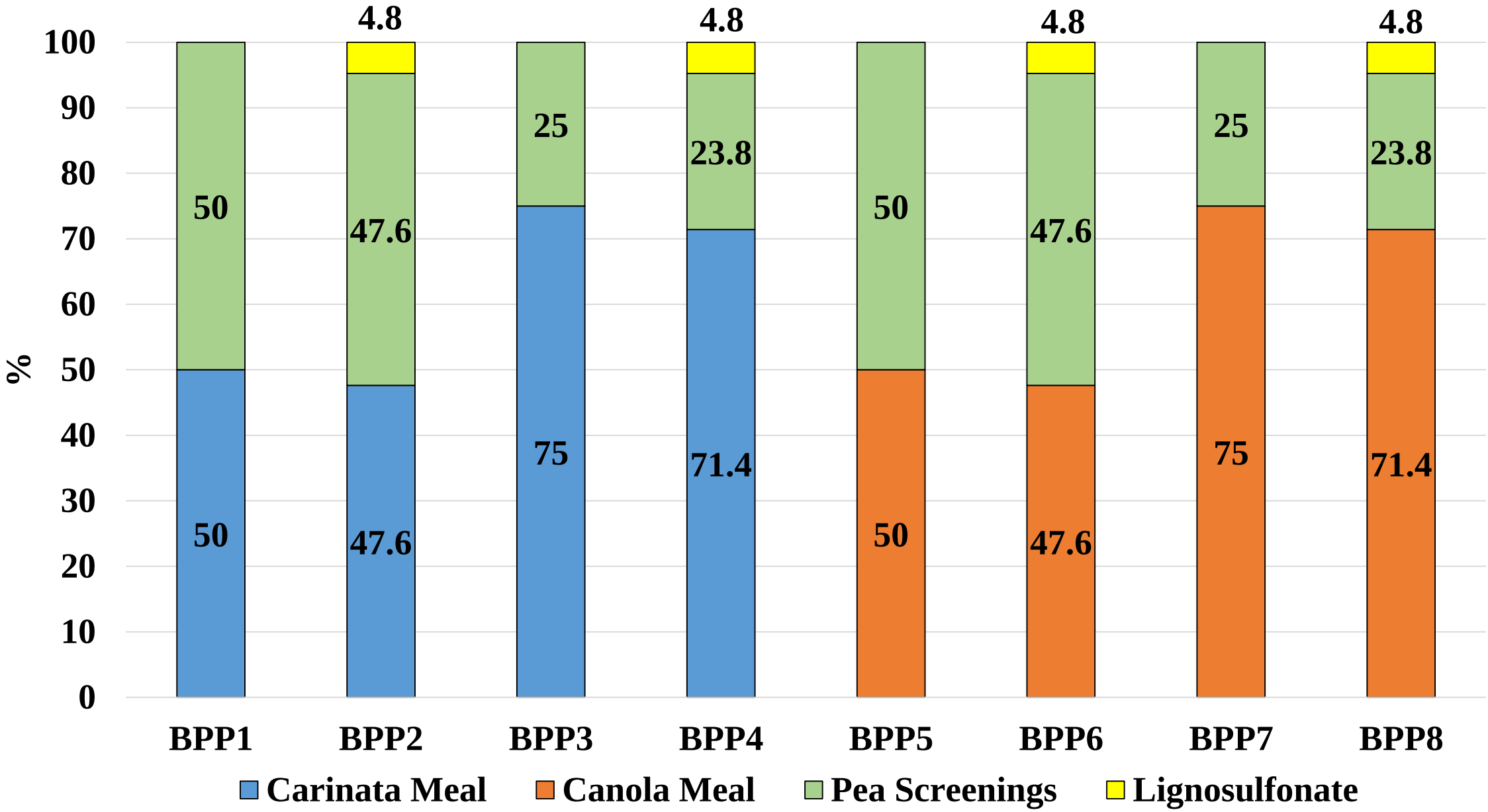
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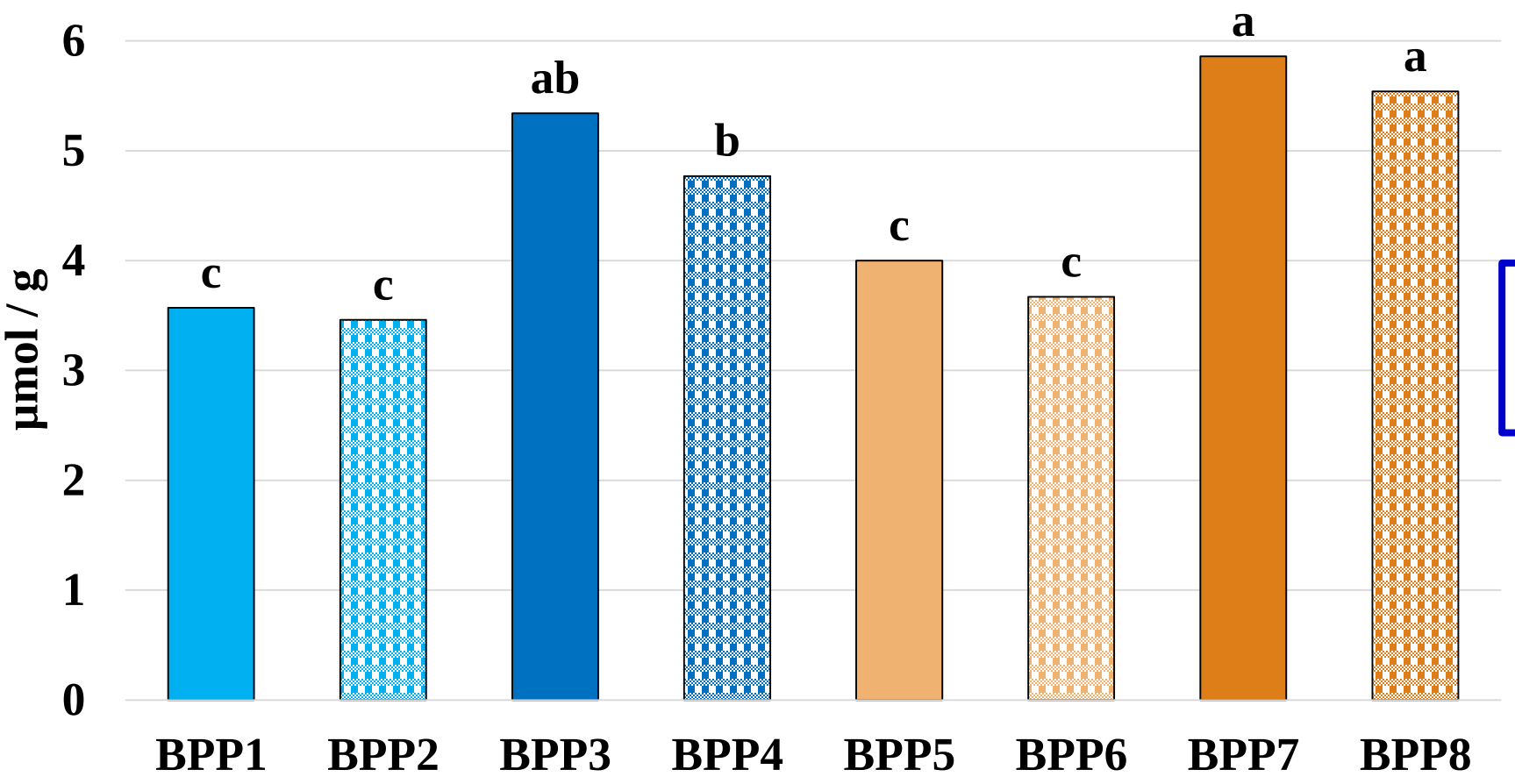
BPP1
BPP2
BPP3
BPP4
BPP5
BPP6
BPP7
BPP8
Carinata Meal
Canola Meal
Pea Screenings
Lignosulfonate

Study II:

Determine Glucosinolate Compounds and Amino Acids.

Glucosinolate Compounds (GS)

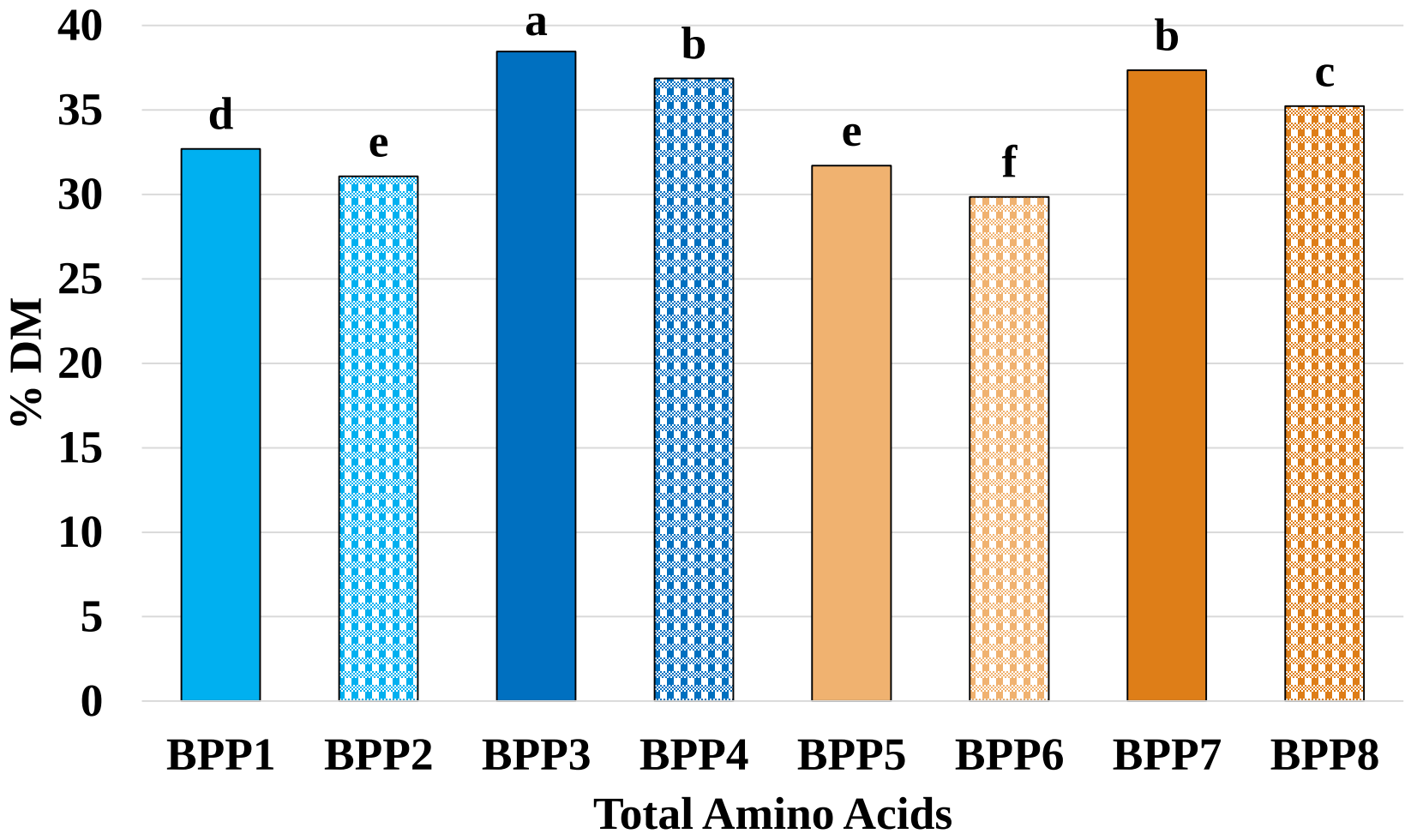


CR vs. CN P < 0.05
LSC no vs. Add P < 0.05
Co-P Low vs. High P < 0.05

Study II:

Determine Glucosinolate Compounds and Amino Acids.

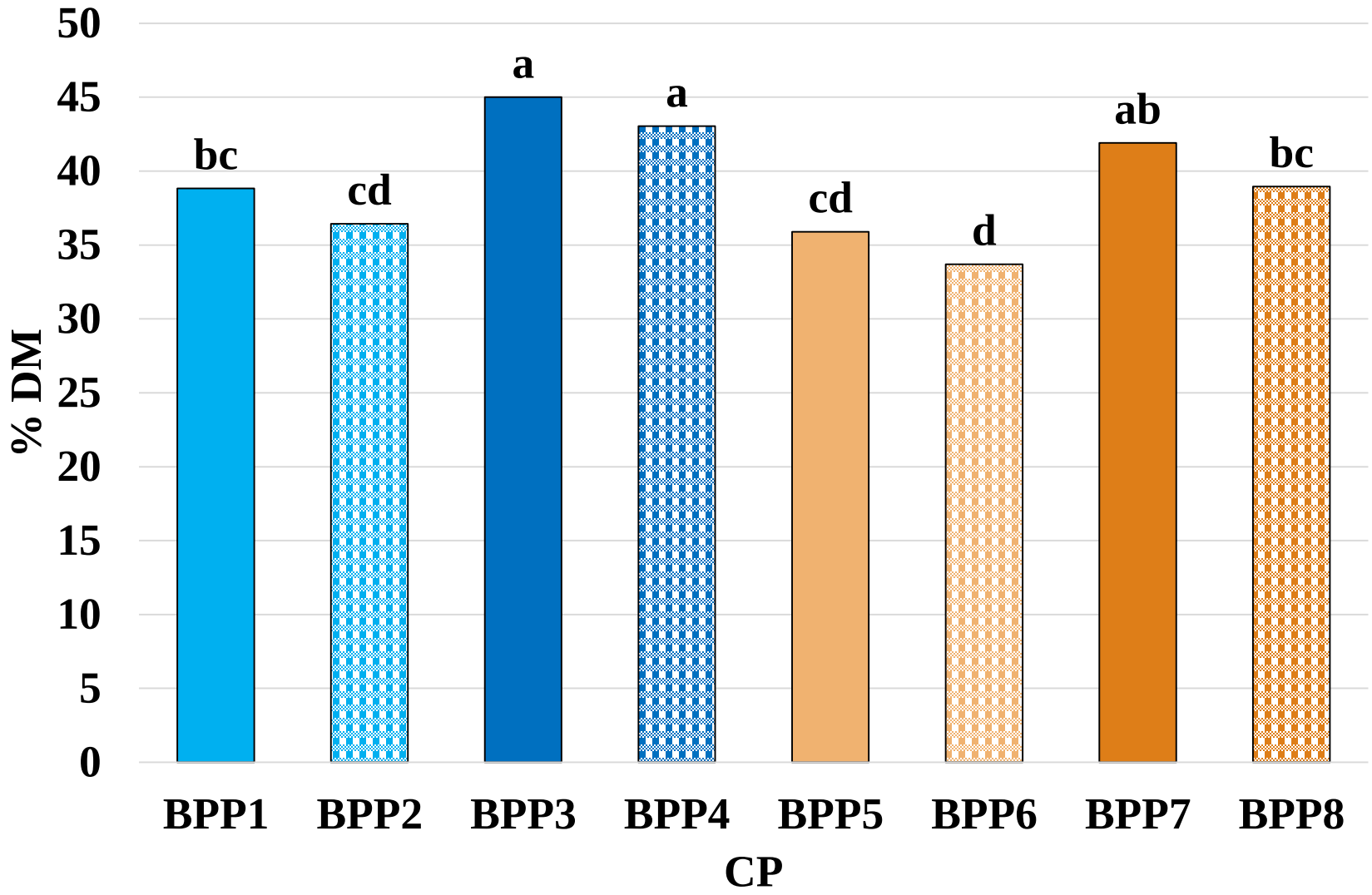
Important Amino Acid Profiles (AA)



CR vs. CN P < 0.05
LSC no vs. Add P < 0.05
Co-P Low vs. High P < 0.05

Study III:

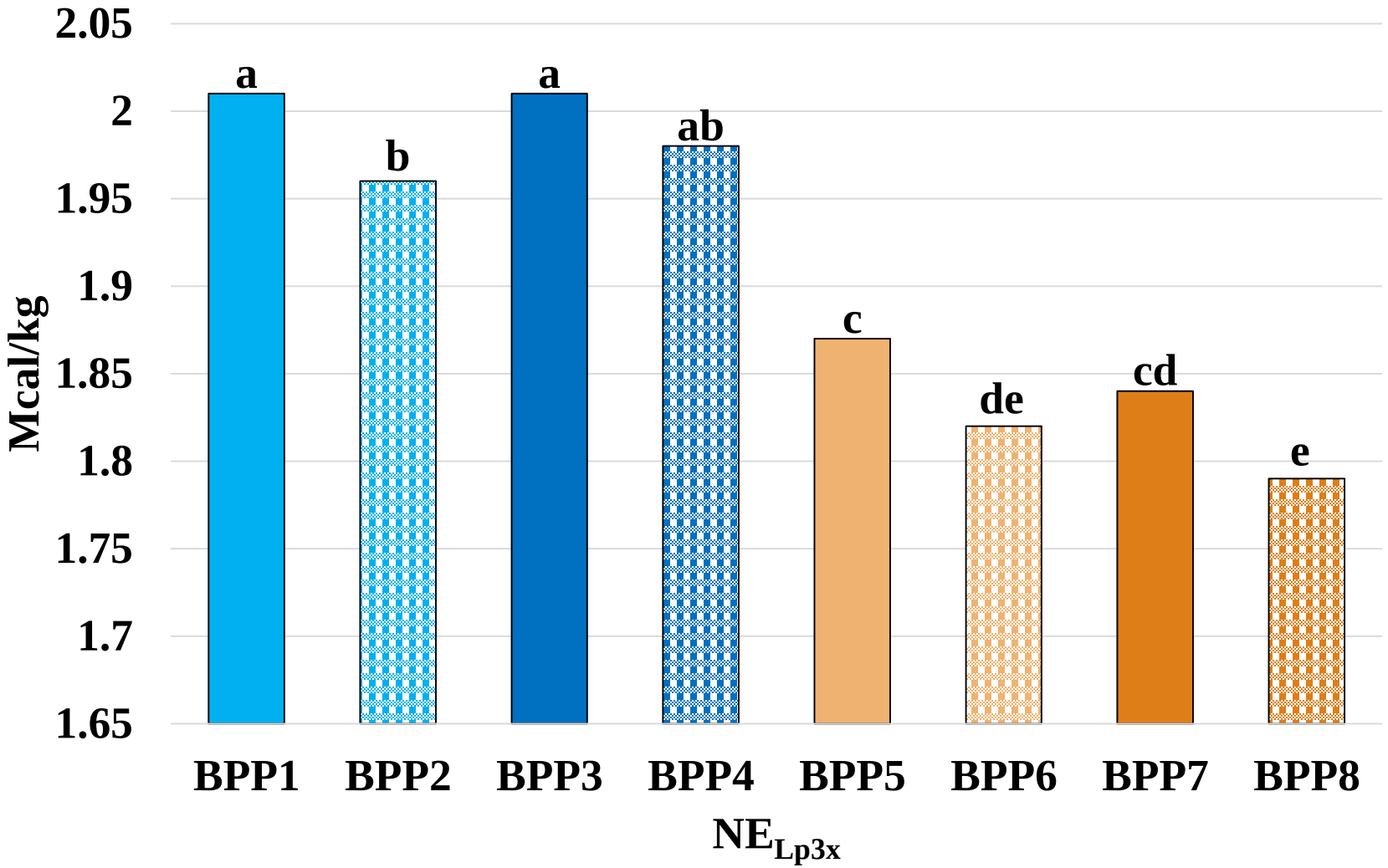
Determine Chemical Profiles of the Blend Pelleted Products.



CR vs. CN P < 0.05
LSC no vs. Add P < 0.05
Co-P Low vs. High P < 0.05

Study IV:

Determine Digestible, Metabolizable and Net Energy Values of the Blend Pelleted Products.



CR vs. CN P < 0.05
LSC no vs. Add P < 0.05

III. Results

PHASE 2

Rumen Degradation Kinetics of Pelleted Products to Dairy Cattle Using Various In Situ and In Vitro Animal Techniques

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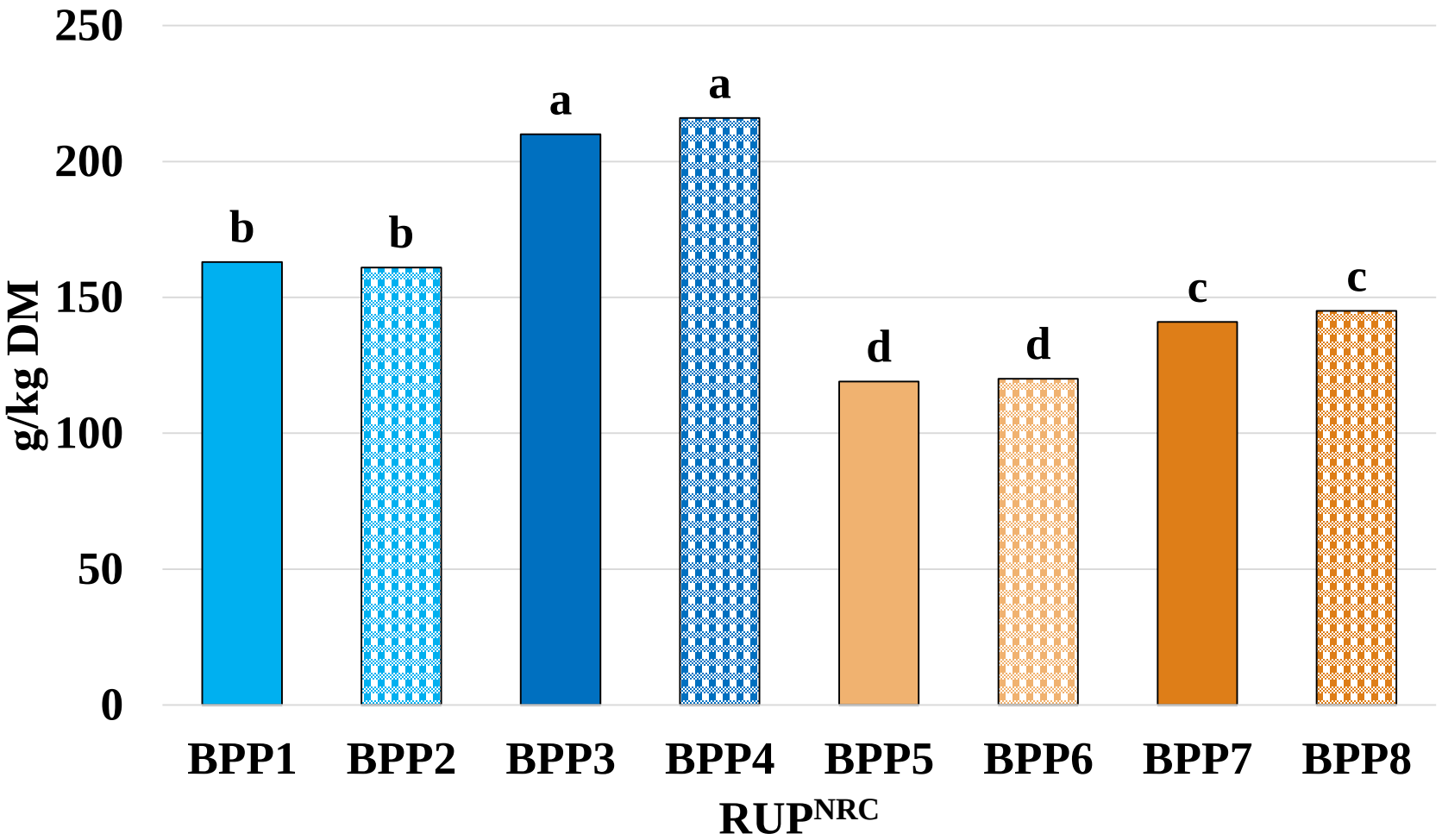
Study I: Rumen Phase

Determine Degradation Kinetics of CP



CR vs. CN $P < 0.05$
Co-P Low vs. High $P < 0.05$

III. Results

PHASE 3

Determine Truly Absorbed Nutrient Supply and Feed Milk Value (FMV) from the Pelleted Products to Dairy Cattle

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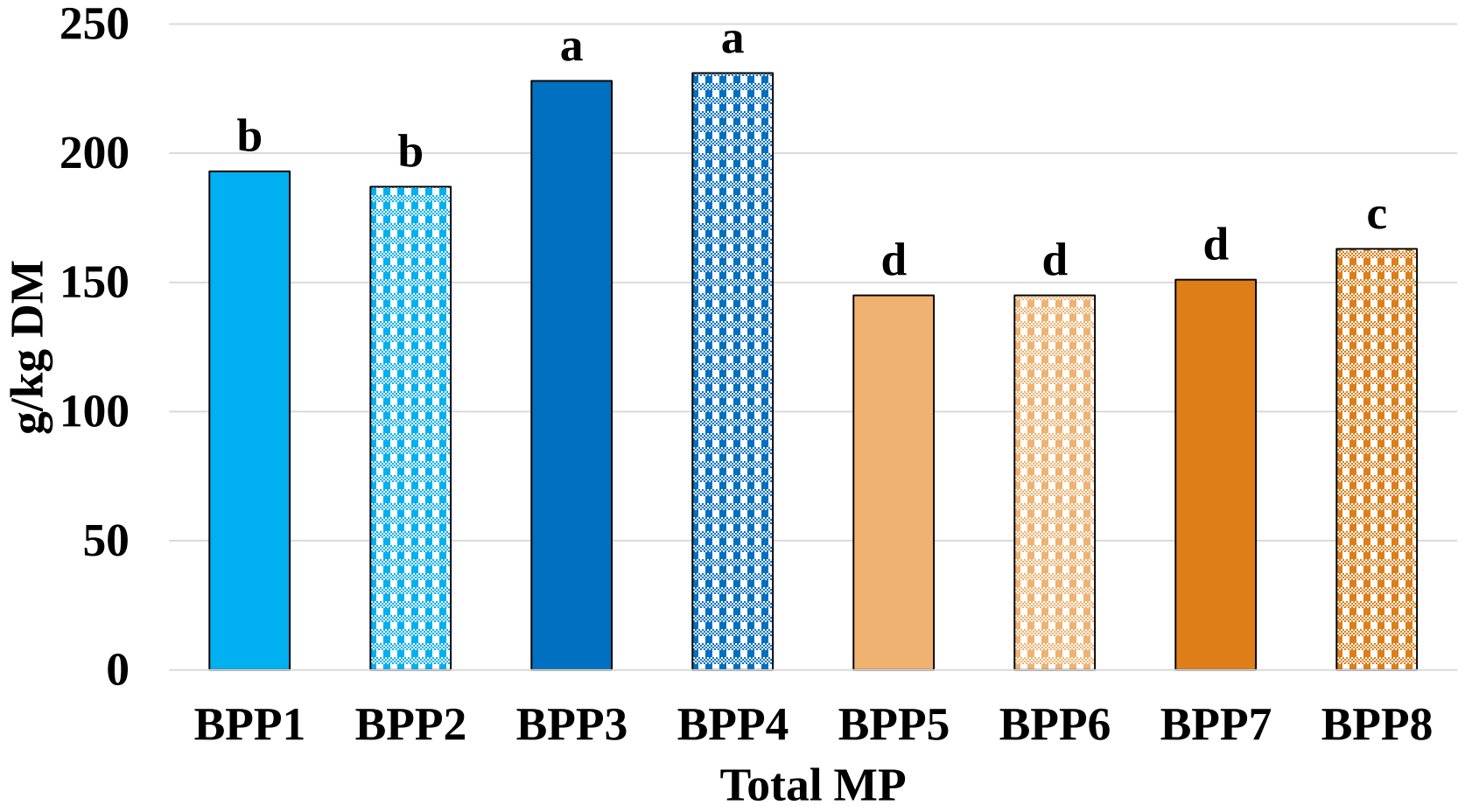
Study I: Metabolic Characteristics

Determine Metabolic Characteristics and True Nutrient Supply of the Pelleted Products

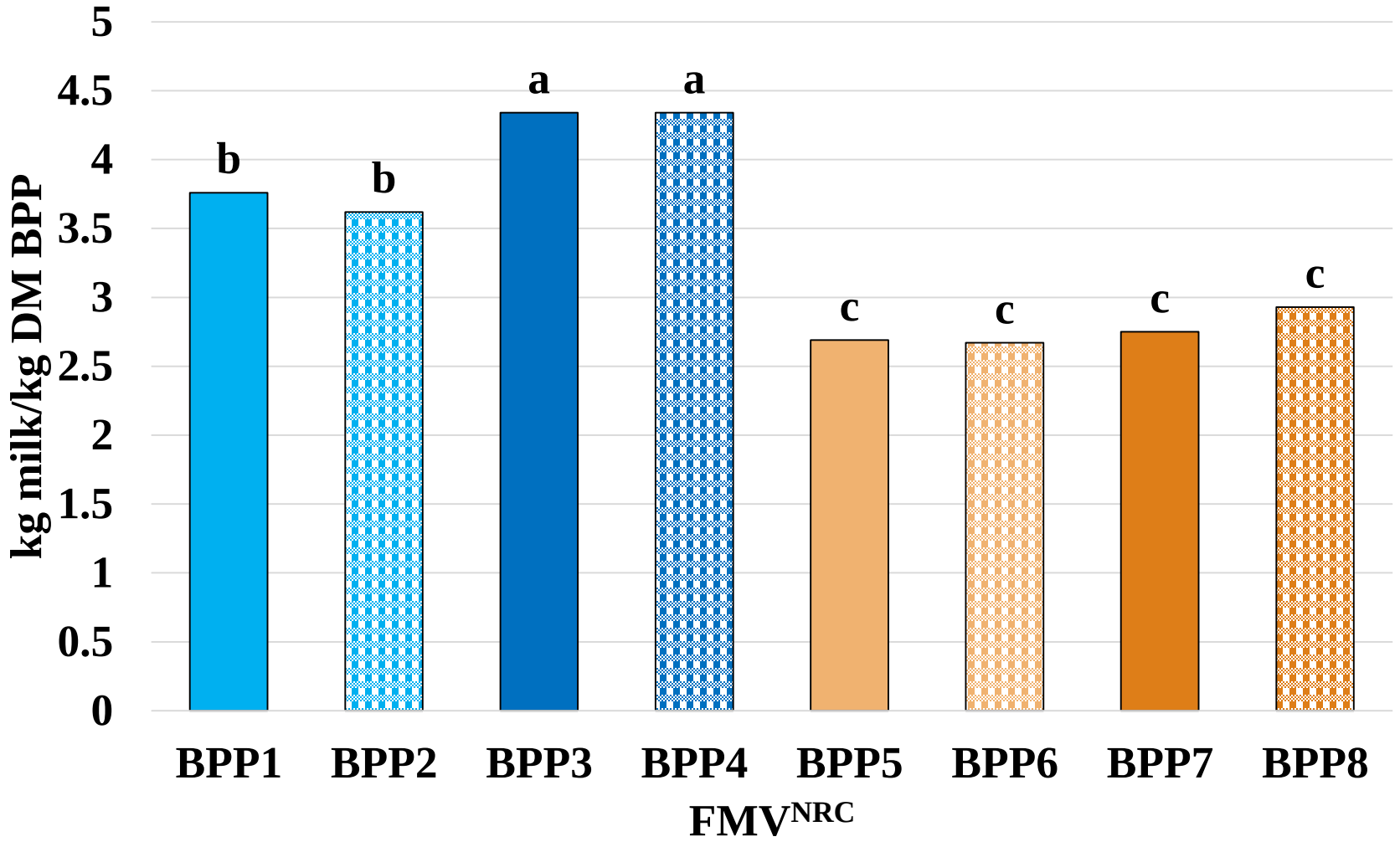
a) NRC Model



CR vs. CN $P < 0.05$
Co-P Low vs. High $P < 0.05$

Study II: Feed Milk Value FMV

Determine Feed Milk Value (FMV) and Dairy Cow Production Performance of the Pelleted Products



CR vs. CN P < 0.05
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IV. Conclusions

- **Lignosulfonate** increases **rumen bypass protein**.
- **Glucosinolates Levels** in all blend pelleted products are considered low and do not cause any risk to the health of ruminants.
- **Blending these ingredients** increases **AA** and **nutrient supply**.

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IV. Conclusions

- **BPP3** and **BPP4** (Carinata blend pelleted products) contain:
  - **Highest Total AA** on dry matter basis.
  - **Highest NE_L** together with BPP1.

- **BPP3** and **BPP4** products provide:
  - **Highest Bypass Protein** (RUP)
  - **Highest Metabolizable Protein** (MP)
  - **Highest Feed Milk Values**

V. Industrial and Commercial Applications

	Price CAD/MT	Price CAD/kg
Pea Screenings	120	0.12
Carinata Meal	340	0.34
Canola Meal	340	0.34
Lignosulfonate	2350	2.35
Barley Grain	200	0.20
Pelleting	7	0.01

	Cost CAD/kg	FMV (kg milk/kg feed)	Milk Price CAD/kg	Total Sale CAD	Benefit/Profit CAD
BPP3	0.29	4.34	0.90	3.91	**3.61**
BPP4	0.39	4.34	0.90	3.91	**3.51**
Barley Grain	0.20	1.36	0.90	1.22	**1.02**
Canola Meal	0.34	2.36	0.90	2.12	**1.78**

V. Industrial and Commercial Applications

- Based on these studies, carinata based pelleted products **BPP3 and BPP4** can be used as a potentially high value concentrate feed for dairy cattle.

- Carinata based pelleted products can **increase milk production** and **reduce feed cost**.

- These blend pellets can be used as future **marketable products** in Canada and worldwide.

Acknowledgements

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Ministry of Agriculture Strategic Feed Research Chair (Dr. Peiqiang Yu)

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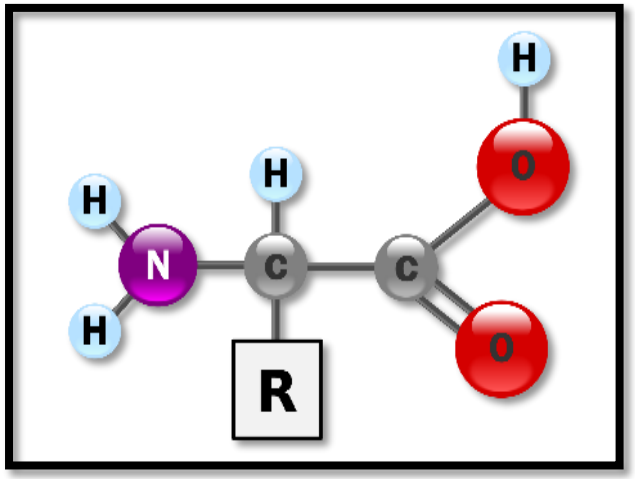
THANK YOU VERY MUCH !!



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