

## Effects of corn co-products on gaseous emissions from swine

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## Interest in corn co-products

- Availability
- Price
- Concentration of nutrients
- Pre-processing

## Processing

- Dry corn milling
- Wet corn milling
- Degermination

## Fiber and emissions

- Shifts route of excretion of N
  - More fecal N, less urinary N
  - Fecal N less volatile

## Fiber

- Germ contributes to fiber

DDC < Corn  
CGM, DDGS > Corn

## Objective

- Quantify air emissions when pigs are fed corn and corn co-product diets

## Zumwalt air emissions laboratory



## Dietary treatments

- Corn
- Corn germ
- DDGS
- Dehulled de



## Feeding phases

- 6 feeding phases (40 to 270 lbs)
- Co-products included at 5, 10, 15, 20, 25, 30% as phases progressed

## Animal performance

- Body weights
- Feed intake
- Manure volume and composition



## Odorant concentrations



## Emissions

- N emissions
- S emissions
- VOC
- Methane



## Animal performance

- No diet effects
  - Weight gain (199 lbs)
  - Feed intake (625 lb feed)
  - Feed conversion (0.32 lb gain per lb feed)

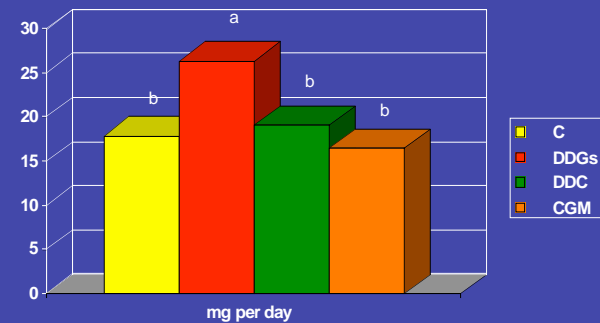
## Manure characteristics

	Mass, kg wet weight	Total N, % (wet basis)	Ammonium N, % (wet basis)
Corn	613	0.43	0.25 <sup>a</sup>
DDC	615	0.47	0.27 <sup>b</sup>
CGM	604	0.44	0.24 <sup>a</sup>
DDGs	680	0.44	0.28 <sup>b</sup>
P =			
Diet	0.234	0.219	0.009

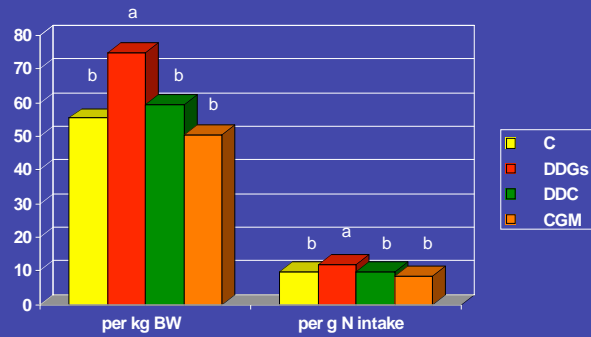
## Odorant concentrations

- Greater for CGM diets
  - Short chain fatty acids, phenols
- Different fermentation??
- Odor differences?

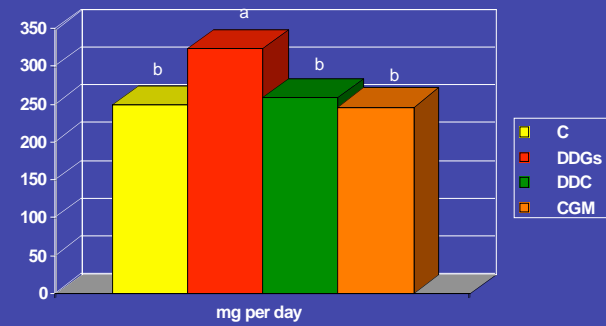
## Ammonia emissions, mg per d



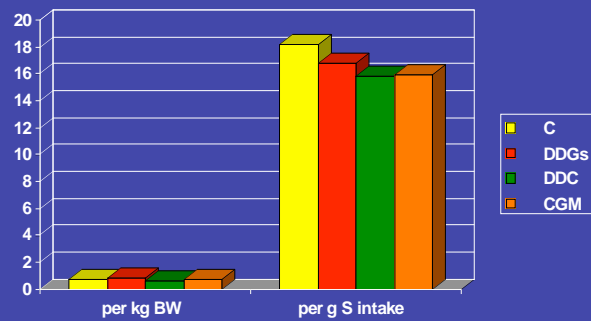
### Ammonia emissions Daily emissions, mg



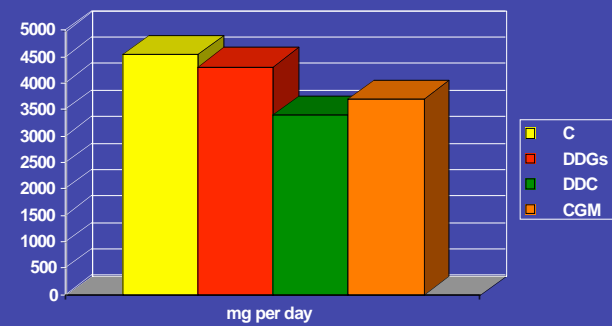
### Hydrogen sulfide emissions, mg per d



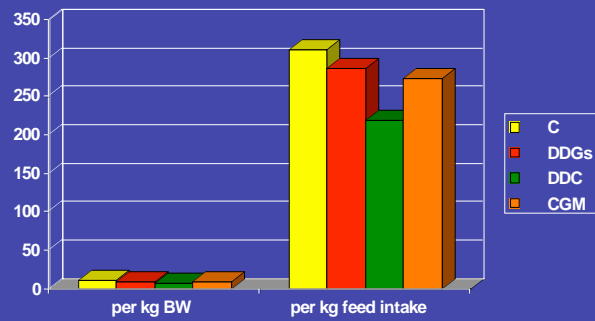
### Hydrogen sulfide emissions Daily emissions, mg



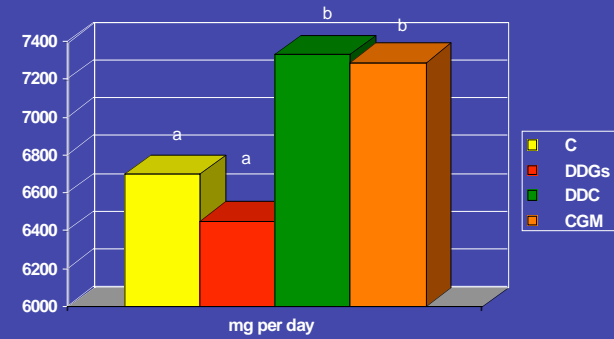
### VOC emissions, mg per d



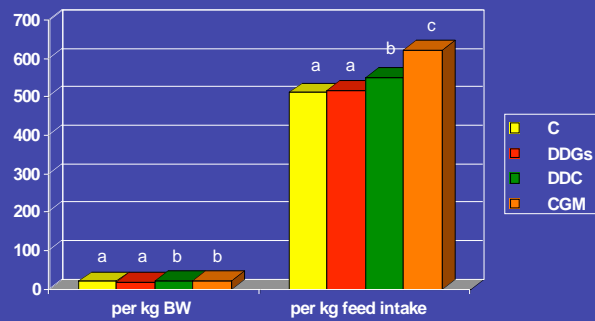
### VOC emissions Daily emissions, mg



### Methane emissions, mg per d



### Methane emissions Daily emissions, mg



### Conclusions

- Corn co-products (dietary fiber) did not affect pig performance
- Manure mass was not different as a result of dietary fiber
- Emissions largely a function of nutrient intake and availability
  - S
  - N

## Conclusions

- Need to formulate for nutrient content appropriately
  - N
  - S
- Does diet modification provide carbon credit opportunities?

## Thank you!

- National Pork Board funding
- Sarah Zamzow – project manager
- Martha Jeffrey – laboratory analyses