

OPPORTUNITY FOR HEMP IN FEED AND PET FOOD

The livestock and poultry industries continue to be a growing market. With this growth comes the opportunity and challenge to provide highly nutritious and energy dense feedstuffs to these animals. Protein and energy are the main requirements for these diets. Identifying new feedstuffs that can supply these required nutrients at an economical cost is an on-going opportunity. Hemp coproducts such as hemp cake, hemp hulls, and the high protein hemp flower and stem can provide an excellent source of protein and energy to help support the growing livestock industry.

Product	TDN	Crude Protein
Hemp Cake	81%	33%
Hemp Flower	68%	25%
Hemp Seed Hulls	52%	14%
Corn	90%	10%
Soybean Meal	84%	44%
Alfalfa Hay	58%	17%

Table 1. Energy and crude protein comparison to main livestock feedstuffs.

Hemp coproducts Total Digestible Nutrients (TDN) and crude protein were compared to corn, soybean meal (SBM), and alfalfa hay to determine an equivalent market price for the hemp products at various market inflections.

** All values represented on a dry matter basis. AURI sent samples of locally sourced hemp cake and flower for TDN and crude protein analysis. Hemp hull values were taken from Evolve Hemp Hulls product. (<https://elitethree.com/products/e5-evolve-hemp-hulls>)

The table below provides an estimated market value for the various hemp coproducts samples at two different corn, soybean meal and alfalfa hay prices. These two sets of values show potential value based on the variability of commodity prices. Potential feed value may vary based on the targeted livestock species.

To evaluate feed value, comparisons were made between samples of each feedstuff and #2 corn, which is the primary source of energy in livestock diets;; 44% protein soybean meal, which is the main source of protein in most North American livestock diets; and lastly 17% alfalfa hay a key protein and energy source for ruminant livestock. Estimated values do not consider variability and nutrient requirements for individual ration or rations balanced for amino acid levels. Least cost livestock ration formulation software may apply slightly different feed values based on protein and energy sources available within specific livestock rations.

Table 2. Hemp coproducts feed value fluctuations as compared with common US feed commodities

Product	Corn - \$3.50 / bushel 44% SBM - \$300 / ton 17% Alfalfa Hay - \$140/ton	Corn - \$4.50 / bushel 44% SBM - \$400 / ton 17% Alfalfa Hay - \$170/ton
Hemp Cake	\$222.40/ton	\$294.33/ton
Hemp Flower and Stem	\$153.80/ton	\$203.00/ton
Hemp Seed Hulls	\$127.33/ton	\$168.85/ton

ADDITIONAL INFORMATION

Hemp cake is a potential feed source for ruminants, poultry and equine. However, cold pressed hemp cake is not ideal for swine feed due to residual unsaturated fatty acids. If chemically extracted hemp cake was available, the defatted cake would be a good feed source for swine. Omega content in cold pressed meal may be a good opportunity for poultry diets, with high omega eggs having a reliable market. Looking at the amino acid profile for hemp cake, it is deficient in the amino acid lysine. Although those hurdles are surmountable with proper diet formulation, resulting in new blended feeds. Based on relatively high protein and fat content of the hemp seed cake, it could serve as a protein and energy source for the pet food industry. It appears pet owners have also shown interest in utilizing the active phyto cannabinoids in the hemp plant in their pets' diet.

Hemp flower after the extraction of Cannabinoids provide an excellent roughage feedstock with high levels of protein and energy.

Hemp hulls are a coproduct from de-hulling hemp seed. They are the removed husk or seed coat, similar to soybean hulls which could serve as a soluble fiber and protein feedstock in the livestock industry.

Hurdles

Work is necessary to achieve American Association of Feed Control Officials (AAFCO) certification for hemp and its coproducts in order to be legally marketed as an animal feed. This work is ongoing in states such as Colorado, Kentucky and North Carolina, where industrial hemp received approval as a pilot crop under the 2014 Farm Bill. Additional work is necessary in the pet food industry with hemp-derived products. The latest update, based on information from a panel discussion at NOCO 2019 where AAFCO members were present, is hemp products marketed as animal feed are at least two years away from being a reality. Further discussion touched on the fact that it costs an estimated \$250,000 for the research required to gain an AAFCO approved feed number for each feed ingredient, and for each species of animal. When a feed trial is carried out or an ingredient receives approval for a specific animal in any state, the information is usable nationally. There are national companies known to be pursuing research to reach AAFCO certification for hemp cake.

Product Opportunities

- Hemp cake (Ruminants, Poultry, Pet food, Swine**)
- Hemp flower (Ruminants)
- Hemp hulls (Ruminants)
- Hemp protein processing byproduct (fiber cut)
- Off-specification seeds for wild bird feed

****Must be defatted, chemical extracted cake for swine diets**

Existing Infrastructure

Once products receive regulatory certification, the livestock and poultry feed industries in Minnesota have assets to efficiently incorporate hemp feed commodities into their livestock feed product lines



Forecasted Market Potential

Estimated feed values for hemp coproducts will continue to be based on commodity price fluctuations. Feed value calculation conducted by AURI show the potential for hemp coproducts to be profitable in Minnesota. There will also be potential for hemp coproducts to be profitable in organic feed markets, which was not taken into account in the AURI feed value calculation. Regulatory and legal hurdles, namely receiving certification through the American Association of Feed Control Officials (AAFCO), will need to be overcome before hemp coproducts can play into animal feed markets. Minnesota will be well suited to be a market player in the feed sector.

AURI Involvement

- Coproducts facility in Waseca is a unique value-added facility in the Midwest.
- Coproducts lab is uniquely positioned to work on new feed products with a range of pilot scale equipment and animal nutrition expertise.
- Capabilities include but are not limited to:
 - Pelleting
 - Milling
 - Mechanical separating
 - Mechanical and thermal dewatering
 - Cold oil pressing and filtration- Blending/mixing ingredients
- Reach out to Harold Stanislawski, Al Doering or Riley Gordon at AURI to learn more about how AURI can help move your hemp feed idea forward.