

# Defining the Feeding Value of Moldy Corn Selected for Low Mycotoxin Content

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### Summary and Implications

Cool, wet conditions during the 2009 growing season resulted in mold infestation of corn before it was mature. This experiment determined the total tract digestibility of energy and dry matter in 7 corn samples, selected for the presence of mold by with low mycotoxin content (< 1.0 ppm DON). Sixteen finishing barrows weighing an average of 99 kg were housed individually and fed experimental diets contained 96.9% of the corn sample. Pigs were fed twice a day for 3 feeding periods of 14 days each. Corn test weight, kernel damage and mold count all varied among sources ( $P < 0.001$ ) and there were also differences in DM and GE digestibility for the most compromised corn sources. We concluded that mold infestation may negatively affect the feeding value of corn. Therefore, the practice of blending moldy corn with clean corn may adversely affect its feeding value for pigs.

### Introduction

Cool, wet conditions during the 2009 growing season resulted in mold infestation of the crop before it was mature. Traditionally, in trade, corn quality is gauged using five main parameters: moisture, test weight, protein percentage, storage life and damage. However, this does not provide much useful information as it relates to feeding value of moldy corn for swine. As a result, there is a need to understand the effect of mold contamination as distinct from mycotoxins on corn. Digestibility of energy and amino acids is essential information that is needed to most effectively utilize moldy corn in swine diets

### Materials and Methods

This experiment determined the total tract digestibility of energy and dry matter in 7 moldy corn samples, selected for low mycotoxin content (< 1.0 ppm DON). An 8<sup>th</sup> corn sample free of mold was used as the positive control. To

ensure that the clean corn sample was representative of good quality corn, this 8<sup>th</sup> sample was produced by blending 3 good quality corn samples, based on bushel weight, moisture level and other physical criteria. Sixteen finishing barrows weighing an average of 99 kg were housed individually and fed experimental diets contained 96.9% of the corn sample plus minerals, vitamins and chromic oxide. Pigs were fed twice a day for 3 feeding periods of 14 days each. Pigs were randomly assigned to dietary treatment within each period, except a pig could not be on the same treatment twice. Fecal grab samples were collected twice a day on days 7 and 8, following the introduction of the experimental diet and then placed on a standard grower diet for 4 days prior to initiating another collection period. Corn sources were analyzed for physical characteristics and diets and fecal samples were analyzed for dry matter, gross energy and chromic oxide. Data were analyzed using the GLIMMIX procedure of SAS (SAS Inst. Inc., Cary, NC).

### Results and Discussion

There were significant differences among the corn samples, in terms of test weight, percent kernel damage and mold count ( $P < 0.001$ ). The A number of the corn samples had bushel weights between 53 and 56 lb; samples with the highest mold count had the lowest bushel weights. The control corn had only 2.9% damaged kernels, while the moldy corn samples ranged from 9 to 66% damaged kernels. Mold count in the corn sample was 150,000 colony forming units (CFU) per gram, but the visibly moldy corn ranged from 110,000 to 61,120,000 CFU/g.

There were also differences in DM and GE digestibility ( $P < 0.01$ ). Dry matter and energy digestibility were highest in the control corn. The moldy corn samples ranged from 85.2 to 87.7% dry matter digestibility, compared to 89% in the control corn. The moldy corn samples ranged in energy digestibility from 83.1 to 86.2%, while the energy digestibility of the control corn was 87.7%. However, the lowest digestibilities were not necessarily associated with the highest mold country.

We concluded that mold infestation may negatively affect the feeding value of corn. The low energy digestibility of some of the moldy corn samples would result in economically important reductions in feed efficiency and possibly in growth rate. Therefore, particular diligence needs to be paid to mold contamination when purchasing corn. Buyers of corn should know if blending of clean and moldy corn has occurred, as this too could affect the feeding value of apparently normal corn.

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**Table 1. Physical characteristics and effects of moldy corn on the DM and GE digestibility of diets for growing pigs**

	Control	B	C	D	E	F	G	H	Pooled SEM	<i>P</i> =
Corn										
Test weight, lbs/bu	55	52.1	48.3	44.9	56.1	55.9	53.2	53.2	0.49	< 0.0001
Total kernel damage, %	2.9	25.8	65.8	60.6	26.7	14.5	9.4	33.6	4.12	< 0.0001
Mold count, CFU/g × 10 <sup>4</sup>	15	108	6,112	2,992	197	35	11	31	237.2	< 0.0001
Digestibility, %										
Dry matter	89	87.1	86.7	85.2	87.7	87	85.6	86.3	0.63	0.002
Gross energy	87.7	85.1	85	83.12	86.2	85.4	83.4	84.7	0.76	0.002