



Hemp Seed Meal for Dogs Health Benefits Analysis

Prepared by the Hemp Feed Coalition | June 2026 | CONFIDENTIAL — For Regulatory and Legislative Use

Introduction

The dominant protein sources in commercial dog food—soybean meal, corn gluten meal, fish meal, and poultry by-product meal—were selected primarily on cost, availability, and processing compatibility. Hemp seed meal (HSM) enters this comparison from a different angle: rather than competing on lowest-cost protein density, it offers a differentiated nutritional profile addressing specific canine health needs increasingly recognized by veterinary nutritionists.

This document draws on peer-reviewed research to compare HSM against the principal competing ingredients across three dimensions: macronutrient and fatty acid profile, specific health benefits with published evidence, and safety and regulatory considerations.

Nutritional Profile of Hemp Seed Meal

Hemp seed meal is the residual fraction remaining after oil extraction from hemp grain. It retains the majority of the seed's protein and all of its dietary fiber, along with a residual fatty acid profile that includes gamma-linolenic acid (GLA) and stearidonic acid (SDA)—two functionally significant fatty acids absent from every competing dog food protein ingredient.

Nutrient	Value	Range	Source
Crude Protein	33.0%	30–35%	Mohamed et al. 2024
Crude Fat	8.37%	7–12%	Mohamed et al. 2024
Neutral Detergent Fiber (NDF)	39.3%	25–40%	Mohamed et al. 2024
Total PUFA (% of fat)	73–76%	~73%	Mohamed et al. 2024
Linoleic Acid / LA (n-6)	53.5%	—	Mohamed et al. 2024
Alpha-Linolenic Acid / ALA (n-3)	17.1%	—	Mohamed et al. 2024
Gamma-Linolenic Acid / GLA (n-6)	4.14%	—	Mohamed et al. 2024
Stearidonic Acid / SDA (n-3)	1.53%	—	Mohamed et al. 2024
n-6:n-3 Ratio	~3:1	—	Mohamed et al. 2024



Trypsin Inhibitor Activity	1,400–2,200 TIU/g	Below thresholds	Mohamed et al. 2024
First-Limiting Amino Acid	Lysine	All EAAs present	Mohamed et al. 2024

Comparison to Competing Dog Food Protein Ingredients

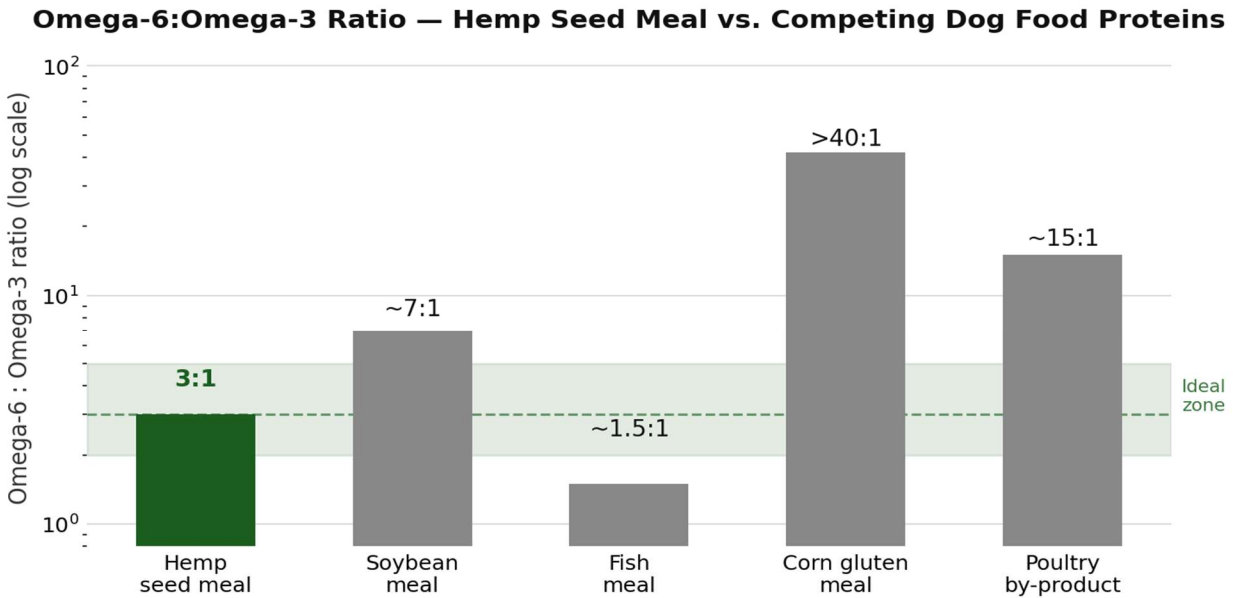


Figure 1. n-6:n-3 ratio comparison among dog food protein ingredients. Lower = better. Green zone = optimal range (2:1 to 5:1). Source: Mohamed et al. (2024); USDA FoodData Central.

Attribute	Hemp Seed Meal	Soybean Meal	Corn Gluten Meal	Fish Meal	Poultry By-Product
Crude Protein %	30–35%	44–48%	60–65%	60–65%	58–65%
n-6:n-3 Ratio	~3:1 ✓	~7:1	>40:1	Low n-6	10–20:1
Contains GLA	Yes (4.1%) ✓	No	No	No	No
Contains SDA	Yes (1.5%) ✓	No	No	No	No
Dietary Fiber (NDF)	39.3% ✓	~7–10%	<3%	Negligible	Moderate
Phytoestrogens	None ✓	High	None	None	None
Heavy Metal Risk	Below detection ✓	Low	Low	Moderate (Hg)	Low–moderate

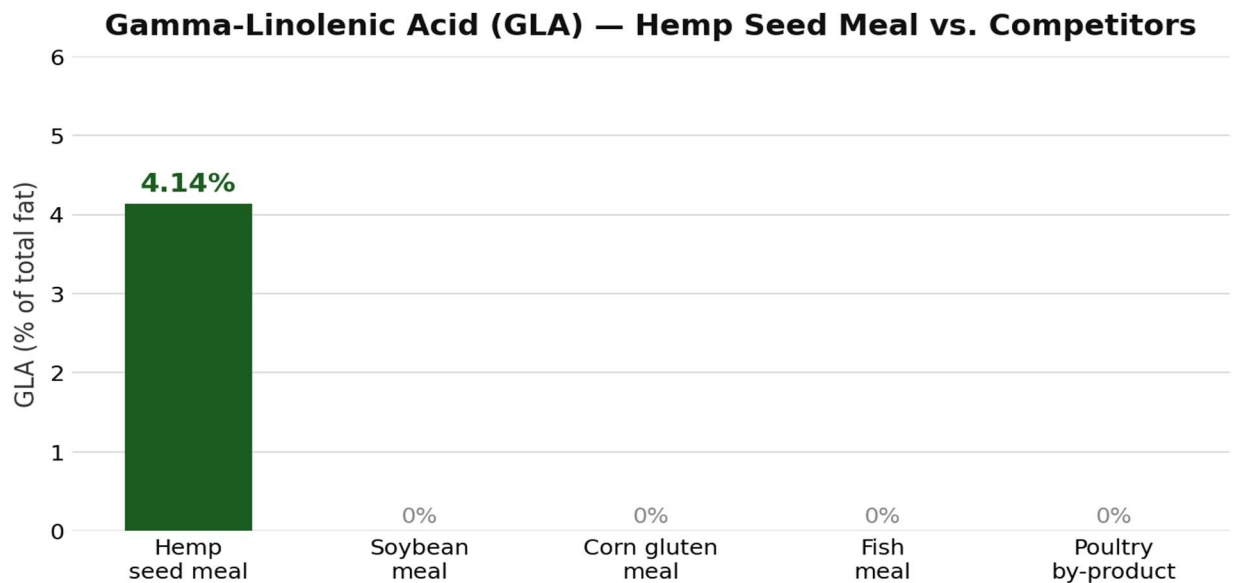


✓ denotes hemp seed meal's advantage. Competitive data from AAFCO nutrient databases, USDA Feed Composition Tables, and Mohamed et al. (2024).

	Hemp seed meal	Soybean meal	Corn gluten	Fish meal	Poultry by-product
Contains GLA	✓	—	—	—	—
Contains SDA	✓	—	—	—	—
Balanced n-6:n-3 (~3:1)	✓	—	—	P	—
High dietary fiber	✓	—	—	—	P
No phytoestrogens	✓	—	✓	✓	✓
Low heavy-metal risk	✓	✓	✓	P	P

✓ = advantage present. P = partial advantage. — = not present.
Hemp seed meal is the only ingredient with a full column of advantages.
Source: Mohamed et al. (2024); AAFCO/USDA.

Figure 2. Hemp seed meal is the only dog food protein ingredient with advantages across all six key nutritional and safety attributes.
Source: Mohamed et al. (2024); AAFCO/USDA.



GLA is absent from every competing dog food protein ingredient. Source: Mohamed et al. (2024).

Figure 3. GLA content (% of total fat) across dog food protein ingredients. Hemp seed meal is the only source of dietary GLA.

Key Health Benefits Supported by Published Research

1. Anti-Inflammatory Properties: The GLA Advantage



The most clinically significant nutritional distinction of hemp seed meal relative to every competing dog food protein source is the presence of gamma-linolenic acid (GLA) at approximately 4.14% of total fat (Mohamed et al., 2024). GLA is essentially absent from soybean meal, corn gluten meal, fish meal, and poultry by-product.

Dietary omega-6 linoleic acid (LA) must be converted to GLA by the enzyme $\Delta 6$ -desaturase before proceeding to the anti-inflammatory metabolite dihomo- γ -linolenic acid (DGLA). This conversion step is rate-limiting—impaired by aging, stress, diabetes, viral infection, and excess dietary trans-fatty acids—meaning many dogs derive sub-optimal benefit from LA-rich diets alone. Dietary GLA bypasses this bottleneck entirely.

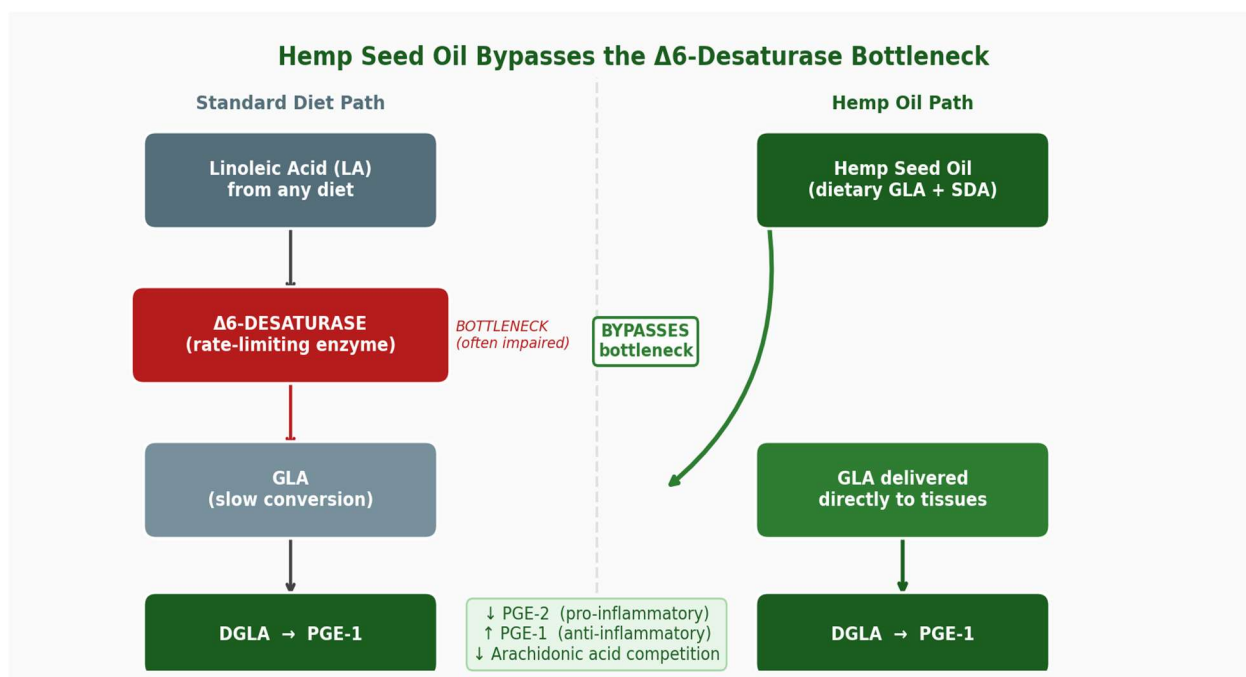


Figure 4. Hemp seed meal (via residual oil) bypasses the rate-limiting $\Delta 6$ -desaturase enzyme, delivering GLA directly to anti-inflammatory DGLA production.

2. Pain and Inflammation in Osteoarthritic Dogs: Clinical Evidence

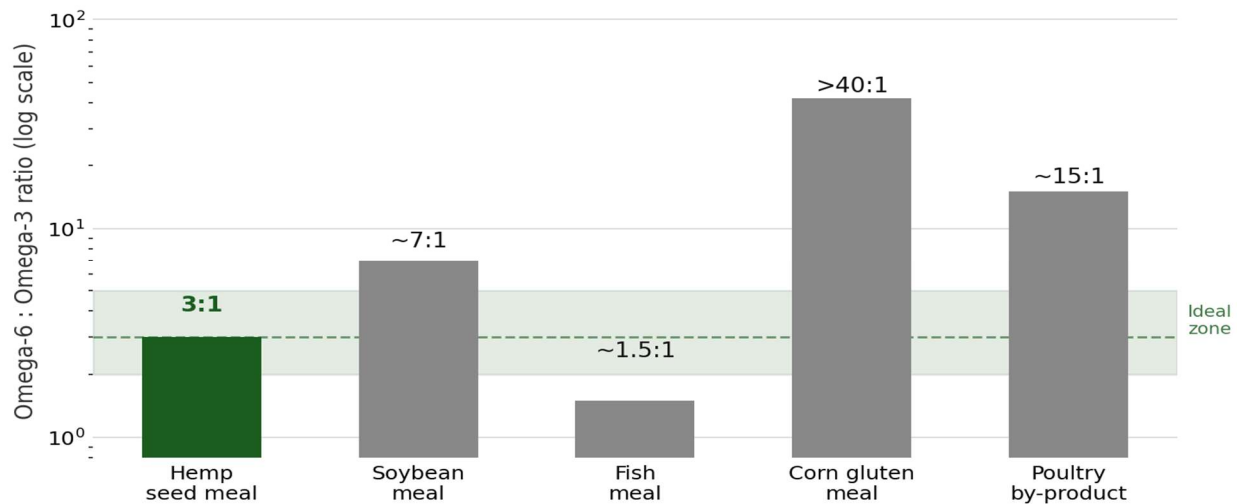
A randomized, placebo-controlled clinical trial by Amato et al. evaluated a cannabinoid-based supplement (CBD + CBG) in 21 dogs with naturally occurring osteoarthritis over 30 days. Key findings: significant reduction in validated pain scores; decreased serum IL-6; increased serum IL-10; reduced oxidative stress biomarkers; no adverse effects at any timepoint. Hemp seed meal provides the same bioactive compounds alongside the GLA anti-inflammatory mechanism, offering a multi-pathway approach to inflammation management.

3. Balanced Omega Fatty Acid Ratio for Immune and Skin Health

Hemp seed meal provides a dietary n-6:n-3 ratio of approximately 3:1 (Mohamed et al., 2024). By comparison, soybean meal is ~7:1 and corn gluten meal exceeds 40:1. Chronically elevated n-6:n-3 ratios promote systemic low-grade inflammation linked to atopic dermatitis, inflammatory bowel disease, and joint degeneration in dogs. Substituting a portion of soybean or corn gluten meal with HSM at 10% dietary inclusion would measurably reduce the n-6:n-3 imbalance without reformulation of the base recipe.



Omega-6:Omega-3 Ratio — Hemp Seed Meal vs. Competing Dog Food Proteins



Lower ratio = better omega balance. Green zone = optimal (2:1–5:1). Source: Mohamed et al. (2024); USDA FoodData Central.

Figure 5. n-6:n-3 ratio comparison — hemp seed meal at 3:1 falls squarely in the optimal zone, while corn gluten meal and soybean meal are profoundly imbalanced.

4. Skin Barrier Integrity and Coat Health

At 53.5% LA of total fat (Mohamed et al., 2024), hemp seed meal is among the richest plant-based sources of linoleic acid—the essential fatty acid in epidermal ceramides that maintains skin barrier integrity. Simultaneously, GLA supports skin barrier function through anti-inflammatory signaling, providing a dual mechanism (barrier repair via LA + anti-inflammatory via GLA → DGLA) unavailable from any competing protein ingredient.

5. Digestive Health and Prebiotic Fiber

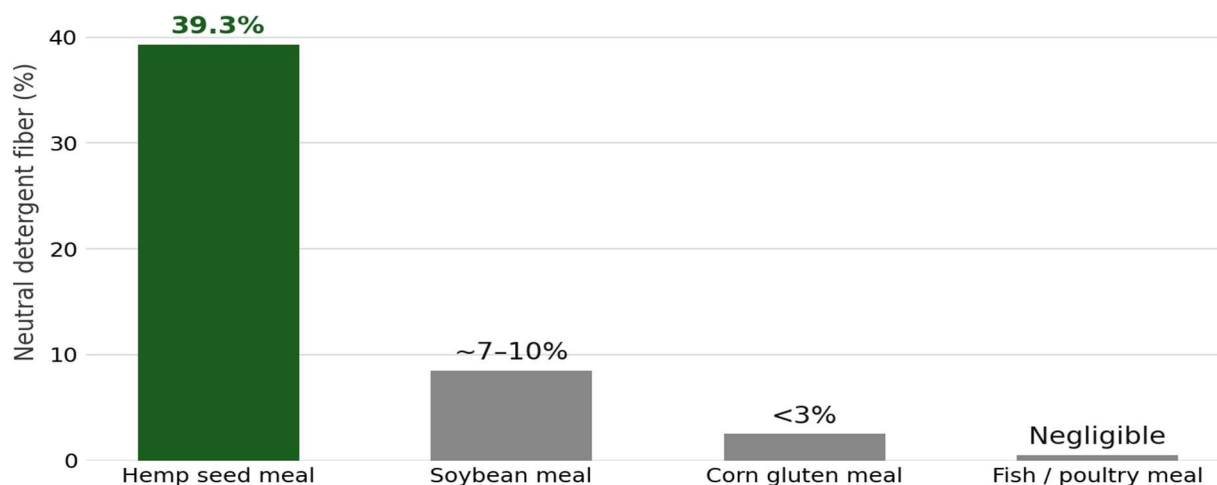
Hemp seed meal contains approximately 39.3% neutral detergent fiber (NDF)—substantially higher than soybean meal (~7–10%), corn gluten meal (<3%), or fish and poultry ingredients (negligible). This high fiber content supports canine gut health through three mechanisms:

- Prebiotic effect: fermentable fiber fractions serve as substrate for beneficial colonic bacteria (Lactobacillus, Bifidobacterium), supporting microbiome diversity associated with immune regulation and reduced intestinal inflammation.
- Stool quality regulation: insoluble fiber fractions normalize transit time and reduce loose stool frequency, one of the most common dog-owner complaints about diet changes.
- Satiety and weight management: high fiber density dilutes caloric content, making HSM particularly valuable in weight-management formulations where caloric restriction is required without sacrificing ingredient volume.

This dual protein-and-fiber functionality sets HSM apart from every competing ingredient. Soybean meal, corn gluten meal, and fish meal function as **protein concentrates**; HSM functions simultaneously as a **protein source and a prebiotic fiber ingredient**—a combination unavailable from any single competing dog food ingredient.



Dietary Fiber (NDF) — Hemp Seed Meal vs. Competing Proteins



Hemp seed meal functions as both protein source and prebiotic fiber. Source: Mohamed et al. (2024).

Figure 6. NDF content (%) of hemp seed meal versus competing dog food protein ingredients. Hemp seed meal's fiber content is 4–8× higher than soybean meal and orders of magnitude above corn gluten, fish, and poultry ingredients. Source: Mohamed et al. (2024).

Safety Profile

- Mohamed et al. (2024): No detectable cannabinoids in poultry tissue at up to 24% dietary inclusion—more than twice the 10% modeled here.
- Kleinhenz et al. (2022): Hepatic enzyme panels within reference ranges throughout 14 days of industrial hemp supplementation in bovines; no adverse clinical findings.
- HSM trypsin inhibitor activity of 1,400–2,200 TIU/g is well below thresholds for growth depression in swine (10,000–15,000 TIU/g) or poultry (5,000–10,000 TIU/g).
- Heavy metals and mycotoxins consistently below detection limits and regulatory maximums (Mohamed et al., 2024).

Conclusion

Hemp seed meal offers a nutritional profile that addresses known gaps in commercial dog food formulations: the chronic omega-6:omega-3 imbalance, the complete absence of GLA from all competing plant-based protein sources, the negligible fiber content of protein-concentrate ingredients, and the phytoestrogen load associated with soy-based formulations. Against its main competitors, HSM's advantages are not marginal—they represent fundamentally different nutritional capabilities. The regulatory pathway requires only that FDA finalize its animal food safety determination for hemp seed products.

References

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