



Swine diets in the U.S. industry for LCA footprint analysis

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According to the Institute for Feed Education and Research (IFEEDER), over 61 million ton of feed were used to feed pigs in the U.S. during 2024. The major ingredients used were corn (65.7%), soybean meal (SBM; 10.0%), corn distillers grains (DDGS; 9.6%), wheat middlings (3.3%), wheat (1.9%), and hominy feed (1.7%). The remaining 7.6% of the total included 25 different ingredients, such as amino acids, minerals, fat, and animal and plant by-products (Table 1).

The detailed composition reported by IFEEDER provides a representative baseline that may be used in a Life Cycle Assessment of the entire U.S. swine industry. However, from a production standpoint, averages may not always reflect the most appropriate formulations used by individual producers. Swine diets vary considerably across stages of production; therefore, examples of sow (Table 2), nursery (Table 3), and finishing diets without (Table 4) or with fat (Table 5) are provided. Options are provided with and without DDGS. Average vitamin and trace mineral inclusion levels in U.S. swine diets can be determined from the review by Faccin et al. (2003).

Key Takeaways

Corn and SBM are the base of most swine diets in the U.S. Corn DDGS and fat are valuable tools that are strategically included based on production stage, ingredient economics, and desired performance outcomes. The diets presented here are average diets. Actual diets used would change depending on the specific conditions of each production system.

Table 1. Ingredient utilization in the U.S. swine industry according to IFEEDER-2024¹

| Ingredient | % |
|-------------------------------|---------|
| Corn | 65.71 |
| Soybean Meal | 9.97 |
| Corn DDGs | 9.58 |
| Wheat middlings | 3.31 |
| Wheat | 1.87 |
| Hominy feed | 1.72 |
| Limestone | 0.89 |
| Soybean Hulls | 0.87 |
| Barley | 0.86 |
| Wheat Flour | 0.83 |
| Sorghum | 0.68 |
| Inorganic phosphates | 0.58 |
| Choice white grease | 0.46 |
| Molasses | 0.41 |
| Rice mill Feed | 0.37 |
| Miscellaneous byproduct feeds | 0.32 |
| Salt | 0.31 |
| Poultry Byproduct Meal | 0.30 |
| Soybean Oil | 0.29 |
| Meat and Bone Meal | 0.20 |
| Lysine | 0.20 |
| Corn Gluten Feed | 0.14 |
| Threonine | 0.04 |
| DL-Met | 0.03 |
| Millet | 0.02 |
| Oats | 0.02 |
| Whey | 0.01 |
| Tryptophan | 0.01 |
| Rye | < 0.001 |
| Canola Meal | < 0.001 |
| Meat Meal | < 0.001 |
| Total | 100.00 |

¹ A total of 60,880,897 tons of ingredients were used in 2024 to feed pigs.

References

Faccin, J. E. G., M. D. Tokach, J. C. Woodworth, J. M. DeRouchey, J. T. Gebhardt, and R. D. Goodband. 2023. Industry survey of added vitamins and trace minerals in U.S. swine diets. *Transl. Anim. Sci.* 7(1):txad035. doi:10.1093/tas/txad035

Table 2. Sow diets (as-fed)¹

| Ingredients, % | Corn + SBM | | Corn + SBM + Corn DDGS | |
|---------------------------------|------------|-----------|------------------------|-----------|
| | Gestation | Lactation | Gestation | Lactation |
| Corn | 84.20 | 66.49 | 68.01 | 58.82 |
| Soybean Meal ² | 12.38 | 28.09 | 8.60 | 25.80 |
| Corn DDGS ² | --- | --- | 20.00 | 10.00 |
| Choice White Grease | --- | 2.00 | --- | 2.00 |
| Calcium carbonate | 0.71 | 0.81 | 0.71 | 0.81 |
| Calcium phosphate (monocalcium) | 1.45 | 1.20 | 1.45 | 1.20 |
| Sodium chloride | 0.50 | 0.50 | 0.50 | 0.50 |
| L-Lys-HCl | 0.15 | 0.25 | 0.18 | 0.28 |
| DL-Met | 0.01 | 0.04 | --- | --- |
| L-Thr | 0.08 | 0.09 | 0.03 | 0.07 |
| Phytase | 0.03 | 0.03 | 0.03 | 0.03 |
| VTM Premix (Gestation) | 0.50 | --- | 0.50 | --- |
| VTM Premix (Lactation) | --- | 0.50 | --- | 0.50 |
| Total | 100.00 | 100.00 | 100.00 | 100.00 |
| Calculated analysis | | | | |
| SID amino acids, % | | | | |
| Lys | 0.60 | 1.06 | 0.60 | 1.06 |
| Ile:Lys | 72 | 65 | 80 | 67 |
| Leu:Lys | 183 | 137 | 231 | 150 |
| Met:Lys | 35 | 29 | 41 | 27 |
| Met & Cys:Lys | 68 | 54 | 77 | 53 |
| Thr:Lys | 75 | 64 | 75 | 63 |
| Trp:Lys | 19 | 19 | 19 | 19 |
| Val:Lys | 84 | 71 | 98 | 74 |
| ME, kcal/lb | 1,486 | 1,525 | 1,488 | 1,526 |
| NE, kcal/lb | 1,141 | 1,142 | 1,121 | 1,133 |
| CP, % | 13.0 | 19.2 | 15.4 | 20.2 |
| Ca, % | 0.59 | 0.64 | 0.59 | 0.63 |
| P, % | 0.62 | 0.63 | 0.67 | 0.65 |
| STTDP, % | 0.50 | 0.49 | 0.55 | 0.51 |

¹ Diets designed for sows eating 4.6 and 15.0 lb/day in gestation and lactation, respectively.

² The protein for SBM was 47.7% and DDGS was assumed to contain 6 to 9% fat.

³ VTM Premix = Vitamin and trace mineral premix

Table 3. Nursery diets (as-fed)¹

| Ingredients, % | Corn + SBM | | | Corn + SBM + Corn DDGS | | |
|--------------------------------|------------|---------|---------|------------------------|---------|---------|
| | Phase 1 | Phase 2 | Phase 3 | Phase 1 | Phase 2 | Phase 3 |
| Corn | 44.68 | 56.64 | 66.87 | 39.79 | 50.52 | 57.02 |
| Soybean meal ² | 14.90 | 25.79 | 29.40 | 14.95 | 21.89 | 24.27 |
| Corn DDGS ² | | --- | --- | 5.00 | 10.00 | 15.00 |
| Blood Plasma | 2.50 | --- | --- | 2.50 | --- | --- |
| Vegetable protein ³ | 6.00 | 4.50 | --- | 6.00 | 4.50 | --- |
| Whey powder | 25.00 | --- | --- | 25.00 | --- | --- |
| Whey permeate | --- | 8.75 | --- | --- | 8.75 | --- |
| Choice white grease | 3.00 | --- | --- | 3.00 | --- | --- |
| Calcium carbonate | 0.70 | 0.75 | 0.75 | 0.70 | 0.80 | 0.85 |
| Monocalcium phosphate | 1.02 | 1.17 | 0.78 | 0.98 | 1.07 | 0.61 |
| Salt | 0.30 | 0.50 | 0.60 | 0.30 | 0.50 | 0.60 |
| L-Lys-HCl | 0.42 | 0.53 | 0.51 | 0.40 | 0.60 | 0.60 |
| DL-Met | 0.22 | 0.22 | 0.20 | 0.19 | 0.21 | 0.17 |
| L-Thr | 0.18 | 0.23 | 0.20 | 0.15 | 0.23 | 0.20 |
| L-Trp | 0.03 | 0.04 | 0.04 | 0.02 | 0.05 | 0.06 |
| L-Val | 0.12 | 0.15 | 0.13 | 0.09 | 0.14 | 0.11 |
| Vitamin premix | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 |
| Choline chloride 60% | 0.05 | --- | --- | 0.05 | --- | --- |
| Phytase | 0.07 | 0.07 | 0.07 | 0.07 | 0.07 | 0.07 |
| Zinc oxide | 0.38 | 0.25 | 0.03 | 0.38 | 0.25 | 0.03 |
| Copper sulfate | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 |
| Trace mineral Premix | 0.15 | 0.15 | 0.15 | 0.15 | 0.15 | 0.15 |
| Total | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| Calculated analysis | | | | | | |
| SID amino acids, % | | | | | | |
| Lys | 1.35 | 1.35 | 1.30 | 1.35 | 1.35 | 1.30 |
| Ile:Lys | 55 | 55 | 55 | 57 | 54 | 55 |
| Leu:Lys | 112 | 110 | 115 | 119 | 117 | 128 |
| Met:Lys | 35 | 36 | 36 | 34 | 37 | 36 |
| Met & Cys:Lys | 58 | 57 | 57 | 58 | 57 | 57 |
| Thr:Lys | 64 | 63 | 62 | 64 | 63 | 62 |
| Trp:Lys | 19 | 19 | 19 | 19 | 19 | 19 |
| Val:Lys | 70 | 70 | 70 | 70 | 70 | 70 |
| ME, kcal/lb | 1,573 | 1,499 | 1,492 | 1,573 | 1,502 | 1,495 |
| NE, kcal/lb | 1,192 | 1,112 | 1,106 | 1,185 | 1,108 | 1,098 |
| CP, % | 19.74 | 20.68 | 20.41 | 20.65 | 21.12 | 21.32 |
| Ca, % | 0.75 | 0.73 | 0.60 | 0.75 | 0.73 | 0.60 |
| P, % | 0.69 | 0.68 | 0.55 | 0.70 | 0.67 | 0.54 |
| STTD P, % | 0.62 | 0.56 | 0.43 | 0.63 | 0.56 | 0.43 |

¹ Diets are designed for a weight range of weaning to 15, 15 to 25, and 25 to 50 lb, with a feed budget of 3.5, 12.9, and 40.8 lb/pig for phases 1, 2, and 3 respectively.

² The protein for SBM was 47.7% and DDGS was assumed to contain 6 to 9% fat.

³ HP 300 (Hamlet Protein, Findlay, OH)

Table 4. Finishing diets (as-fed)¹

| Ingredients, % | Corn + SBM | | | | | Corn + SBM + DDGS | | | | |
|---------------------------|------------|---------|---------|---------|---------|-------------------|---------|---------|---------|---------|
| | Phase 1 | Phase 2 | Phase 3 | Phase 4 | Phase 5 | Phase 1 | Phase 2 | Phase 3 | Phase 4 | Phase 5 |
| Corn | 74.07 | 77.61 | 83.73 | 86.93 | 87.94 | 61.10 | 64.22 | 70.49 | 73.65 | 81.59 |
| Soybean Meal ² | 22.64 | 19.35 | 13.66 | 10.77 | 10.01 | 15.80 | 12.83 | 6.98 | 4.09 | 6.28 |
| Corn DDGS ² | --- | --- | --- | --- | --- | 20.00 | 20.00 | 20.00 | 20.00 | 10.00 |
| Calcium carbonate | 0.90 | 0.80 | 0.75 | 0.75 | 0.75 | 0.90 | 0.90 | 0.85 | 0.85 | 0.85 |
| Monocalcium phosphate | 0.69 | 0.73 | 0.54 | 0.35 | 0.22 | 0.46 | 0.50 | 0.31 | 0.14 | 0.11 |
| Sodium chloride | 0.50 | 0.40 | 0.40 | 0.40 | 0.40 | 0.50 | 0.40 | 0.40 | 0.40 | 0.40 |
| L-Lys-HCl | 0.47 | 0.44 | 0.40 | 0.38 | 0.36 | 0.59 | 0.55 | 0.52 | 0.49 | 0.43 |
| DL-Met | 0.13 | 0.10 | 0.05 | 0.04 | 0.02 | 0.09 | 0.06 | 0.01 | --- | 0.01 |
| L-Thr | 0.17 | 0.15 | 0.12 | 0.11 | 0.10 | 0.16 | 0.14 | 0.12 | 0.10 | 0.12 |
| L-Trp | 0.03 | 0.03 | 0.03 | 0.03 | 0.02 | 0.05 | 0.05 | 0.05 | 0.05 | 0.04 |
| L-Val | 0.08 | 0.06 | 0.04 | 0.02 | --- | 0.04 | 0.03 | --- | --- | --- |
| Vitamin premix | 0.15 | 0.15 | 0.13 | 0.10 | 0.08 | 0.15 | 0.15 | 0.13 | 0.10 | 0.08 |
| Phytase | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 |
| Trace mineral premix | 0.15 | 0.15 | 0.13 | 0.10 | 0.08 | 0.15 | 0.15 | 0.13 | 0.10 | 0.08 |
| Total | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| Calculated analysis | | | | | | | | | | |
| SID amino acids, % | | | | | | | | | | |
| Lys | 1.10 | 1.00 | 0.83 | 0.74 | 0.71 | 1.10 | 1.00 | 0.83 | 0.74 | 0.71 |
| Ile:Lys | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 55 |
| Leu:Lys | 122 | 126 | 137 | 144 | 148 | 142 | 149 | 164 | 175 | 163 |
| Met:Lys | 30 | 33 | 31 | 31 | 30 | 30 | 33 | 30 | 31 | 30 |
| Met & Cys:Lys | 56 | 56 | 56 | 57 | 57 | 56 | 56 | 56 | 58 | 58 |
| Thr:Lys | 62 | 62 | 62 | 63 | 63 | 62 | 62 | 62 | 63 | 65 |
| Trp:Lys | 18 | 19 | 19 | 18 | 18 | 18 | 19 | 18 | 19 | 19 |
| Val:Lys | 68 | 68 | 68 | 68 | 66 | 68 | 68 | 68 | 70 | 68 |
| ME, kcal/lb | 1,497 | 1,500 | 1,507 | 1,511 | 1,514 | 1,504 | 1,505 | 1,512 | 1,516 | 1,516 |
| NE, kcal/lb | 1,126 | 1,136 | 1,154 | 1,165 | 1,168 | 1,117 | 1,125 | 1,144 | 1,154 | 1,164 |
| CP, % | 17.63 | 16.28 | 13.97 | 12.80 | 12.47 | 18.84 | 17.60 | 15.23 | 14.07 | 12.98 |
| Ca, % | 0.60 | 0.56 | 0.48 | 0.43 | 0.40 | 0.55 | 0.55 | 0.47 | 0.42 | 0.41 |
| P, % | 0.50 | 0.50 | 0.43 | 0.38 | 0.35 | 0.49 | 0.49 | 0.42 | 0.37 | 0.34 |
| STTD P, % | 0.38 | 0.38 | 0.33 | 0.29 | 0.26 | 0.38 | 0.38 | 0.33 | 0.29 | 0.26 |

¹ Diets are designed for a weight range of 50 to 75, 75 to 140, 140 to 195, 195 to 240, and 240 to 287 lb, with a feed budget of 52, 161, 158, 150, and 134 lb/pig for phases 1, 2, 3, 4, and 5, respectively.

² The protein for SBM was 47.7% and DDGS was assumed to contain 6 to 9% fat.

Table 5. Finishing diets (as-fed)¹

| Ingredients, % | Corn + SBM + Fat | | | | | Corn + SBM + DDGS + Fat | | | | |
|---------------------------|------------------|---------|---------|---------|---------|-------------------------|---------|---------|---------|---------|
| | Phase 1 | Phase 2 | Phase 3 | Phase 4 | Phase 5 | Phase 1 | Phase 2 | Phase 3 | Phase 4 | Phase 5 |
| Corn | 68.65 | 72.38 | 78.84 | 82.23 | 83.29 | 55.80 | 59.38 | 65.60 | 68.78 | 77.14 |
| Soybean Meal ² | 25.05 | 21.54 | 15.52 | 12.44 | 11.61 | 18.07 | 14.62 | 8.85 | 5.95 | 7.73 |
| Corn DDGS ² | --- | --- | --- | --- | --- | 20.00 | 20.00 | 20.00 | 20.00 | 10.00 |
| Choice white grease | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 |
| Calcium carbonate | 0.90 | 0.80 | 0.75 | 0.75 | 0.75 | 0.90 | 0.90 | 0.85 | 0.85 | 0.85 |
| Monocalcium phosphate | 0.69 | 0.73 | 0.54 | 0.35 | 0.22 | 0.46 | 0.50 | 0.31 | 0.14 | 0.11 |
| Salt | 0.50 | 0.40 | 0.40 | 0.40 | 0.40 | 0.50 | 0.40 | 0.40 | 0.40 | 0.40 |
| L-Lys-HCl | 0.47 | 0.44 | 0.40 | 0.38 | 0.36 | 0.59 | 0.57 | 0.52 | 0.49 | 0.43 |
| DL-Met | 0.14 | 0.12 | 0.07 | 0.05 | 0.04 | 0.10 | 0.08 | 0.03 | --- | 0.01 |
| L-Thr | 0.17 | 0.16 | 0.13 | 0.12 | 0.11 | 0.17 | 0.15 | 0.12 | 0.11 | 0.11 |
| L-Trp | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.05 | 0.05 | 0.05 | 0.05 | 0.04 |
| L-Val | 0.09 | 0.07 | 0.05 | 0.03 | 0.03 | 0.05 | 0.04 | 0.01 | --- | 0.01 |
| Vitamin premix | 0.15 | 0.15 | 0.13 | 0.10 | 0.08 | 0.15 | 0.15 | 0.13 | 0.10 | 0.08 |
| Phytase | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 |
| Trace mineral premix | 0.15 | 0.15 | 0.13 | 0.10 | 0.08 | 0.15 | 0.15 | 0.13 | 0.10 | 0.08 |
| Total | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| Calculated analysis | | | | | | | | | | |
| SID amino acids, % | | | | | | | | | | |
| Lys | 1.15 | 1.05 | 0.87 | 0.78 | 0.74 | 1.15 | 1.05 | 0.87 | 0.78 | 0.74 |
| Ile:Lys | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 55 |
| Leu:Lys | 119 | 123 | 133 | 140 | 143 | 138 | 144 | 158 | 168 | 157 |
| Met:Lys | 30 | 33 | 32 | 32 | 31 | 30 | 33 | 31 | 30 | 29 |
| Met & Cys:Lys | 56 | 56 | 56 | 57 | 57 | 56 | 56 | 56 | 56 | 56 |
| Thr:Lys | 62 | 62 | 62 | 63 | 63 | 62 | 62 | 62 | 63 | 63 |
| Trp:Lys | 19 | 18 | 19 | 19 | 19 | 18 | 19 | 19 | 18 | 18 |
| Val:Lys | 68 | 68 | 68 | 68 | 68 | 68 | 68 | 68 | 69 | 68 |
| ME, kcal/lb | 1,560 | 1,564 | 1,570 | 1,575 | 1,578 | 1,567 | 1,569 | 1,575 | 1,580 | 1,580 |
| NE, kcal/lb | 1,181 | 1,192 | 1,210 | 1,221 | 1,225 | 1,172 | 1,182 | 1,200 | 1,210 | 1,221 |
| CP, % | 18.34 | 16.92 | 14.47 | 13.23 | 12.89 | 19.50 | 18.10 | 15.73 | 14.56 | 13.31 |
| Ca, % | 0.60 | 0.56 | 0.49 | 0.44 | 0.40 | 0.55 | 0.55 | 0.47 | 0.43 | 0.42 |
| P, % | 0.50 | 0.50 | 0.43 | 0.38 | 0.35 | 0.49 | 0.49 | 0.42 | 0.37 | 0.34 |
| STTD P, % | 0.38 | 0.38 | 0.33 | 0.29 | 0.26 | 0.38 | 0.38 | 0.33 | 0.29 | 0.26 |

¹ Diets are designed for a weight range of 50 to 75, 75 to 140, 140 to 195, 195 to 240, and 240 to 287 lb, with a feed budget of 52, 161, 158, 150, and 134 lb/pig for phases 1, 2, 3, 4, and 5, respectively.

² The protein for SBM was 47.7% and DDGS was assumed to contain 6 to 9% fat.