# CARCASS TRAITS OF PIGS FED WITH DDGS-ENRICHED DIETS

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## I. INTRODUCTION

In the current global population scenario and, especially in the future, the rational use of resources and the maximum utilization of agro-industrial waste are becoming essential. As one of the largest producers and exporters of products from various vegetable crops and animal origin proteins, Brazil faces increasing pressure to seek the best possible alternatives to minimize environmental and social costs throughout all production cycles. Due to its volume and nutritional characteristics, distiller's dried grains with solubles (DDGS) have been commonly used in the U.S. as feedstuff for pigs and cattle. Since this practice is not yet common in South America, we evaluated the effects of increasing levels of DDGS in corn/soybean meal-based diets on pig carcass characteristics.

## II. MATERIALS AND METHODS

The study registered under FZEA CEUA nº 6260270223 involved 500 piglets (250 gilts and 250 immunocastrated males) on a commercial farm, with an average age of 23 days and weight of 6.5 kg at the trial start, which were distributed in randomized blocks according to sexual condition and initial weight. Five treatments were administered to ten replicate pens, each with ten animals, over a 147-day experimental period, covering the nursery, growing, and finishing phases. For T1, DDGS was not included (T1: 0%) in the corn/soybean meal-based diet. For T2 to T5, DDGS was included from 14 days and maintained until the trial's end, replacing corn and soybean meal in the isoenergetic diets, according to the following proportions: T2: 10%; T3: 20%; T4: 30%; and T5: 40%. To evaluate carcass traits variables, two pigs weighing closest to the average weight of the pen, per experimental unit, were slaughtered. After weighing the hot carcasses, it went through a pork carcass typing probe (Hennessy© Grading Systems GP4/BP4, DIDAI), the loin depth, the backfat thickness, and the lean meat content in the carcass were evaluated at the height of the last rib, six centimeters from the carcasses midline cut. Subsequently, the carcasses were cooled for 24 hours and then weighed again. The effect of treatments was analyzed using regression with the REG procedure. Data were subjected to linear and quadratic regression analyses to determine the optimal level of DDGS inclusion. Differences between mean values were considered statistically significant at $P < 0.05$.

## III. RESULTS AND DISCUSSION

Table 1 presents the carcass traits. With increasing DDGS inclusion, a decreasing linear effect was observed on final live weight ($P < 0.0001$), hot carcass weight ($P < 0.0001$), cold carcass weight ($P < 0.0001$) and backfat thickness ($P = 0.042$). Although there was a decrease in backfat thickness, no differences were observed for loin depth or the carcass yield variables. The high neutral detergent fiber (NDF) content in DDGS may explain the weight differences between animals, as fiber increases intestinal thickness, weight and filling [1], potentially affecting yield due to reduced carcass weight during evisceration. However, these differences were not observed in this study. The changes observed are attributed to pigs receiving diets with higher DDGS inclusions becoming lighter at the end of the finishing phase, possibly due to lower daily weight gain, as indicated by previous studies. The high NDF content in DDGS can also impair digestibility [2], leading to a lighter final live weight.

Given that muscle and body weight gains are more pronounced as the finishing phase progresses [3], researchers have suggested including DDGS in the early periods of this phase and transitioning to a low-fiber diet as the finishing phase progresses to reduce undesirable carcass results [4].

Table 1 – Effects of experimental treatments on carcass traits

| Traits | Treatments (DDGS inclusion, replacing corn/soybean meal) | | | | | SEM | P value | |
|---|---|---|---|---|---|---|---|---|
| | T1 (0%) | T2 (10%) | T3 (20%) | T4 (30%) | T5 (40%) | | Linear | Quadratic |
| FLW[1], kg | 130.6 | 130.3 | 127.6 | 126.8 | 123.1 | 2.28 | **<0.0001** | 0.195 |
| HCW[2], kg | 93.97 | 93.47 | 91.55 | 90.67 | 87.51 | 1.34 | **<0.0001** | 0.216 |
| HCY, % | 71.74 | 71.72 | 71.73 | 71.51 | 71.04 | 0.53 | 0.160 | 0.414 |
| CCW[3], kg | 91.61 | 91.00 | 90.15 | 88.48 | 85.17 | 1.44 | **<0.0001** | 0.063 |
| CCY, % | 69.94 | 69.84 | 70.27 | 69.79 | 69.14 | 0.47 | 0.137 | 0.276 |
| WLDC, % | 2.50 | 2.82 | 2.03 | 2.40 | 2.67 | 0.32 | 0.976 | 0.995 |
| LD, mm | 60.56 | 59.96 | 59.30 | 60.24 | 56.80 | 1.69 | 0.231 | 0.730 |
| BT[4], mm | 14.03 | 14.80 | 13.74 | 14.24 | 12.72 | 1.22 | **0.042** | 0.125 |
| LM, % | 57.41 | 56.80 | 57.41 | 57.21 | 57.71 | 0.84 | 0.472 | 0.409 |

SEM: standard error of the mean; FLW: final live weight; HCW: hot carcass weight; HCY: hot carcass yield; CCW: cold carcass weight; CCY: cold carcass yield; WLDC: weight loss during chilling; LD: loin depth; BT: backfat thickness; LM: lean meat content in the carcass. [1]Significant linear regression: $y = 131.38 - 0.1852\ x$, $R^2 = 0.9221$; [2]Significant linear regression: $y = 94.5953 - 0.1579x$, $R^2 = 0.9302$; [3]Significant linear regression: $y = 92.3855 - 0.1549x$, $R^2 = 0.8892$; [4]Significant linear regression: $y = 14.5569 - 0.03230x$, $R^2 = 0.4285$.

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## IV. CONCLUSION

An increasing incorporation of DDGS in pig diets has negatively impacted weight-related carcass traits. While DDGS is being tested for potential benefits, such as reduced cost or other sustainability aspects, its high-dose use in pig diets compromises important carcass traits, adversely affecting productivity.

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