

DDGS
IN POULTRY DIETS

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Considerations in Feeding DDGS to Poultry

- Diet levels (how high?)
- Amino acid balance
- Amino acid digestibility
- Product quality and variability
- Metabolizable energy content
- Phosphorus availability
- Cost in relation to other ingredients

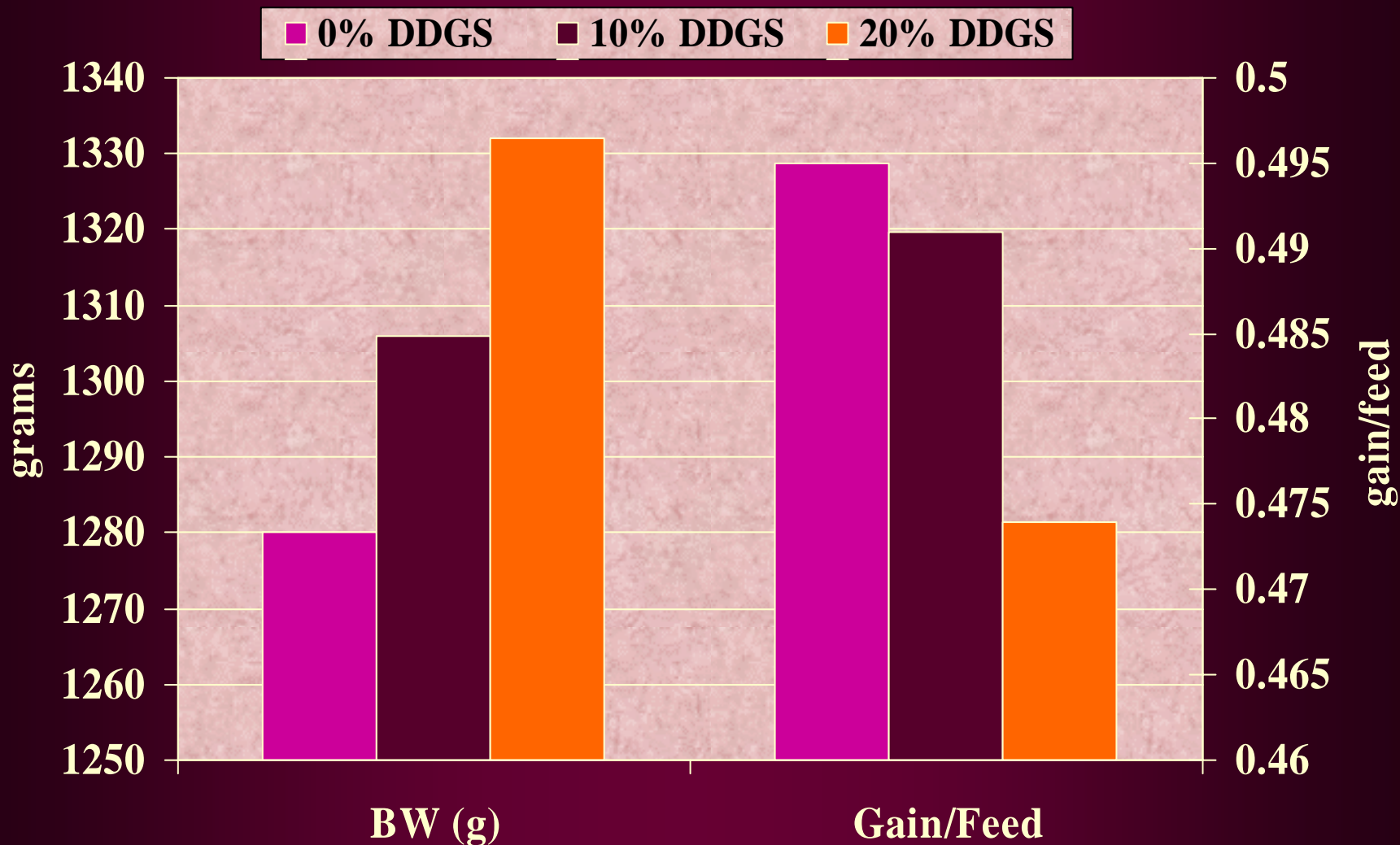
Use of DDGS in Poultry Diets

- **Source - Unidentified Growth Factor**
 - Low levels of inclusion (LT 5%)
 - Enhancement of growth or reproduction
 - Feed intake or palatability effect
- **Protein supplement**
 - Higher levels of inclusion

Growth or Hatchability Factor

- **Growth response (Couch et al., 1957)**
 - 5% DDGS in turkey diets
 - 17-32% improvement in gain
- **Feed preference (Alenier & Combs, 1981)**
 - 10% DDGS in chicken layer diets
- **Reproduction improvement (Manley, 1978)**
 - 3% DDGS in turkey breeder hen diets
 - improvement in egg numbers and hatch (late lay)

Turkey Poults 8 Weeks, Potter 1966



As Protein Supplement

- **Amino acid balance & variability**
- **Amino acid digestibility**
- **Diet energy adjustment**

Ingredient Amino Acids (% of Protein)

AA	SBM	Corn	MBM	Canola	DDGS
M+C	3.0	4.6	2.4	4.3	4.2
Lys	6.2	3.0	5.4	5.5	2.8
Iso	4.3	3.2	3.0	3.6	3.6
Arg	7.2	5.0	6.7	6.0	4.4
Tryp	1.5	0.9	0.7	1.5	0.8
Thr	4.0	3.5	3.2	4.2	3.8
Val	4.6	4.8	3.8	4.8	4.8

Variability - DDGS

Amino Acids (Shurson,2000)

- Lysine
 - Ave .85 with range of .72-1% (DM basis)
 - C.V. 17%
- Methionine
 - Ave .55 with range of .49-.65% (DM basis)
 - C.V. 14%

As Protein Supplement

- Limiting amino acids (Parsons et al., 1983)
 - Lys
 - Tryp
 - Arg (perhaps equally limiting with trypt)

As Protein Supplement

- **Amino acid digestibility**
 - **Heating**

Lysine Availability (%)

Source	Lysine Bioavail.	Lysine Digest.
Combs & Bossard (1969)	71-93	----
Parsons (1983)	66	82
Heartland (1998)	----	57

As Protein Supplement

- **Lys and energy adjustments with inclusion**
 - **growth**
 - **feed conversion**

***Performance Response of Broiler Chickens (0-42 days)
to DDGS in Diets Adjusted and Not Adjusted for Energy***

DDGS Inclusion Level (%)	BW (g)		Gain/Feed	
	Fixed Energy	Variable Energy	Fixed Energy	Variable Energy
0	1288	1206	.513	.493
5	1237	1227	.518	.505
10	1237	1203	.508	.490
15	1220	1165	.513	.444*
20	1246	1164	.498	.467
25	1247	1096*	.500	.446*

*** Different from control**

Why Conduct Research on DDGS?

- **Limited current information on use for turkey growth and meat yield**
- **Limited information on current DDGS**

Poultry Production Changes

- Intensive genetic selection for growth (28# tom at 20 wks vs 40# at 20 wks)
- Marketing of turkey meat products vs traditional RTC
- Targeted feed formulation - growth, meat, environment

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Recent Research in Turkey Nutrition

- Study 1
 - “High” DDGs inclusion level in combination with canola meal
 - Potential limitation of tryp and arg
- Study 2
 - Diet protein reduction
 - Potential limitation of thr

Study 1. Specific Experimental Objectives

- **Determine if significant inclusion of canola and DDGS affects turkey meat yield**
- **Determine potential for limiting amino acids other than lysine and methionine**
- **Determine amino acid digestibility of DDGS and other alternative ingredients**

Methods/Measurements

- Trial 5-20 wks
- 70 turkeys/trt
- Weights & feed intakes at 8, 11, 14, 17 and 19 wks of age
- Carcass and Meat yield

Methods Continued

- **Treatments**
 - **1. Control - corn, SBM, MBM**
 - **2. As 1 plus DDGS**
 - **3. As 1 plus canola**
 - **4. As 1 plus DDGS and canola**
 - **5. As 4 plus tryp to Trt 1**
 - **6. As 4 plus tryp, iso to Trt 1**
 - **7. As 4 plus tryp, iso, arg to Trt 1**

Ingredient Analyses

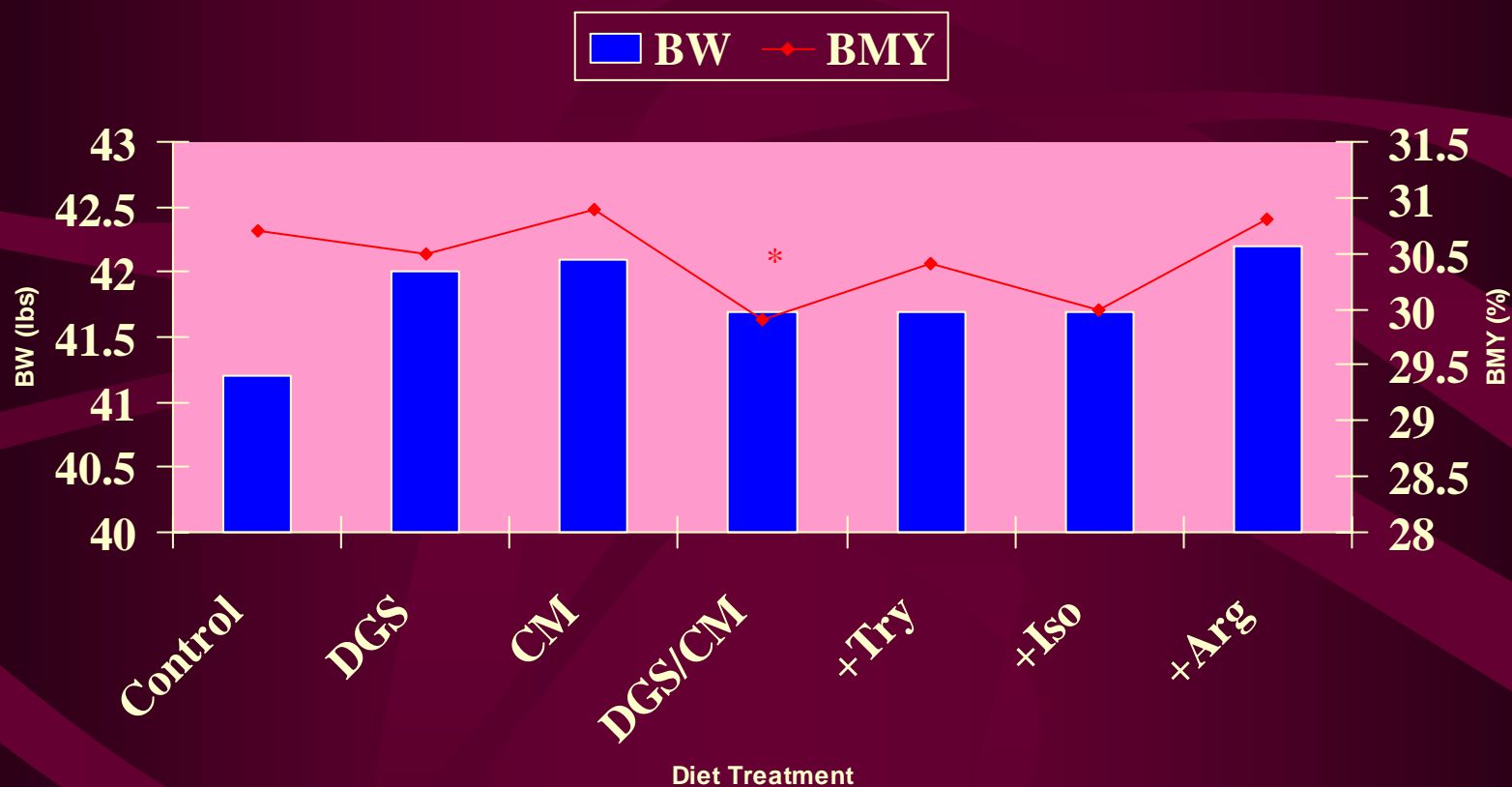
Nutrient	Corn	SBM	MBM	Canola	DDGS
Protein	7.56	46.77 [%]	58.11	37.12	26.39
Fat	4.67	2.31	11.37	3.45	11.51
Fiber	1.70	2.47	.51	10.15	6.17
Met	.15	.63	.99	.65	.49
Cys	.16	.64	.53	.77	.53
Lys	.22	2.69	2.99	1.71	.81
Tryp	.05	.60	.47	.45	.24
Val	.36	2.03	2.19	1.48	1.36
Thr	.24	1.50	1.81	1.23	1.00
Iso	.25	1.93	1.73	1.16	.96

Amino Acid Digestibility (% of total)

AA	Corn	SBM	MBM	DDGS	Canola
	----- % -----				
Met	97.9	94.3	92.3	88.5	90.2
Cys	88.2	-----	84.7	78.4	79.7
Lys	86.2	91.8	90.3	78.6	84.2
Arg	96.1	93.5	94.0	92.5	92.7
Tryp	96.8	93.7	95.1	91.8	98.4
Thr	81.1	84.3	90.1	82.5	81.5
Iso	86.4	90.9	92.2	89.1	85.8
Val	93.3	89.4	90.2	88.1	83.5

2000-2001 Studies

Alternative Ingredients and Amino Acids



Summary

- **Digestibility of DDGS quite improved from book values**
- **Inclusion of 12-8% canola *or* DDGS had no effect on weight or feed conversion**
- **Inclusion of both canola and DDGS resulted in a slight depression in breast meat yield - recovered with tryptophan addition**

Study 2. Specific Experimental Objectives

- Objective - examine response to threonine in diets with adequate and lowered diet CP and, in diets with and without DDGS
- Factorial Experimental Design
 - Diet protein (thr at 90, 95 & 100% NRC)
 - Diet Type (corn-soy-PBM with and without DDGS)
 - Threonine supplementation at 10% of NRC

Study 2. Preliminary Results - Turkey Performance

Dietary Treatment	Body weight at 19 wks (lbs)	F/G 5-19 wks
1. Corn-soy-meat, 100% NRC thr	42.4	2.62
2. As 1, 95% NRC thr	42.5	2.62
3. As 1, 90% NRC thr	41.5	2.66
4. As 1 with DDGs	42.5	2.64
5. As 2 with DDGs	42.4	2.65
6. As 3 with DDGs	42.0	2.66

Study 2. Preliminary Results

Live Performance

- Inclusion of DDGS (11-8%) resulted in similar performance to control
- Performance reduced in diets formulated to 90% NRC thr

Comparison of DDGS Total Amino Acids (Digestible)

%	Study 1	Study 2
CP	26.4	27.8
Met	.49(.43)	.51(.44)
Cys	.53(.42)	.49(.32)
Lys	.81(.64)	.72(.46)
Thr	1(.82)	1.03(.75)
Tryp	.24(.19)	.2(.16)

Table 3. Influence of formulation basis and poultry diet type on value of DDGs (\$/ton)¹.

	Total Amino Acids	Digestible Amino Acids
Broiler Starter	93.40	84.30
Broiler Finisher	93.39	84.30
Turkey Starter	82.15	75.49
Turkey Finisher	82.15	75.49
Egg Layer Developer	102.74	95.54
Egg Layer - Peak	92.63	75.49

¹From Jackson, 2002.

Influence of digestible lysine on value of DDGs (\$/cwt)

Ingred/\$ cwt	Low dAA	High dAA
Corn, 3.10	4.28	4.78
Corn, 3.50	4.54	5.00
Corn, 5.30	5.70	6.02
SBM, 8.25	4.54	5.00
SBM, 8.70	4.72	5.21

Summary

Inclusion of DDGS

- Broilers and Turkeys
 - 5-10% Inclusion rates (Starter/Finisher)
 - > 10%
 - Amino acids - lys, met, thr, tryp
 - Energy adjustments
- Chicken Egg Layers
 - 10% Inclusion levels

DDGs in Poultry Diets

- Practicality??
- Nutrient Value
- Pricing

Acknowledgments- Research

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