

HEMP FEED COALITION.ORG

2021 UPDATE AND FORECAST



WHY THE HEMP FEED COALITION

- OUR MISSION: to gain Federal approval for hemp and its byproducts as animal feed to create new markets.
- Currently, hemp products are NOT approved by AAFCO (Association of American Feed Control Officials or the FDA-Center for Veterinary Medicine to be used in Animal Feed.
- Large scale production of hemp will create by-products that are nutritious and valuable as animal feed ingredients.
- Animals will get healthier, and our market size will increase exponentially!



CREATION OF THE HFC

Background: In 2017, the Colorado Legislature directed the Colorado Department of Agriculture (CDA) to **gather stakeholder input** on the inclusion of hemp in animal feeds.

Published the **Hemp in Animal Feed** Report in 2018 which identified the pathway to legalization including:

- Necessity of a Feed Additive Petition to the FDA-CVM
- Identify gaps in research on the nutritional benefits of hemp and hemp by-products
- HFC evolved out of this initial effort

Established the **Hemp Feed Coalition** as a 501(3) in 2020

- Submission of a Feed Additive Petition to the FDA-CVM
- Includes members from 25 states and Canada
- Farmers, Processors, Veterinarians, Regulators, Livestock and Pet Producers, Researchers and Associations

REGULATORY OVERVIEW

Feed is regulated at both the federal and state level:

- Federal level: the US Food and Drug Administration (FDA) regulates animal feed.
 - Center for Veterinary Medicine (CVM)
- State level: typically regulated by the state department of agriculture.

 The Association of American Feed Control Officials (AAFCO) is a non-regulatory body that promotes the uniform regulation of feed across the US through model regulations, and publishing feed ingredient definitions and terms. (They depend on FDA recommendations.)



Figredient Approval Pathway



GOALS OF THE HFC

- Monitor and Promote Feed studies and research
- Finalize submissions for hemp to AAFCO and the FDA-CVM
- Creation of standards for hemp and its by-products: including manufacturing standards, ingredient composition, investigation of contaminates and variation by geography and genetics.
- Provide industry updates and encourage advocacy in individual states
- Completion of Feed Ingredient Definitions for hemp by-products through AAFCO
- Creation of local supply chains by connecting producer to processor to feed formulator!



COMPOSITION OF OILSEED NUTRITION

Table 3: Summary of 40 American Grown and Processed Hemp Seed Meal Products

Table 3 reports a summary of data collected from 40 different certificates of analysis, including the discreet samples, that all analyzed hemp seed cake derived from 3 different varieties across ten different states including: OR, CO, MN, MI, ND, PA, KY, MT, IN and NC.

Assay	Unit	Average	Relative Std. Dev	No of Data Points
Crude Protein	%	33.5%	12.46	39
Crude Fiber	%	34.0%	28.83	16
Crude Fat	%	10.1%	24.30	34
Acid Detergent Fiber	%	34.6%	11.87	20
Neutral Detergent Fiber	%	43.6%	9.85	20
Calcium	ppm	1584.71	33.70	17
Phosphorus	ppm	8254.06	33.70	18
Selenium	ppm	1.28	129.49	6
Sodium	ppm	<25	-	11
Lysine	mg/g	10.44	6.68	12
Methionine	mg/g	5.48	14.55	12

HEMP FEED COALITION



ANIMAL FEED POTENTIAL IN THE US

- One acre of hemp seed planted yields about 800 pounds of seeds.
- The seed and grain segment of industrial hemp is expected to expand at a CAGR of 19.8% between 2020 and 2027.
- The animal care segment is expected to expand by 9.7% in the next 7 years.
- 190 million tons of animal feed produced in the US every year.
- To produce 10 million tons of seed cake would require producing 30 million tons of seed.
- AMS estimates retailer sales of hemp products to range from \$2.5 billion in 2020 to nearly \$17 billion in 2025.
- AMS estimated total producer sales of \$432 million in 2020 to \$2.9 billion in 2025



ANIMAL FEED POTENTIAL IN THE US

"Animal feed market is expected to grow at a compound annual growth rate of 3.62% over the forecast period to reach a market size of US\$415.494 billion in 2023 from US\$335.738 billion in 2017.







CURRENT PROJECTS

1. **Colorado State University** Dr. Archibeque is currently conducting a lamb study investigating hemp seed meal, this is preapproved by FDA-CVM, Funded by INDHEMP and underway.

2. **Tarleton University** Dr. Smith and June Jacobson are working with the HFC to get pre-approval of methods and protocols for a rabbit trial using hemp seed meal, this is funded and ready to proceed upon approval.

3. Wenger Group chicken study feeding hemp seed meal to egg layers, has been pre-approved by FDA-CVM, privately funded and nearing completion.

4. North Carolina State University Dr Phillips has developed a research proposal for hemp seed oil for horses, pre-approval is the next step, looking for funding.

6. North Dakota State is currently proposing a pilot trial using hemp seed meal for multiple classifications of beef cattle, individuals for trial and meal has been donated, some potential funding has been identified through the Department of Ag.

7. Kansas State University is working on the characterization of cannabinoids in feed and specifically, cannabinoid transference in animals fed hemp and hemp by-products (project funded by USDA grant)

8. Oregon State University Dr Bionaz Massimo and Serkan Ates is conducting clinical feed trials trials using post extracted pulp material for multiple species: lambs, swine, poultry, dairy cattle and horses. This data will help show how higher concentrations of cannabinoids can be fed safely.



PARTICIPATE!

- Feed studies and the application process cost money
- Donate to help fund research; become an application Champion!
- Become a Member of the Hemp Feed Coalition by donating \$100
- Sponsorships are available!
- Spread the word about the work of the Hemp Feed Coalition
- Volunteer on a workgroup or join our Leadership!
- Follow the HFC on social media:



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THANK YOU TO OUR GENEROUS SUPPORTERS

Healthy Oilseeds LLC



Healthy Oilseeds Healthy Heart



















Research on hempseed cake in finishing cattle diets at NDSU

Kendall Swanson (kendall.swanson@ndsu.edu) 166 Hultz Hall, NDSU, Fargo, ND 701-231-6502



Who I am

- Professor Animal Sciences Dept.
- Research
 - Beef cattle nutrition (primarily finishing cattle and wintering cows or heifers)
- Teaching
 - Nutrition-based courses (primarily graduate level)
- Graduate coordinator and oversee beef research program



Who else is working on this at NDSU?

- NDSU
 - Tommy Winders, Kafi Mia, Bryan Neville, Carl Dahlen, Samat Amat, Eric Berg, David Ripplinger
- USDAARS
 - David Smith, Eric Serum





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Experiments

- 1. Growth performance and residue chemistry (currently)
- 2. Digestion, nutrient utilization, and nitrogen balance (starting later this spring)
- 3. Larger study examining more inclusion levels and more cattle (in planning stage)





Ingredient	Control	DDGS	Hempseed cake
Dry-rolled corn	75	55	55
DDGS	0	20	0
Hempseed cake	0	0	20
Corn silage	20	20	20
Supplement	5	5	5



Growth/residue chem experiment 32 finishing heifers (16 per treatment), ~ 100 days

- Feed intake, feeding behavior, ADG, feed efficiency, carcass traits
- CBD residues in feed, feces, plasma, and tissues
- Gene expression of CBD receptors in tissues (GIT and reproductive tissues)
- Ruminal and respiratory microbiome







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Digestion experiment

- ruminal protein degradability of hempseed cake as compared to other common protein sources used for finishing cattle diets using in situ and in vitro digestion approaches
- 2. influence of hempseed cake supplementation on ruminal fermentation, nitrogen balance, and site of digestion in cattle
- 3. preliminary economic analysis and value discovery of hempseed cake as a protein supplement for cattle fed finishing diets.







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Questions?



Let food be thy medicine and thy medicine be thy food.

(Hippocrates)

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Animal Health and Nutrition Research Consortium at Oregon State University

Massimo Bionaz Assoc. Professor Animal and Rangeland Sciences massimo.bionaz@oregonstate.edu

Minnesota Hemp Forum February 10, 2021

ANS439/539 Dairy Production Systems ANS 538 Biology of Lactation



https://bionaz.anrs.oregonstate.edu/

Oregon State University

COLLEGE OF AGRICULTURAL SCIENCES >> **Global Hemp Innovation Center**

LEADING EXPERTISE ABOUT GLOBAL REACH COMPREHENSIVE RESEARCH SEED CERTIFICATION FAO FOR OSU EMPLOYEES



Harnessing the Future of Hemp

OSU's Global Hemp Innovation Center is home to the world's leading experts in hemp research. The largest of its kind in the nation, it promises to advance the research of hemp and its market potential across multiple diverse industries and research fields to serve the growing international demand for innovative approaches to food, health, and fiber.





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Jay Noller Director



Jeffrey Steiner Associate Director

12 Research Consortia

Animal Health and Nutrition Research Consortium: Members



Serkan Ates Ass. Prof. Forages and Pasture Management



Jenifer Cruickshank Ass. Prof. Pract. Dairy Specialist



James Hermes Distinguished Professor Poultry nutrition



Massimo Bionaz Assoc. Prof. Nutrigenomics



David Bohnert, Prof.; Director Eastern Oregon Agricultural Research Center



Michelle Kutzler Assoc. Prof. Reproduction





Jennifer Duringer Director Endophyte Service Laboratory



Gerd Bobe Assoc. Prof. Dietary disease prevention





Juliana Ranches Assi. Prof. Beef Specialist



Long-term goals

- 1. FDA approval as a feed
- 2. Feed effectiveness for livestock and poultry
- 3. Gain producer and consumer acceptability

Industry Partners



Spent hemp biomass



Spent hemp biomass vs. Alfalfa

Analyte	Unit	SHB	Alfalfa hay
Dry Matter	%	89.6	88.6
Crude protein	% DM	19.2	21.8
Soluble Protein	% CP	28	28
Acid Detergent Fiber	% DM	17.6	31.6
Neutral Detergent Fiber	% DM	23.4	37.9
Non Fiber Carbohydrate	% DM	37.7	28.3
Minerals			
Са	% DM	2.76	1.52
P	% DM	0.71	0.22
Mg	% DM	0.61	0.38
К	% DM	2.31	1.96
Na	% DM	0.02	0.09
Fe	ppm	334	258
Zn	ppm	64	17
Cu	ppm	24	11
Mn	ppm	129	42
Total Digestible Nutrient	%	69.9	60.0
Metabolizable Energy	Mcal/kg	2.67	2.39
Net Energy for Lactation	Mcal/kg	1.59	1.36
Net Energy for Maintenance	Mcal/kg	1.74	1.44
Net Energy for Growth	Mcal/kg	1.12	0.85

Cannabinoids in spent hemp biomass

Analyte	% Mean	SD	LoQ
CBC	0.07	0.002	0.03
CBC-A	0.27	0.022	0.03
CBC-Total	0.30	0.021	0.05
CBD	0.58	0.010	0.03
CBD-A	1.88	0.042	0.03
CBD-Total	2.24	0.049	0.05
CBDV	<loq< th=""><th></th><th>0.03</th></loq<>		0.03
CBDV-A	<loq< th=""><th></th><th>0.03</th></loq<>		0.03
CBDV-Total	<loq< th=""><th></th><th>0.05</th></loq<>		0.05
CBG	<loq< th=""><th></th><th>0.03</th></loq<>		0.03
CBG-A	0.10	0.004	0.03
CBG-Total	0.09	0.003	0.05
CBL	<loq< th=""><th></th><th>0.03</th></loq<>		0.03
CBN	<loq< th=""><th></th><th>0.03</th></loq<>		0.03
D8-THC	<loq< th=""><th></th><th>0.03</th></loq<>		0.03
D9-THC	0.03	0.004	0.03
THC-A	0.04	0.015	0.03
THC-Total	0.07	0.017	0.05
THCV	<loq< th=""><th></th><th>0.03</th></loq<>		0.03
THCV-A	<loq< th=""><th></th><th>0.03</th></loq<>		0.03
THCV-Total	<loq< th=""><th></th><th>0.05</th></loq<>		0.05
Total Cannabinoids	3.01	0.113	









Spent hemp biomass → improves fertility?



Michelle Kutzler Assoc. Prof. Reproduction



USDA DOS United States Department of Agriculture Agricultural Research Service



Biomass effects on dairy cattle



Analysis of cannabinoids at OSU



Jennifer Duringer Director Endophyte Service Laboratory

Agilent Ultivo Triple Quadrupole LC/MS



- Sample preparation
- Potency (cannabinoid) characterization
- Project consultation
- Method development

Food Use Authorization







Jane Ishmael Ass. Prof. Pharmaceutical Sciences



Contact Information

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Association of American Feed Control Officials

www.aafco.org