The Utilization of Corn DDGS in Swine Rations. Some "reminders"

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Corn distillers dried grains with solubles (DDGS) is an ingredient that has been successfully incorporated into swine diets for many years. The following is an update on some recent research with this ingredient, plus some "tips" or reminders when incorporating corn DDGS into swine rations.

Current estimates for a US corn crop that may be one of the largest on record (USDA Feed outlook, Sept 2021) plus a continuing demand for bioethanol ensures a continuing supply of corn DDGS. The nutrient content of corn DDGS can be variable, primarily dependent upon the corn used (especially if one of the new high protein varieties) and the residual oil content in the DDGS. It is estimated that the majority of bioethanol plants are utilizing some post-processing to extract the oil from the DDGS. The NRC (2012, swine) lists corn DDGS with either >10%, 6 to 9% or < 4% oil. The starch content increases from ~ 6 % to 10% as the oil decreases. The crude protein and total lysine content were similar, regardless of oil content and approximately 3 times that of corn. While these numbers are reasonable estimates, they are based upon the limited data available at that time and do not provide reliable information on nutrient (energy and amino acid) availability.

The energy content of corn DDGS is affected by the content of fat, fibre, starch and protein. Shurson and co-workers (2018) collected 15 samples of corn DDGS from the midwestern US and found that the ME content ranged from 3,280 to 3,700 kcal ME/kg. Surprisingly, the energy content was not well correlated with the oil or starch content. Recent estimates of the NE content of corn DDGS are about 2,200 kcal NE/kg (Shurson 2019) while others (Cemin et al. 2019) estimated that high protein corn DDGS had about 2680 kcal/kg "productive energy" (comparable to NE), or very close to the energy content of corn. Variability in the energy content of corn DDGS does make it difficult to accurately gauge its value and incorporate it into diets. It is recommended that producers work with their nutritionist and suppliers to obtain a consistent product and monitor performance carefully when introducing corn DDGS into the ration. If growth or feed conversion worsens, the energy content of the DDGS was overestimated, resulting in a diet that contained less energy than estimated.

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Similar to other nutrients, the precent standardized ileal digestible amino acids is concentrated in corn DDGS approximately 3 times, relative to corn. It has been suggested that lysine should be at least 2.8 % of crude protein, as lower values indicate heat damage (Stein 2007). However, the quality of DDGS has improved greatly and recent work indicates that heat damage is less of an issue (Espinosa et al. 2019). Current evidence indicates that up to 30% corn DDGS can be included in the diet of growing pigs provided that diets are

balanced using NE and SID amino acids. The THR:LYS ratio should be increased to 0.61 or greater. The high fibre content limits the inclusion of corn DDGS to newly weaned piglets; 5% is suggested as the maximum in stage 1 diets. This may increase to 10 or 15% in later stages in the nursery but growth and feed conversion should be monitored. In contrast, the high fibre contents makes this an ideal ingredient to be included in the diet of the gestating sow, up to 40% is suggested.

Some producers who haven't used corn DDGS for several years may remember the previous issues with pork fat quality, storage, and mycotoxins. The reduced oil DDGS has improved storage and handling characteristics, and has alleviated the pork fat quality issues. Mycotoxins can always be a problem, as they will be concentrated in DDGS, relative to what was observed in the corn. However, according to the recent US Corn Harvest Quality report, greater than 98% of samples tested from the 2020 crop year had very low levels of deoxynivalenol, aflatoxins and fumonisin.

In conclusion, corn DDGS can be a very attractive addition to our ingredient "toolbox". The energy content is variable. Producers can determine if energy content has been overestimated by monitoring feed conversion numbers.