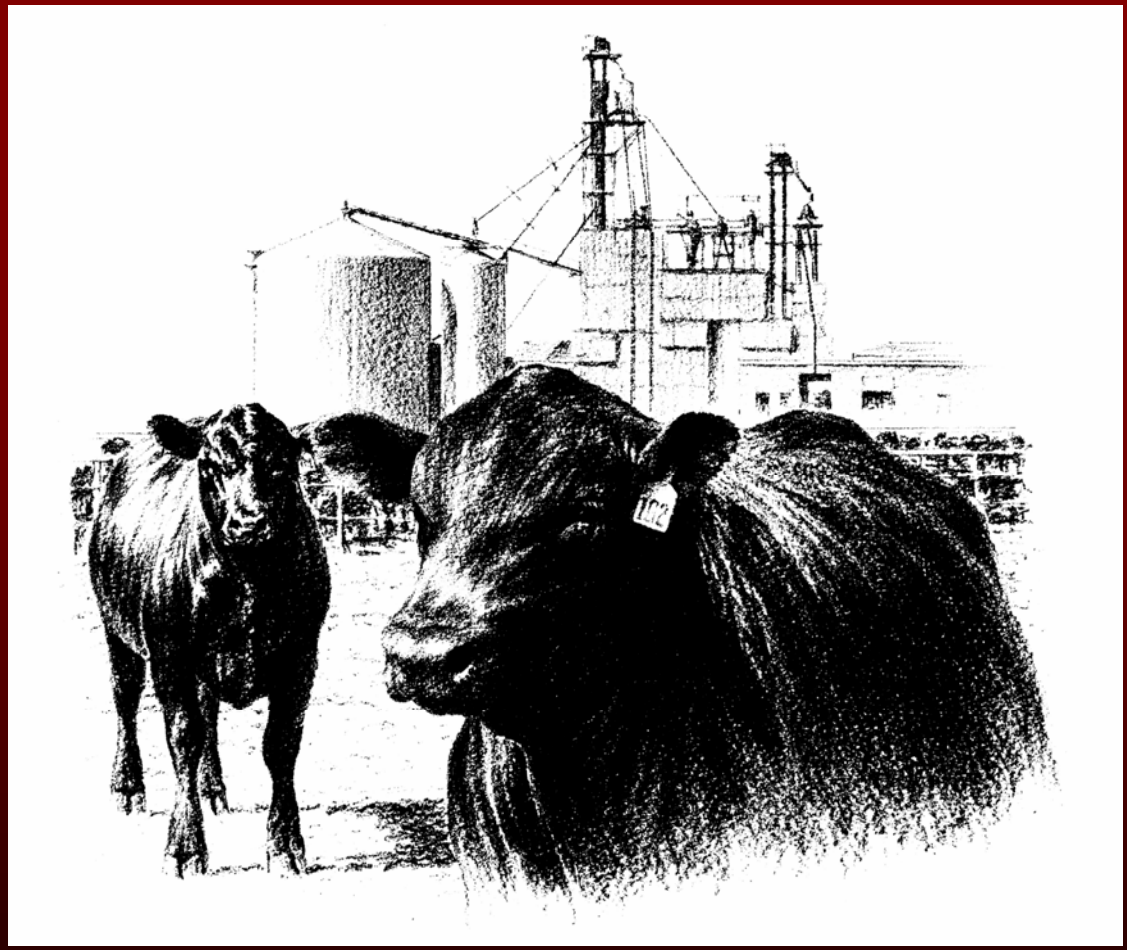
Use of “New Generation” DDGS in Ruminant Diets



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Nutrient Composition

Item	% of DM
Crude protein	28 to 36
RUP, % of CP	47 to 63
NEl, Mcal/kg	2.20
Fat	8.2 to 11.7
ADF	19 to 24
NDF	38 to 44
Ca	0.10 to 0.15
P	0.43 to 0.83

High-bypass potential with >80% SI digestion

NDF

As effective as Alfalfa haylage

Only 68% as effective as Corn silage

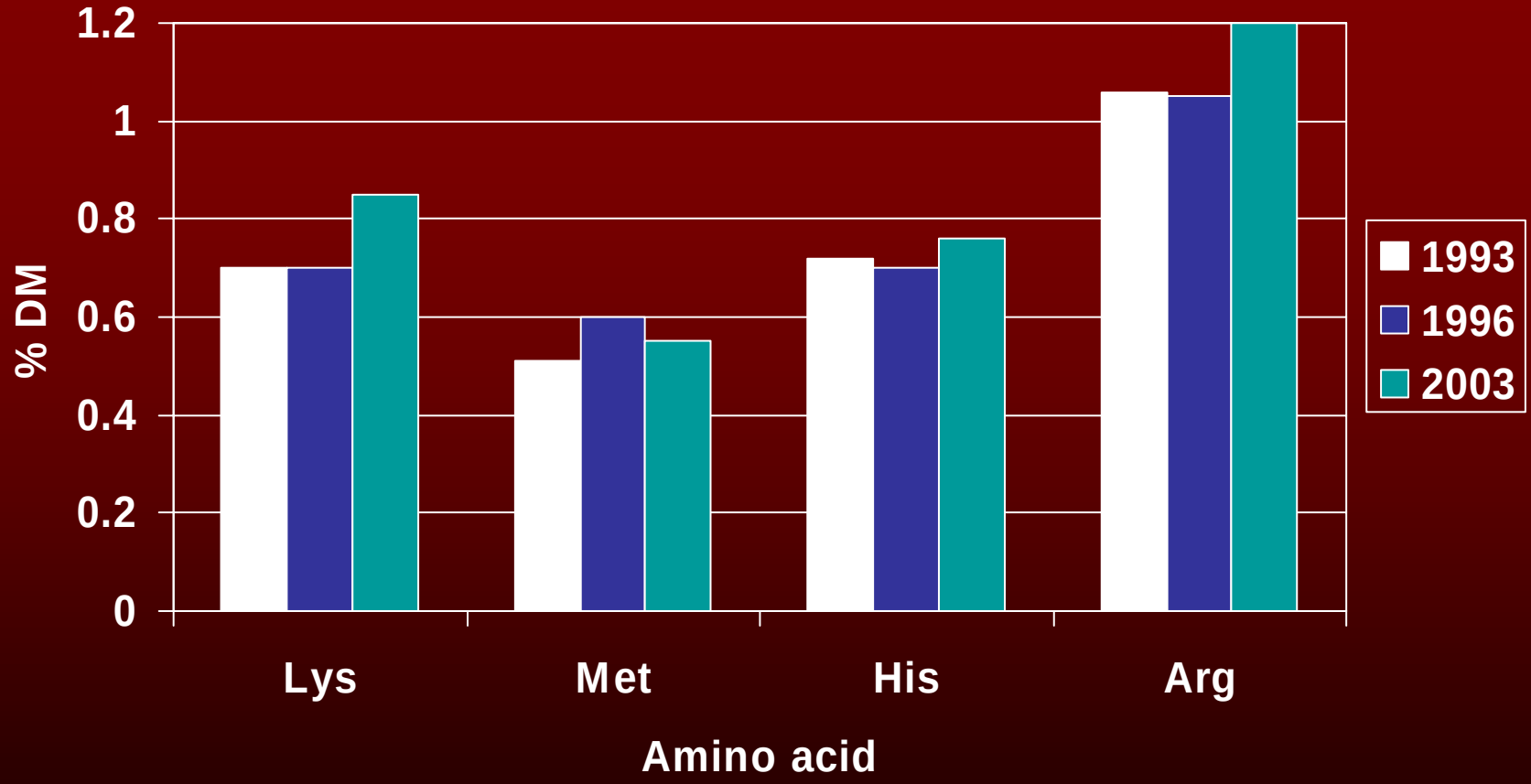
Handling that causes particle separation will result in considerable variation of DDG or DDGS composition.

Akayezu et al., 1998

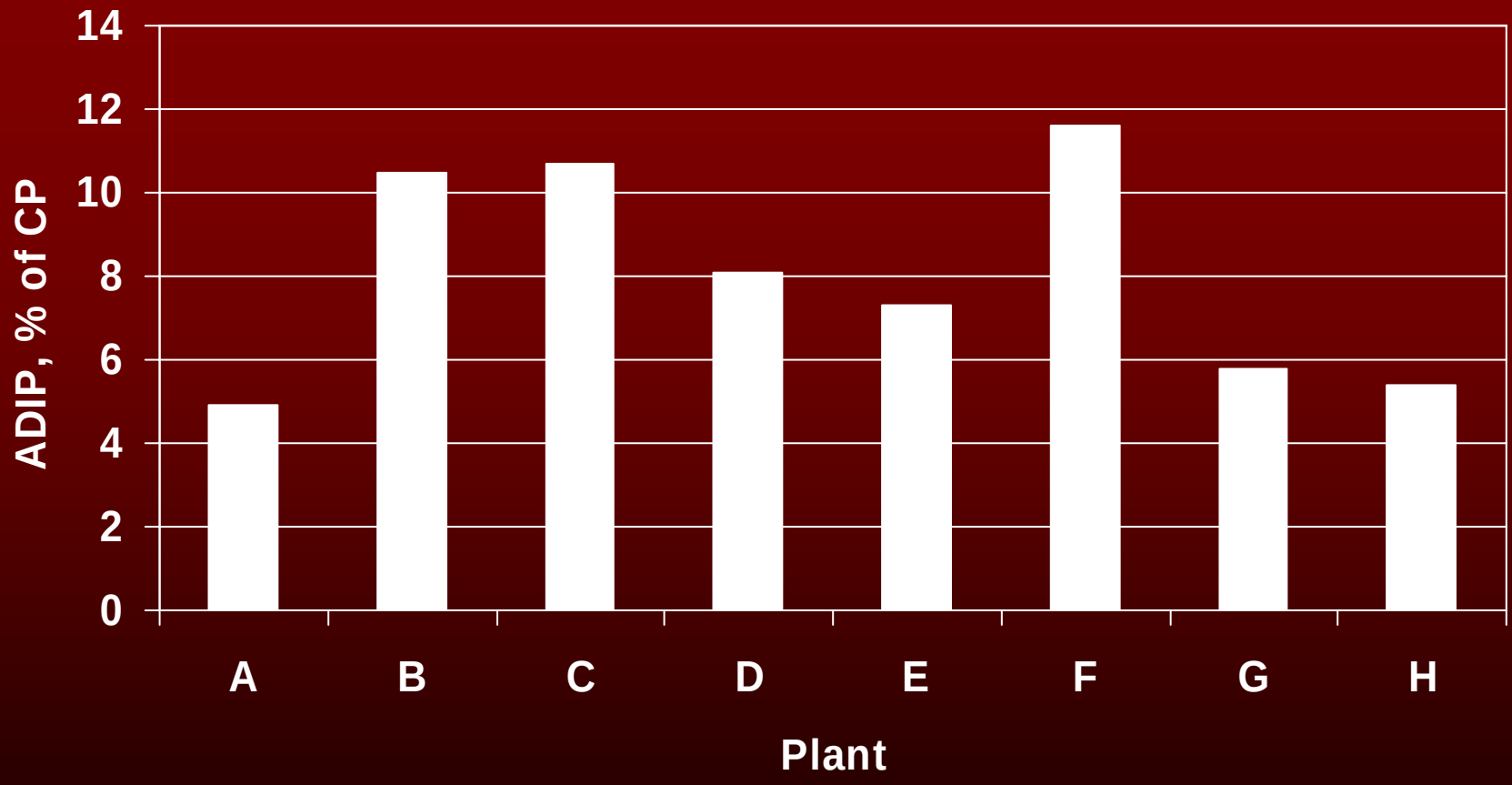
Fine particles (< 1 mm) represented 58% of the sample weight on average across 8 ethanol production facilities (CV 20.6%).

Harty et al., 1998

Amino Acid Profile



ADICP

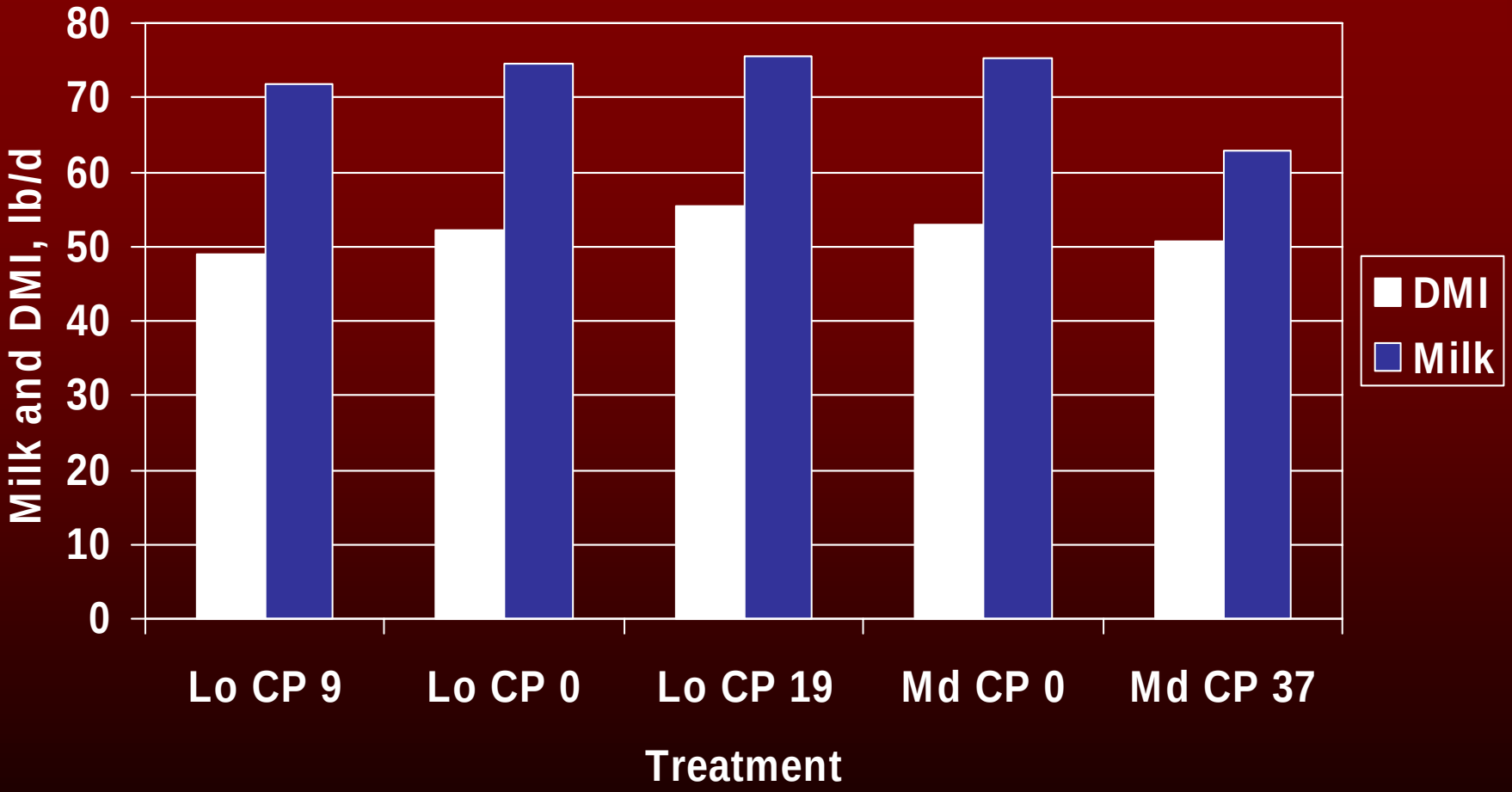


Harty et al., 1998

When ADIN>13% N lightness correlated with ADIN and IARUP.

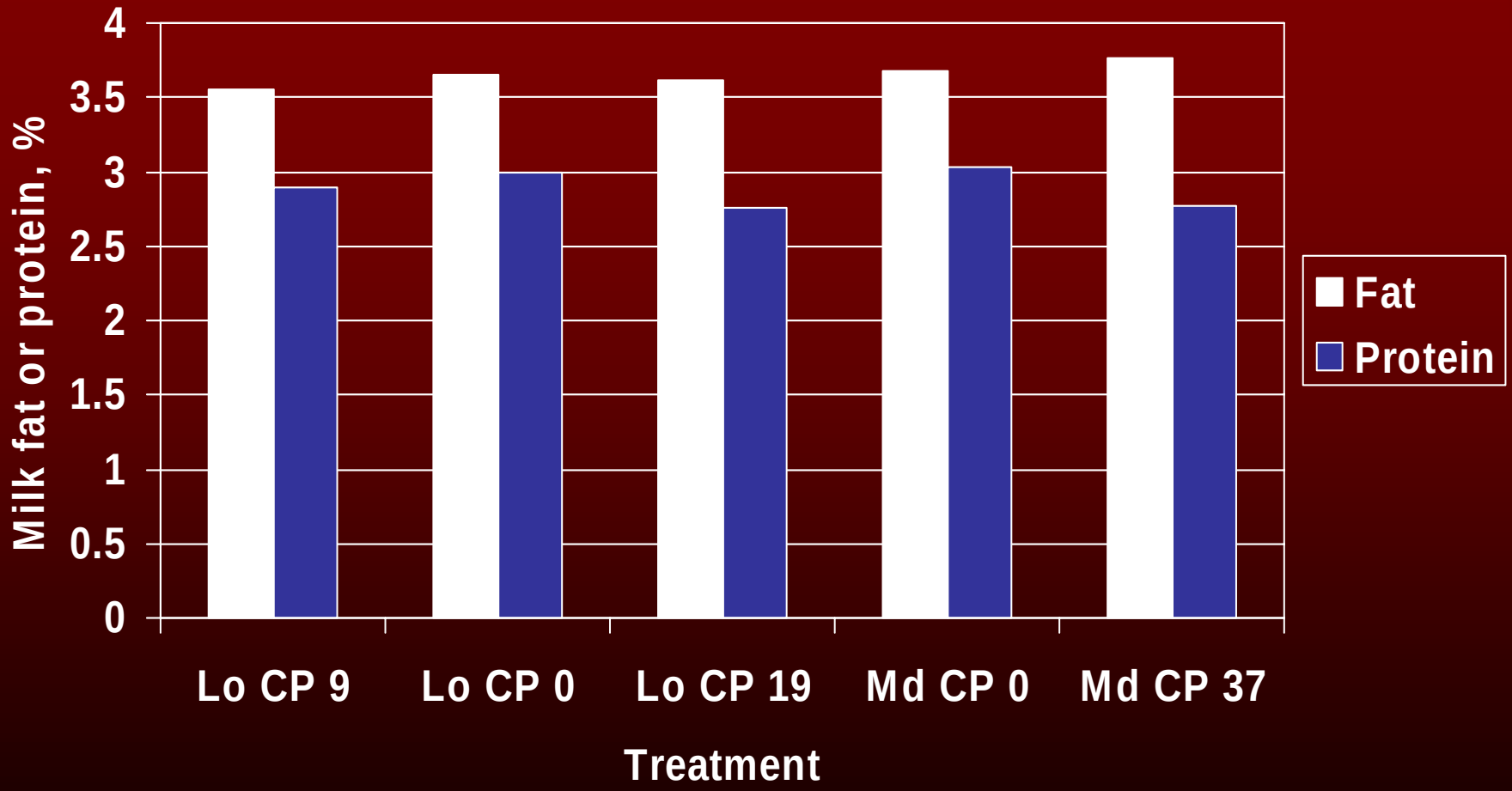
Owen and Larson, 1991

(Ammoniated corn silage 50% diet DM)



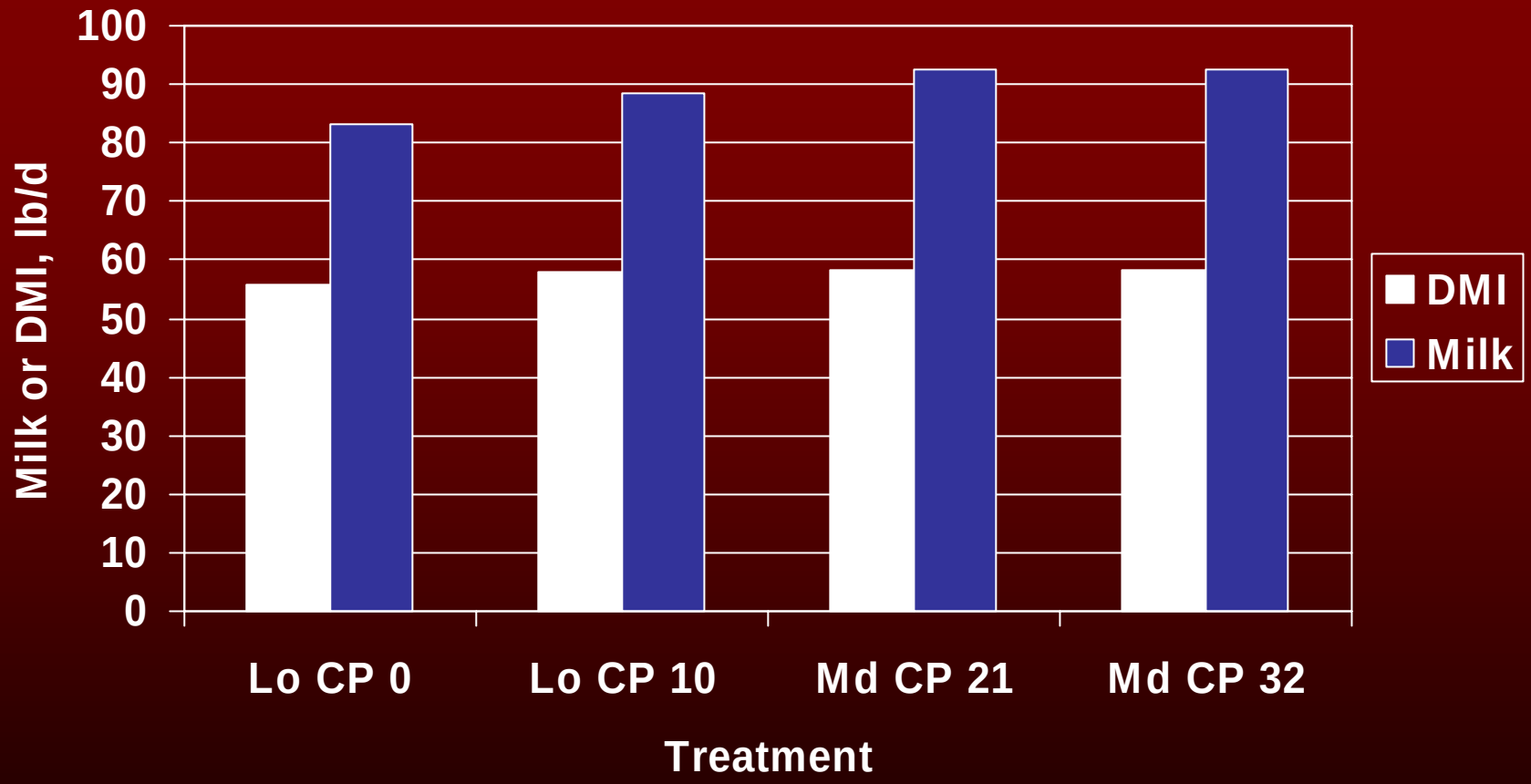
Owen and Larson, 1991

(Ammoniated corn silage 50% diet DM)



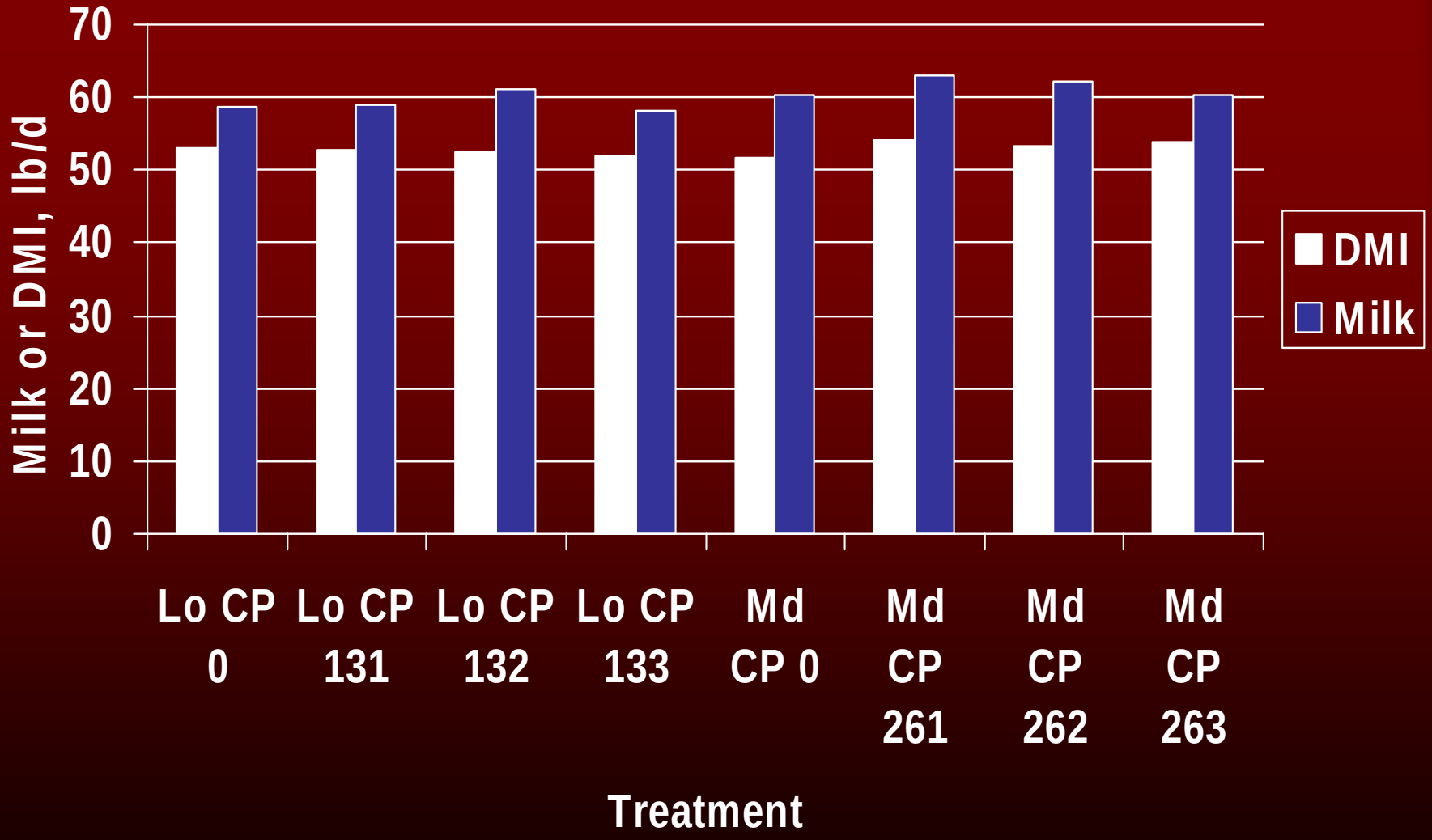
Grings et al., 1992

(Alfalfa 39% diet DM)



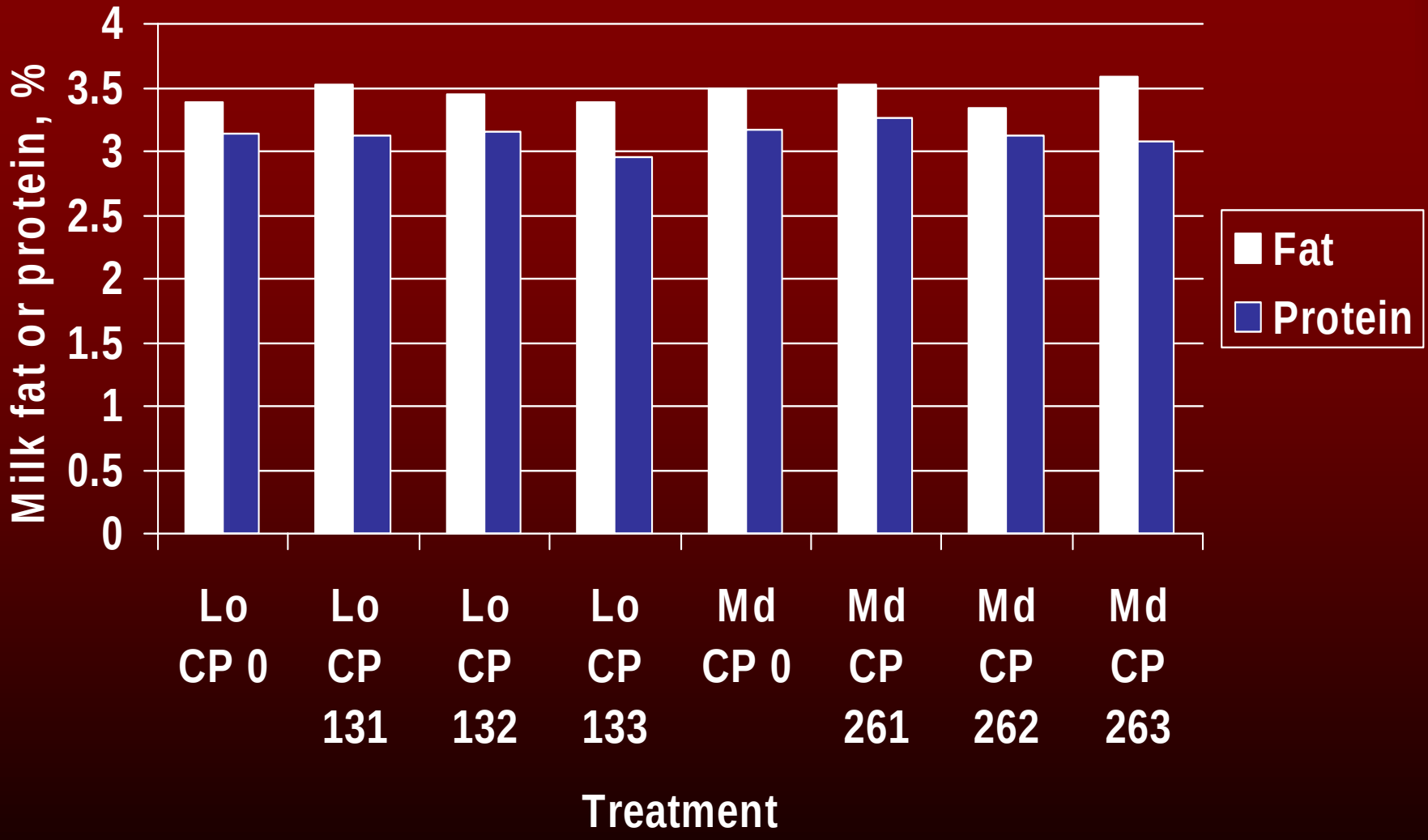
Powers et al., 1995

(Corn silage 50% diet DM)



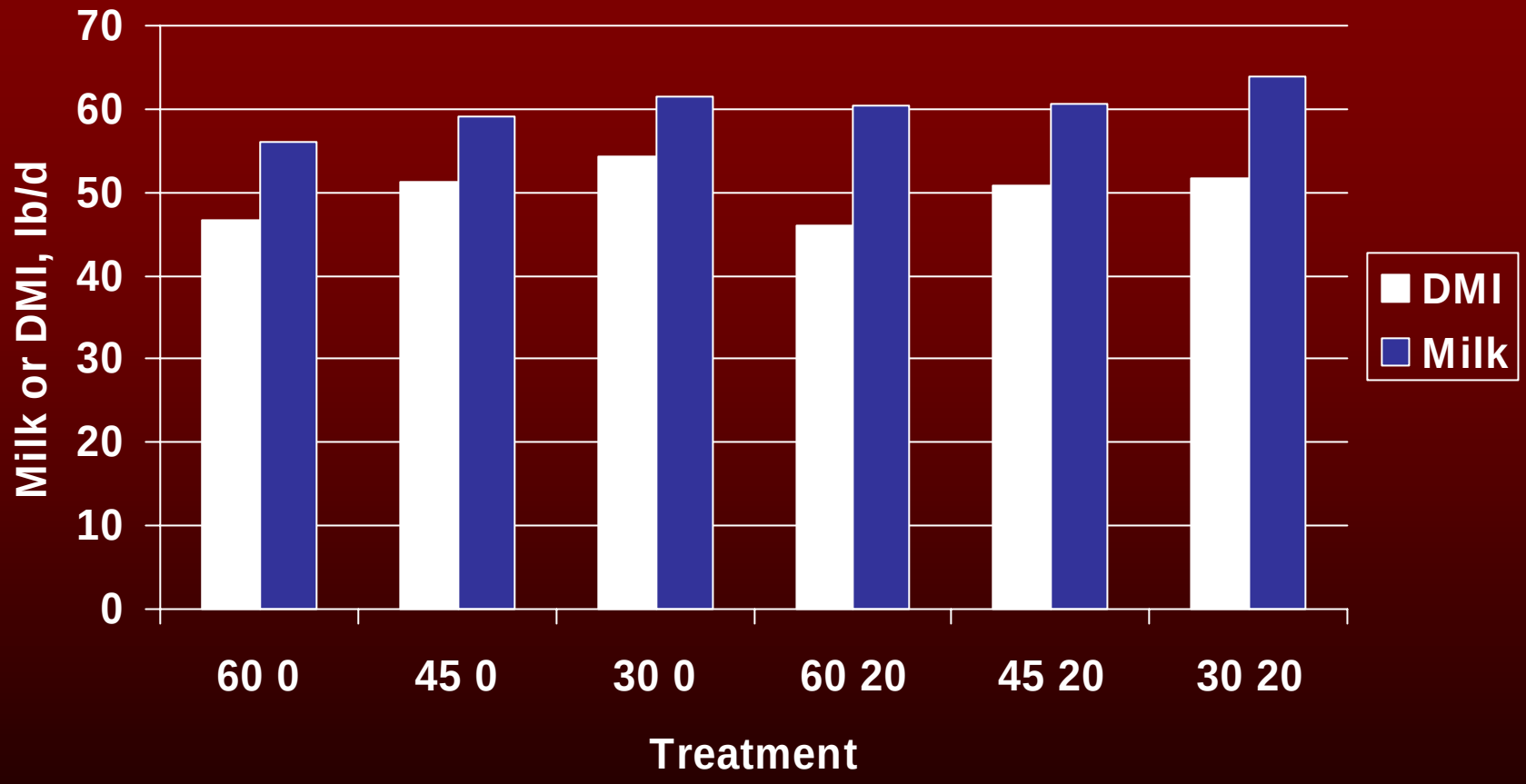
Powers et al., 1995

(Corn silage 50% diet DM)



Staples et al., 1995

(corn silage 30%, 45%, 60% diet DM)



Recommendations

- Research suggests DDGS can comprise between 20% and 26% of the diet DM
  - Limiting factors: CP, RUP and lysine content
    - ✓ Balance for RUP, RDP, CP and lysine
    - ✓ Limit CP coming from corn sources to less than 60% of total CP
      - – Corn grain, silage, DDGS, gluten meal, gluten feed
- DDGS replaces forage NDF at 66% effectiveness
  - For every 1 lb forage replaced, use 1.5 lb NDF from DDGS

DDGS Research in Ruminants

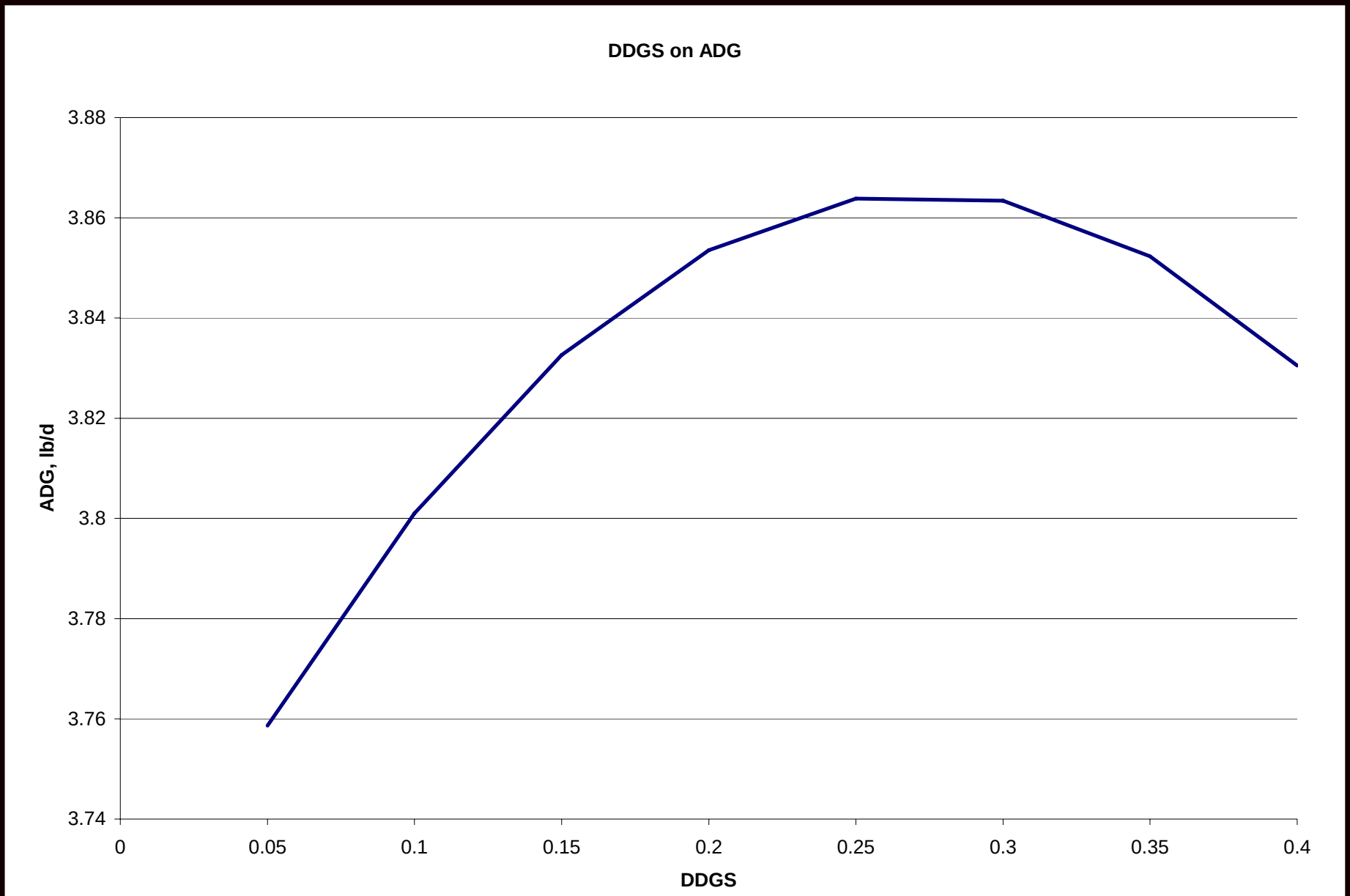
- **NCR-88 Beef Growing-Finishing Systems**
  - **Summarized studies in 1984 (NCR No. 297)**
    - ✓ **Characterization of fermentation by-products**
      - – **Higher protein concentration than corn**
      - – **Similar or greater RUP**
      - – **Similar energy concentration as corn**
    - ✓ **DDGS as a protein source**
      - – **Replacement for other protein sources**
        - » **When combined with urea of equal value as SBM**
      - – **As a bypass source**
        - » **Fortified with urea > urea alone**
        - » **More efficient protein source when combined with urea than SBM**
    - ✓ **DDGS as an energy source**
      - – **“if abundant supplies of wet distillers’ grains should become available—as a result, for example, of increased production of fuel alcohol—this by-product could be used as an energy source in livestock feeds.”**

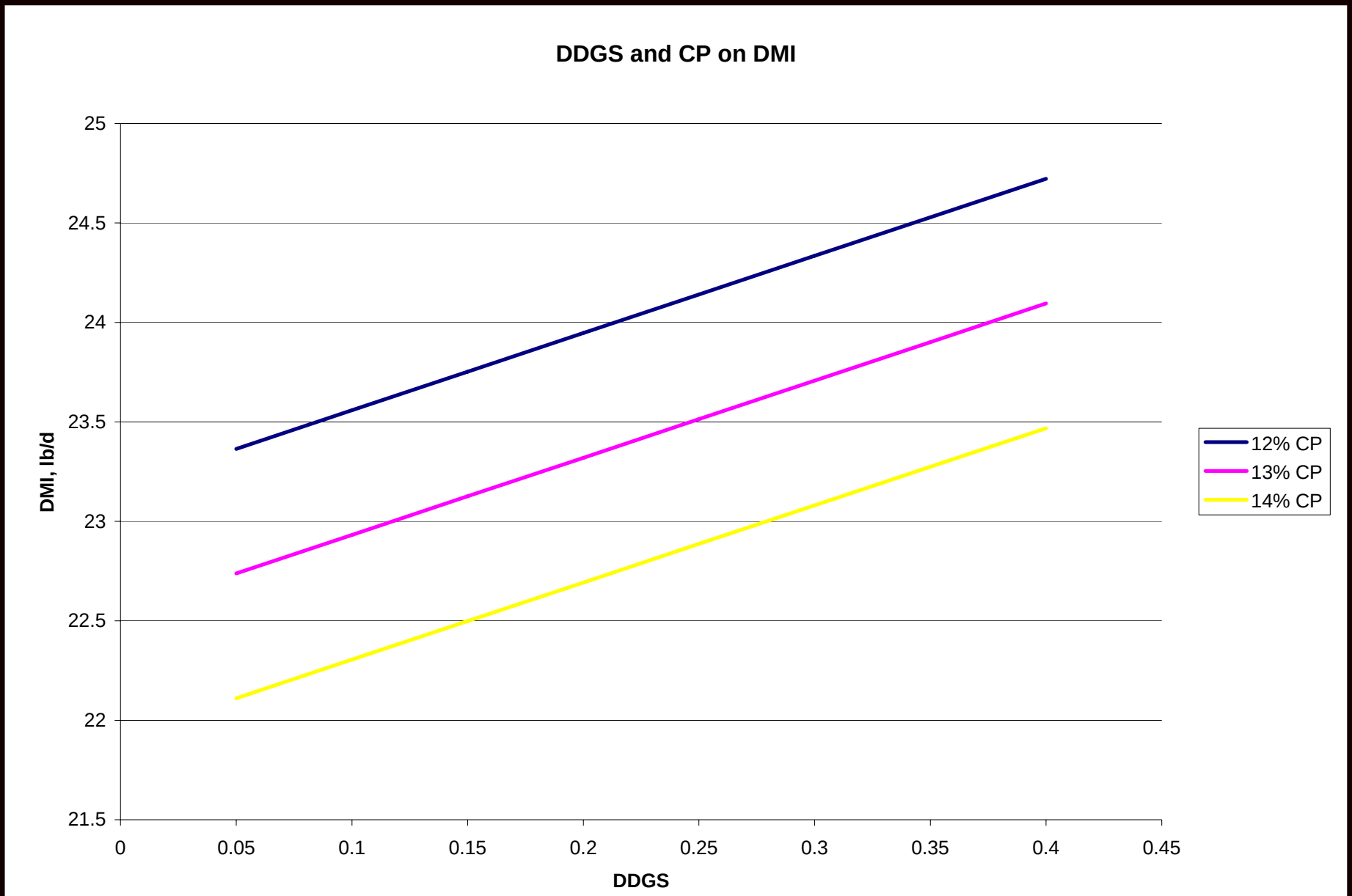
Beef Feedlot Research

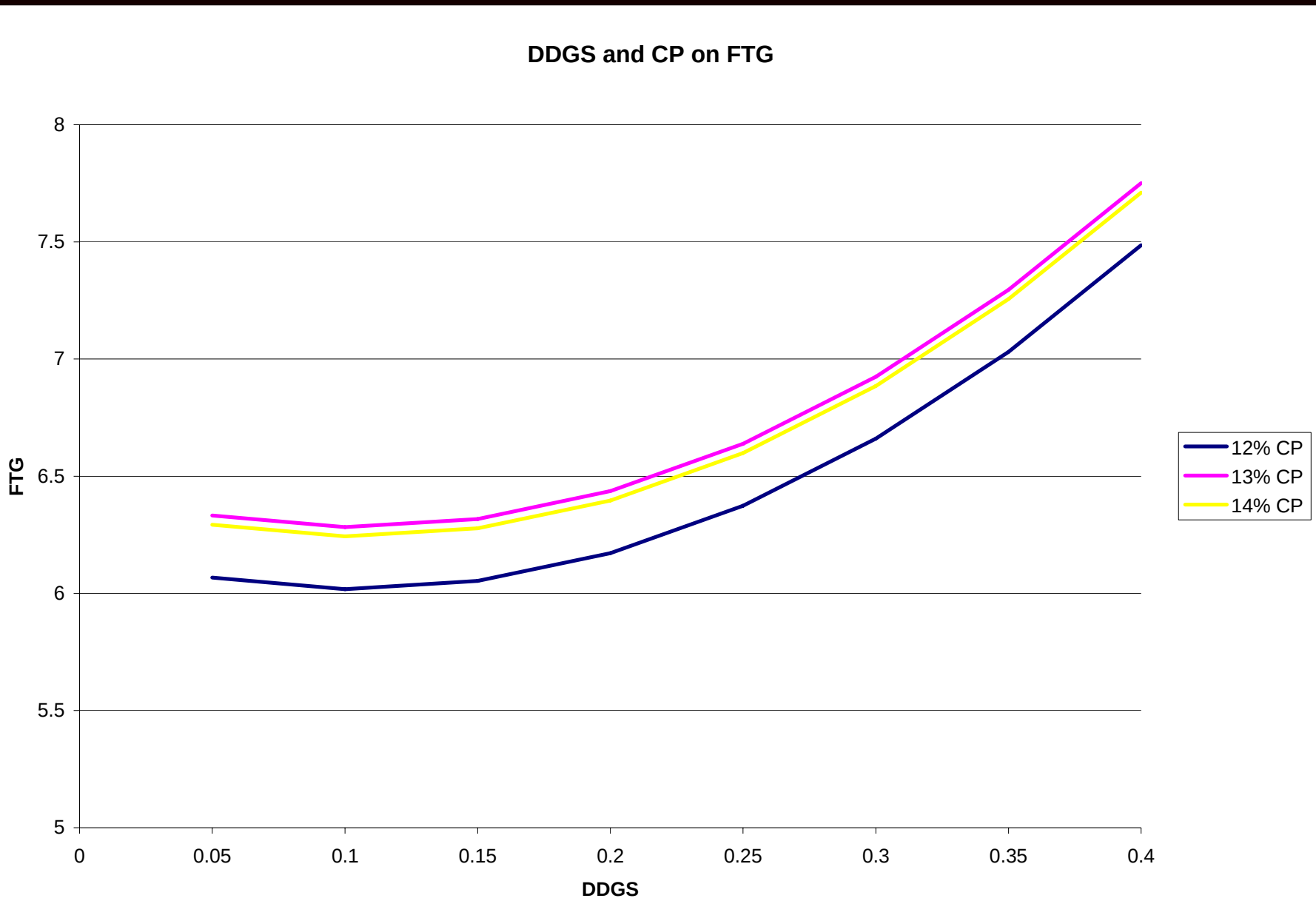
- **Focus of most of the DDGS and WDGS work**
  - No complications with composition of gain
  - Typically require lower fiber and CP concentrations
- **Variable**
  - Crude protein sources
  - Crude protein concentrations
  - Age and/or weight at feedlot entry

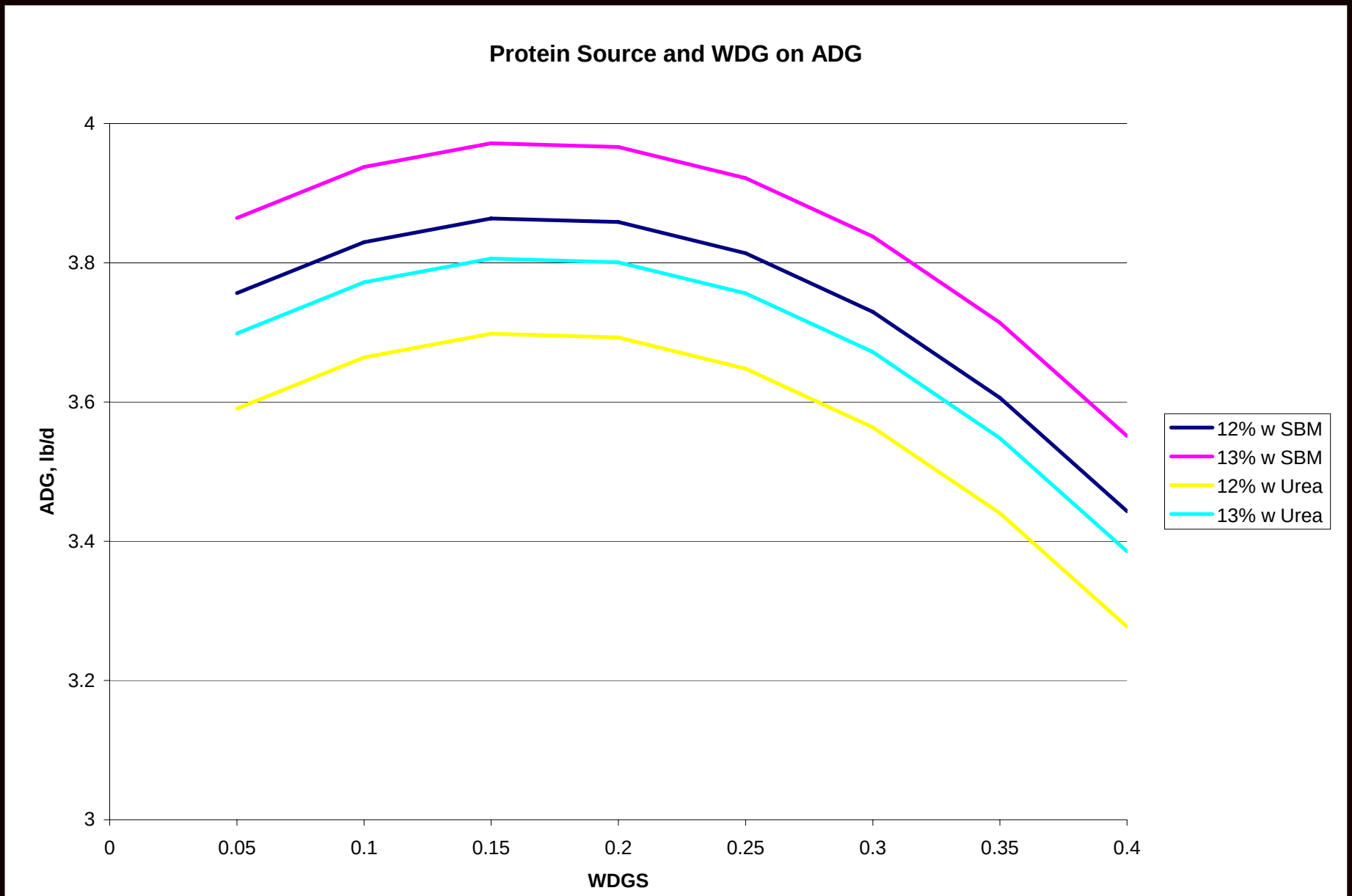
Research

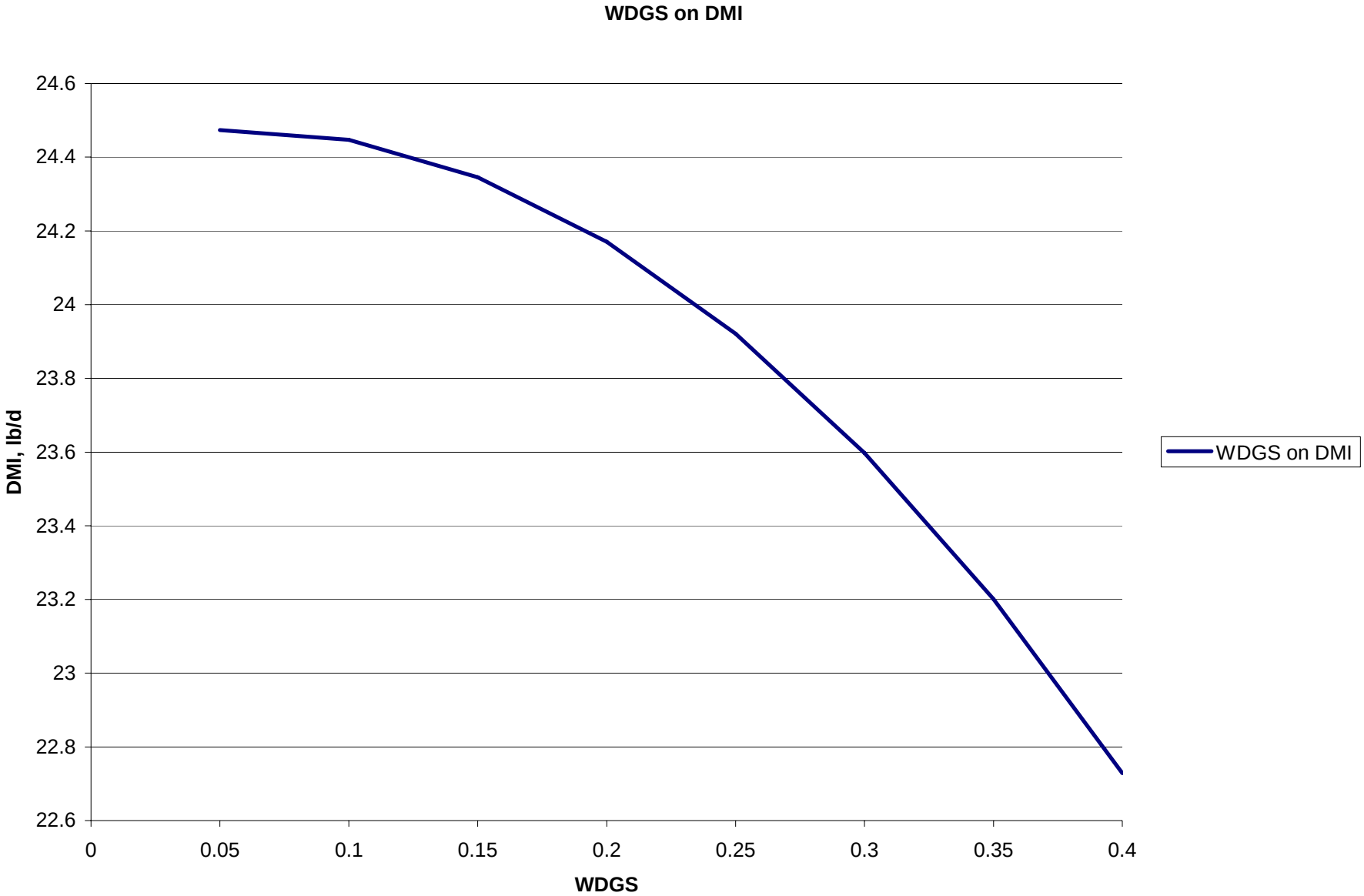
- Data from studies conducted since 1990
- 264 pens housing 1,541 head of cattle
- 796 lb (361 kg) initial weight
- NE, IA, KS, SD

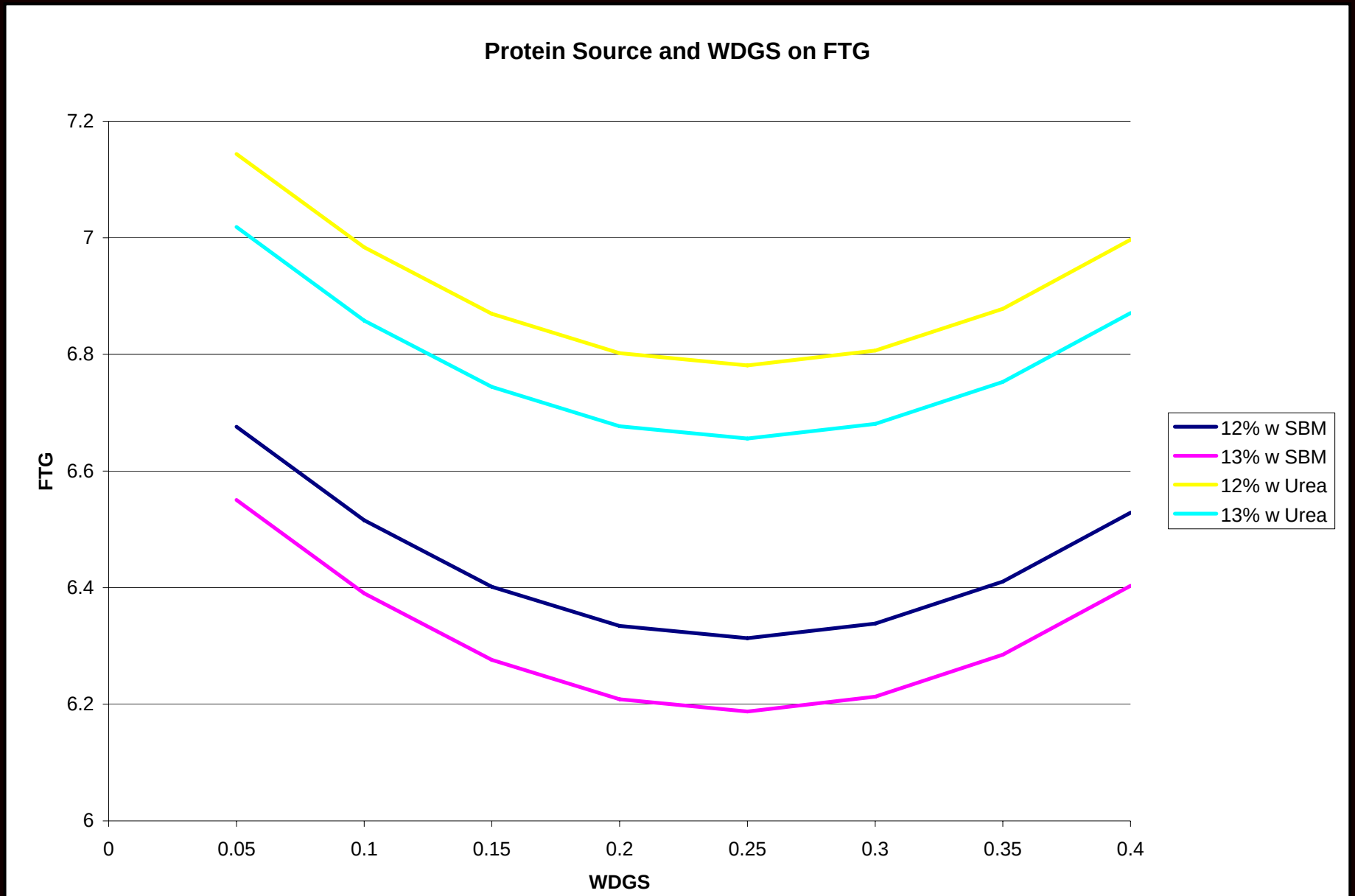

DDGS on ADG
3.88
3.86
3.84
3.82
3.8
3.78
3.76
3.74
ADG, lb/d
0
0.05
0.1
0.15
0.2
0.25
0.3
0.35
0.4
DDGS


DDGS and CP on DMI
25
24.5
24
23.5
23
22.5
22
21.5
DMI, lb/d
0
0.05
0.1
0.15
0.2
0.25
0.3
0.35
0.4
0.45
DDGS
12% CP
13% CP
14% CP


DDGS and CP on FTG
8
7.5
7
6.5
6
5.5
5
FTG
0
0.05
0.1
0.15
0.2
0.25
0.3
0.35
0.4
DDGS
12% CP
13% CP
14% CP


Protein Source and WDG on ADG
ADG, lb/d
4
3.8
3.6
3.4
3.2
3
0
0.05
0.1
0.15
0.2
0.25
0.3
0.35
0.4
WDGS
12% w SBM
13% w SBM
12% w Urea
13% w Urea


WDGS on DMI
24.6
24.4
24.2
24
23.8
23.6
23.4
23.2
23
22.8
22.6
DMI, lb/d
0
0.05
0.1
0.15
0.2
0.25
0.3
0.35
0.4
WDGS
WDGS on DMI


Protein Source and WDGS on FTG
7.2
7
6.8
6.6
6.4
6.2
6
FTG
0
0.05
0.1
0.15
0.2
0.25
0.3
0.35
0.4
WDGS
12% w SBM
13% w SBM
12% w Urea
13% w Urea

Recommendations

- Feed between 25% and 30% DDGS for enhanced gain
- Intake response is linear, and greater at lower dietary CP
- Feed 10% DDGS for enhanced feed conversion
- Feed conversion response is greater at lower dietary CP

Thank You!