Protein Powders

Demystified: Science-Based Guidance

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Question #1

If two separate protein powders
both contain 20g of protein per serving…
Are they actually equivalent?

Question #2

How many of us routinely check the ingredients
in protein powders as carefully
as we check the protein content?

Question #3

At what point does a protein powder stop being a health-supportive product and start becoming an ultra-processed food?

Question #4

Would you still recommend a protein powder if the protein itself was the least concerning ingredient?

Beyond the protein percentage

What’s more important:

- Protein types and quality differences
- Additives and formulation considerations
- Contaminants and testing standards
- And why older scoring systems, like PDCAAS, don’t always reflect real-world use

The protein landscape

Whey protein concentrate

Whey protein isolate

Whey hydrolysate

Casein

Egg white protein

Collagen

Pea protein

Rice protein

Hemp protein

Soy protein

Blends

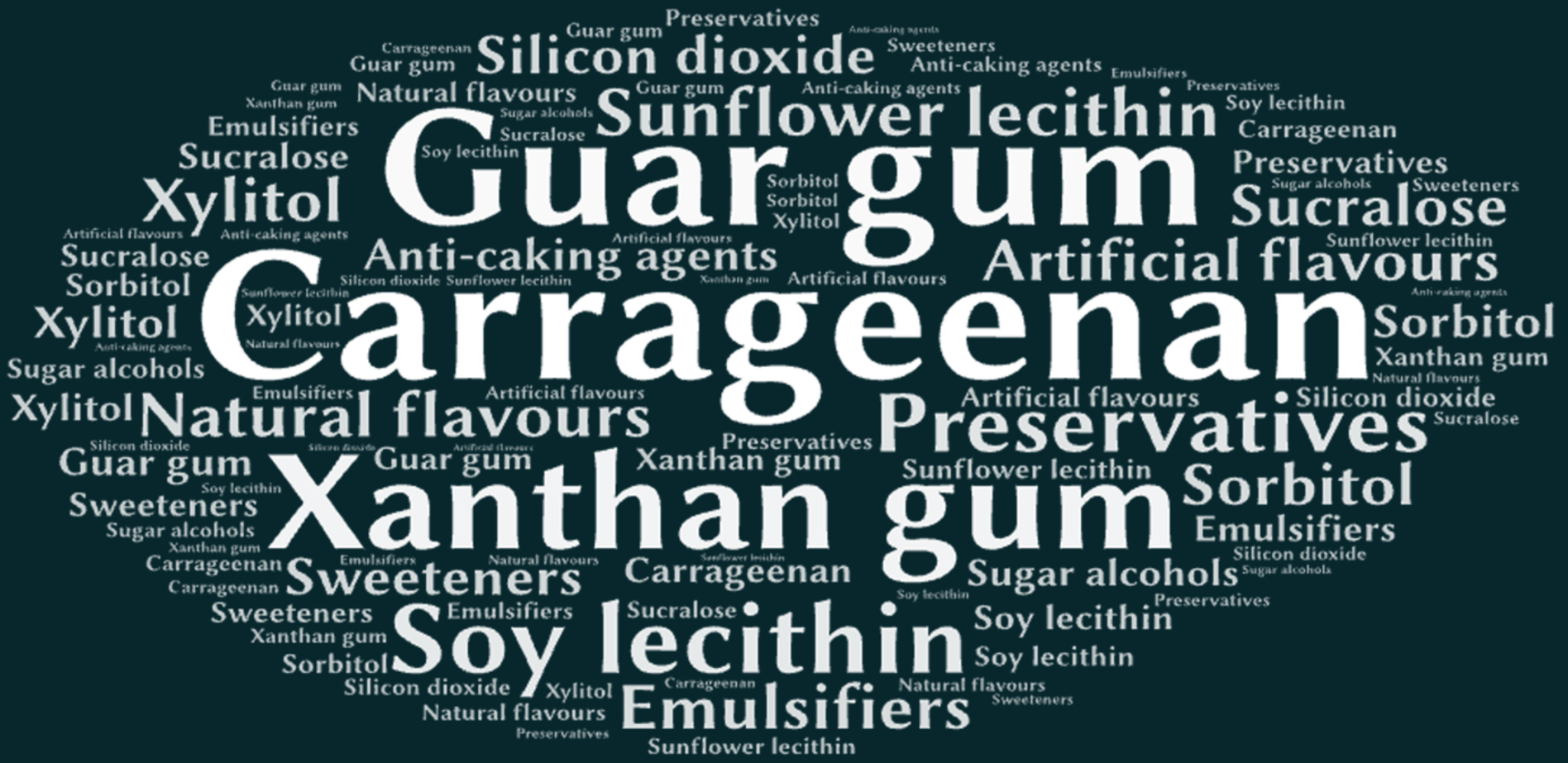
Fermented protein

Insect protein

Beef isolate

Fungal Protein

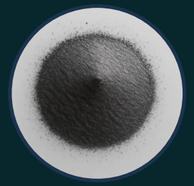
What’s added to Protein Powders?



Emerging Evidence Suggests

- Emulsifiers may influence gut microbiota and metabolic markers
- Non-nutritive sweeteners may alter glucose response and microbiome composition
- Gums and thickeners may contribute to GI symptoms in sensitive individuals
- Protein shakes with additives commonly linked to bloating and intolerance in clinical populations

What else is found in protein powders?



Heavy metals:

lead, cadmium, arsenic, mercury

Microbial contamination: poor manufacturing hygiene

Mycotoxins:

grain/plant-derived inputs

Processing contaminants: heat-formed compounds

Pesticide residues: plant-based proteins

How Are Protein Powders Tested for Safety?

Testing quality depends on sourcing,
manufacturing and quality control systems.

Common Quality Controls:

- GMP-certified manufacturing
- Raw material verification
- Heavy metal testing
- Microbiological testing
- Allergen testing
- Certificate of Analysis (CoA)
- Positive release systems

Case study Nuzest:

- Independent accredited laboratory testing
- ISO 17025 certified laboratories
- Composite heavy metal testing
- Positive release before distribution
- HACCP / GFSI aligned systems

Certificate of Analysis

Clean Lean Protein Smooth Vanilla 500g

Product Code: UK-CLP500-SV		Best Before Date: 22-Mar-2028
APN/EAN/UPC: 9342749000264	Units per Shipper: 6	Batch Number: NT0001-2

Physical /Organoleptic Testing		
Test	**Limits**	**Results**
Appearance	Beige free flowing powder	Conforms
Taste	Sweet vanilla with a hint of pea	Conforms
Aroma	Slight vanilla	Conforms
Fill Weight	NLT 500g	Conforms

Chemical Testing		
Test	**Limits**	**Results**
Arsenic (As)	0.1 ppm (mg/kg)	0.057 ppm (mg/kg)
Cadmium (Cd)	0.1 ppm (mg/kg)	0.014 ppm (mg/kg)
Lead (Pb)	0.1 ppm (mg/kg)	< 0.010 ppm (mg/kg)
Mercury (Hg)	0.01 ppm (mg/kg)	< 0.010 ppm (mg/kg)
Gluten	< 20.0 ppm (mg/kg)	Conforms
Dairy	< 2.5 ppm (mg/kg)	Conforms
Soy	< 2.5 ppm (mg/kg)	Conforms

Micro Testing		
Test	**Limits**	**Results**
Total Plate Count	< 10,000 cfu/g	~20 cfu/g
Mould	< 1,000 cfu/g	< 100 cfu/g
Yeast	< 1,000 cfu/g	< 100 cfu/g
Enterobacteriaceae	< 100 cfu/g	< 10 cfu/g
E. coli	< 10 cfu/g	< 3 cfu/g
Coag. + Staph.	< 100 cfu/g	< 100 cfu/g
Salmonella	Not Detected / 25g	Not Detected / 25g

Note
Certificate of Analysis References: FM2574437, FM2574648, FM2574654, FM2581947-AB

Approved By:

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Why Formulation Still Matters

Two products may have:

- Similar protein scores
- Similar protein percentages

…but differ in:

- Digestive tolerance
- Additives and excipients
- Sweeteners/ emulsifiers
- Ingredient transparency
- Overall formulation quality

Key biological lenses to consider

- Amino Acid completeness
- Leucine content → MPS trigger
- Digestibility - Survival of the fittest
- Isolate vs. Concentrate vs. Hydrolysate

Key biological lenses to consider

	Concentrate	Isolate	Hydrolysates
Processing level	Lightly filtered: original food source is minimally refined so retains more bioactive compounds	Highly filtered: to remove carbs, fat and most anti-nutrients	Highly processed: often enzymatically, through hydrolysis to break down peptide chains
Typical protein level	70-80%	85-90%	80-90%
Lactose and anti-nutrient content	Often higher (due to more carbs, fats, lactose and intact proteins)	Less (due to more-filtered proteins)	Often higher (depends on protein type, e.g. animal vs. plant)
Taste	Generally stronger	Generally neutral	Sometimes bitter
Absorption speed	Slower	Medium	Faster (as pre-digested into smaller peptide chains
Digestibility	Lower ratings/ harder to digest for some	Higher ratings/ easier to digest	Varies, depends on source
Clinical uses	Metabolically healthy individuals, recreational exercisers, those without GI sensitivity	Low appetite, high protein needs, GI sensitivity or digestive compromise, lactose intolerance	Requirements for faster gastric emptying, quick uptake in elite sports recovery

How do we score proteins?

PDCAAS → older system

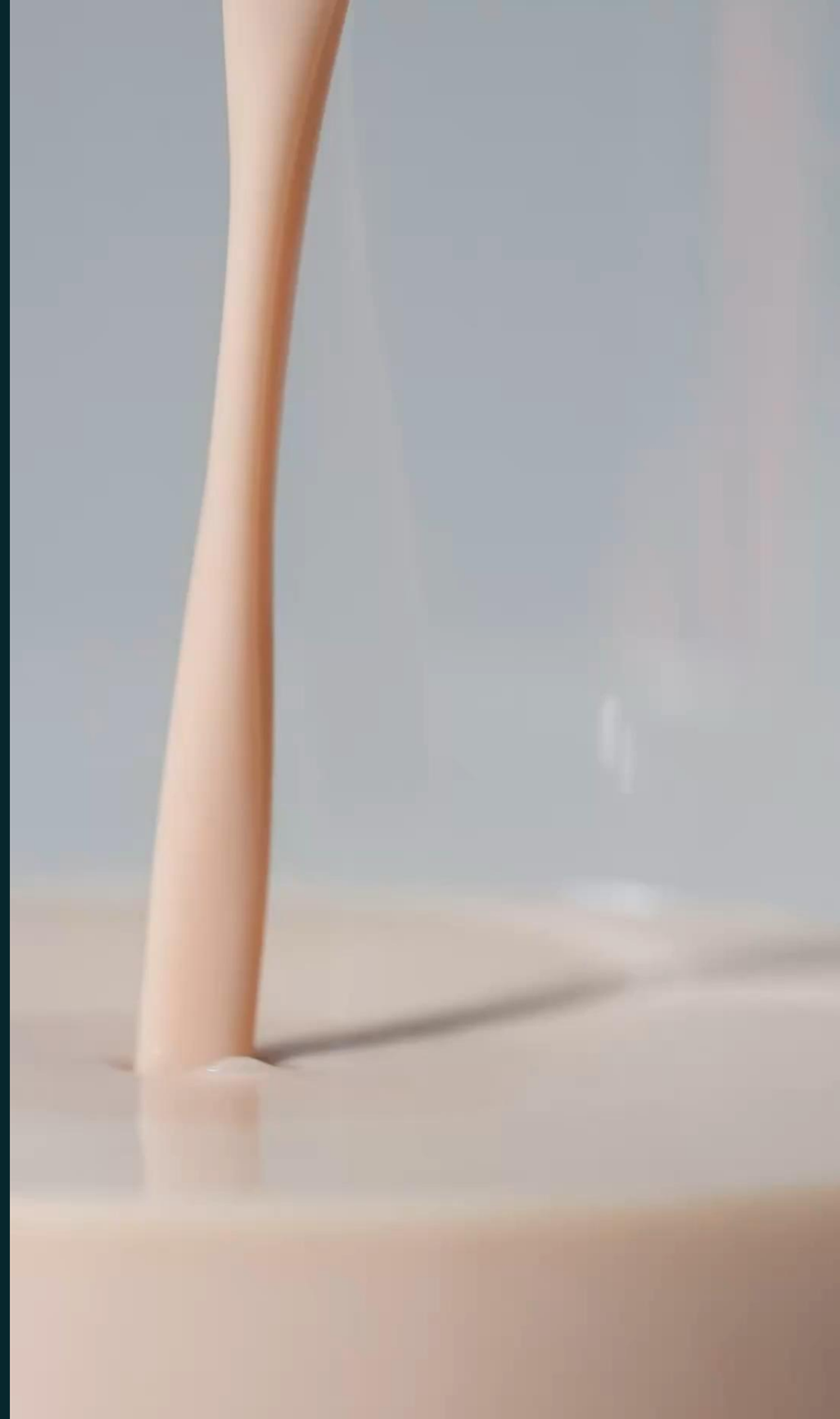
Protein Digestibility Corrected Amino Acid Score

DIAAS → newer system

Digestible Indispensable Amino Acid Score

PDCAAS: The Traditional Standard

- Developed by Food and Agriculture Organization / World Health Organisation in the early 1990s
- Measures overall protein digestibility + amino acid profile
- Based on total digestive tract (faecal digestibility)
- Scores capped at 1.0
- Still widely used for regulatory and food labelling purposes



The Problems with PDCAAS

1. Score ceiling

Cannot distinguish superior proteins

2. Total tract digestion

Less precise absorption measurement

3. Plant protein bias

May underestimate isolated plant proteins

DIAAS: A More Precise Approach

- Developed following Food and Agriculture Organization expert consultations in 2011
- Measures digestibility at the end of the small intestine (ileal digestibility)
- Evaluates individual essential amino acid absorption
- No score cap → allows differentiation between protein quality levels
- Considered more accurate for isolated and plant-based proteins

Why DIAAS Matters for Plant Proteins

1

Whole plant protein:

Fibre

Starch

Anti-nutrients

2

Isolation process removes:

Much of fibre/ carbohydrate fraction

Some anti-nutrient compounds

3

Result:

Increased amino acid density

Improved digestibility

Improved DIAAS scoring

But Neither System Tells the Whole Story

Neither PDCAAS nor DIAAS fully account for:

- food processing
- final product formulation
- gums/emulsifiers
- contaminants
- individual digestion
- microbiome differences

In Conclusion

PDCAAS	DIAAS
Current regulatory standard	More scientifically precise
Measures total tract digestibility	Measures ileal amino acid digestibility
Scores capped at 1.0	No scoring cap
Less reflective of isolated plant proteins	Better assessment of amino acid availability
Useful for standardisation	Useful for deeper physiological insight

Neither system fully predicts real-world digestion,
tolerance or formulation quality.

Clinical Framework for Assessing Protein Powders

Protein quality	Manufacturing & Testing
✓What is the leucine content / MPS potential?	✓GMP-certified manufacturing?
✓Is digestibility supported by the formulation?	✓Third-party or accredited laboratory testing?
✓Concentrate, isolate or hydrolysate? Why?	✓Heavy metal & microbiological screening?
	✓Certificate of Analysis (CoA) available?

Ingredient Transparency	Clinical Tolerability
✓Are all ingredients clearly disclosed?	✓Appropriate for the individual’s digestion & sensitivities?
✓Are sweeteners, gums, emulsifiers or flavour systems excessive?	✓Any issues with lactose, gums, sugar alcohols or sweeteners?
✓Is the ingredient list proportionate to the product goal?	✓Does the product support adherence and usability?


Any questions?

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