Maltodextrin in Protein Formulations: Scientific Review

What is Maltodextrin?

Maltodextrin is a highly processed carbohydrate produced by partial hydrolysis of starch obtained from corn, rice, potato, wheat, or tapioca. Chemically, it consists of short chains of glucose molecules (oligosaccharides) that are rapidly digested and absorbed in the intestine.

Why is Maltodextrin Added to Protein Powders?

Manufacturers commonly add maltodextrin because it:

1. Acts as a bulking agent/filler
2. Improves texture and mouthfeel
3. Enhances solubility
4. Increases product volume at low cost
5. Improves shelf life
6. Provides quick calories
7. Reduces manufacturing costs compared to high-quality proteins and fibers

Why Does Maltodextrin Increase Glycemic Index So Much?

Although maltodextrin is technically a "complex carbohydrate," it behaves more like glucose than starch.

Mechanism

1. Short glucose chains require minimal digestion.
2. Rapid intestinal absorption occurs.
3. Blood glucose rises quickly.
4. Large insulin release follows.

Studies report that maltodextrin has a Glycemic Index (GI) ranging from approximately 95–136, which is often higher than:

Substance	Approximate GI
Fructose	20-25
Sucrose (table sugar)	60-65
White bread	70-75
Glucose	100
Maltodextrin	95-136

Clinical Significance:

A high GI ingredient causes:

- Rapid glucose excursions
- Hyperinsulinemia
- Increased glycemic variability
- Greater oxidative stress
- Increased inflammatory response
- Poorer long-term glycemic control

Especially concerning in:

- ✓ Diabetes
- ✓ Prediabetes
- ✓ Metabolic syndrome
- ✓ Cardiovascular disease
- ✓ Chronic kidney disease

Why Maltodextrin Should Be Avoided in Diabetic Protein Formulations.

1. Causes Rapid Blood Sugar Spikes

Diabetic nutrition formulas should provide:

✓ Slow glucose release
✓ Sustained energy
✓ Low glycemic response

Maltodextrin does exactly the opposite.

Research shows that maltodextrin can raise blood glucose rapidly due to its near-complete conversion to glucose after ingestion.

Potential Consequences

- Poor HbA1c control
- Increased insulin requirements
- Greater postprandial glucose spikes
- Increased risk of diabetic complications

Why Maltodextrin Is Not Ideal for Cardiac Patients

Cardiac patients frequently have:

- Diabetes
- Insulin resistance
- Obesity
- Metabolic syndrome

Repeated postprandial glucose spikes are associated with:

- Endothelial dysfunction
- Increased oxidative stress
- Increased inflammatory mediators
- Accelerated atherosclerosis

Thus, low-GI nutritional support is preferred over maltodextrin-containing formulas.

Why Maltodextrin Is Not Ideal for Kidney Patients

Patients with CKD often suffer from:

- Impaired glucose metabolism
- Insulin resistance
- Increased cardiovascular risk

High glycemic load diets may:

- Increase inflammation
- Worsen insulin resistance
- Increase cardiovascular burden

Renal nutrition guidelines generally favor controlled-carbohydrate, low-GI nutritional support. Maltodextrin offers calories without meaningful micronutrient benefits.

Why Hospitalized Patients May Not Benefit from Maltodextrin-Rich Protein Powders

Hospitalized patients often experience:

- Stress hyperglycemia
- Reduced insulin sensitivity
- Increased inflammatory burden

Goals of clinical nutrition include:

✓ Protein preservation
✓ Glycemic control
✓ Immune support

Excessive rapidly absorbable carbohydrates may worsen glycemic variability, which is associated with poorer clinical outcomes in hospitalized patients. Therefore, many modern clinical nutrition products are moving toward lower-GI carbohydrate systems and higher-quality proteins.

Emerging Concerns About Gut Health

Several studies have raised concerns regarding maltodextrin's impact on intestinal health.

Study: Laudisi et al., 2018

Researchers demonstrated that maltodextrin:

- Reduced protective intestinal mucus
- Increased intestinal inflammation
- Promoted gut barrier dysfunction

The authors concluded that maltodextrin may contribute to intestinal inflammatory processes.

Systematic Review (2022)

A review of 70 randomized controlled trials found that orally consumed maltodextrin frequently affected:

- Gut microbiota composition
- Inflammatory markers
- Gut permeability
- Gastrointestinal physiology

The authors questioned whether maltodextrin can even be considered a physiologically inert placebo due to its biological effects.

Advantages of a Maltodextrin-Free Protein Formula

For products like **ADON-P**, being Maltodextrin-Free provides several scientific and marketing advantages.

1. Better Glycemic Control

- Lower postprandial glucose spikes
- More suitable for diabetics
- Better HbA1c management support

2. Reduced Insulin Load

- Less insulin stimulation
- Better metabolic control

3. Cardio-Friendly

- Supports low-GI nutritional strategy
- Reduced glycemic variability

4. Kidney-Friendly

- Avoids unnecessary high glycemic carbohydrate burden

5. Improved Nutritional Density

Instead of maltodextrin calories, space can be utilized for:

- Whey protein
- Omega-3 fatty acids
- Dietary fiber
- Vitamins
- Minerals

6. Better Gut Health Profile

Potentially avoids negative effects on:

- Gut microbiota
- Mucosal barrier
- Intestinal inflammation

7. Premium Clinical Positioning

Doctors increasingly prefer:

- Low GI
- Low carb
- High protein
- High fiber
- Maltodextrin-free formulations

for diabetic, cardiac, renal, geriatric, and post-hospitalization patients.

Key Doctor Message

"Why ADON-P is Maltodextrin Free?"

"Most conventional protein supplements use maltodextrin as a cheap carbohydrate filler. Maltodextrin has a glycemic index even higher than table sugar and can cause rapid blood glucose spikes. ADON-P is intentionally formulated without maltodextrin, providing high-quality whey protein, fiber, and Omega-3 nutrition without unnecessary high-GI carbohydrate load. This makes it a more suitable nutritional choice for diabetic, cardiac, renal, elderly, and recovery patients."

Key Clinical & Scientific References on Maltodextrin

1. Almutairi R, et al. (2022)

Validity of food additive maltodextrin as placebo and effects on human gut physiology: Systematic review of placebo-controlled clinical trials.
European Journal of Nutrition. 2022;61(6):2853-2871.

Key Findings:

- Review of 70 randomized clinical trials.
- 63.9% of studies reported physiological or microbiome changes after maltodextrin consumption.
- Effects included changes in gut microbiota, inflammatory markers, gut permeability, and immune responses.
- Authors questioned whether maltodextrin can be considered an "inert" placebo.

PMID: 35230477

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2. Zangara MT, et al. (2022)

Maltodextrin Consumption Impairs the Intestinal Mucus Barrier and Accelerates Colitis Through Direct Actions on the Epithelium.
Frontiers in Immunology. 2022.

Key Findings:

- Maltodextrin impaired the intestinal mucus barrier.
- Increased susceptibility to intestinal inflammation.
- Accelerated colitis progression in experimental models.

PMID: 35359925

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3. Nickerson KP, et al. (2015)

Deregulation of intestinal anti-microbial defense by the dietary additive maltodextrin.
Gut Microbes. 2015;6(1):78-83.

Key Findings:

- Maltodextrin impaired antimicrobial defense mechanisms in the intestine.
- Suggested a role in disruption of intestinal homeostasis.
- Potential relevance in inflammatory bowel disorders.

PMID: 25738413

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4. Laudisi F, et al. (2019)

The Food Additive Maltodextrin Promotes Endoplasmic Reticulum Stress–Driven Mucus Depletion and Exacerbates Intestinal Inflammation.

Key Findings:

- Demonstrated mucus depletion and worsening of intestinal inflammation.
- Suggested a mechanism involving epithelial stress and barrier dysfunction.

This is one of the most frequently cited papers linking maltodextrin with gut inflammation.

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5. Iida T, et al. (2008)

Acute D-Psicose Administration Decreases the Glycemic Responses to an Oral Maltodextrin Tolerance Test in Normal Adults.
Journal of Nutritional Science and Vitaminology.

Key Findings:

- Maltodextrin challenge produced significant glycemic excursions.
- Study used maltodextrin as a model carbohydrate because of its rapid glucose-generating properties.

PMID: 19155592

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6. Livesey G, Tagami H. (2009)

Interventions to Lower the Glycemic Response to Carbohydrate Foods with Resistant Maltodextrin: Meta-analysis of Randomized Controlled Trials.
American Journal of Clinical Nutrition.

Key Findings:

- Resistant maltodextrin (a different ingredient than regular maltodextrin) reduced post-prandial glycemic responses.
- Demonstrates that reducing rapidly digestible carbohydrates improves glucose control.

PMID: 19126874

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7. Jenkins DJA, et al. (PURE Study)

Glycemic Index, Glycemic Load, and Cardiovascular Disease and Mortality.
New England Journal of Medicine.

Key Findings:

- High-GI diets were associated with increased cardiovascular events and mortality.
- Supports the clinical preference for low-GI nutritional interventions in cardiac and diabetic patients.

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8. Livesey G, et al. (2019)

Dietary Glycemic Index and Load and the Risk of Type 2 Diabetes: Assessment of Causal Relations.
Nutrients. 2019.

Key Findings:

- Strong evidence linking high glycemic diets with increased risk of Type 2 Diabetes.
- Reinforces the importance of low-GI nutritional products in diabetes management.

PMID: 31242690

References

1. Laudisi F, et al. *The Food Additive Maltodextrin Promotes Endoplasmic Reticulum Stress–Driven Mucus Depletion and Exacerbates Intestinal Inflammation.* Cell Mol Gastroenterol Hepatol. 2019.
2. Nickerson KP, et al. *Validity of food additive maltodextrin as placebo and effects on human gut physiology: systematic review of placebo-controlled clinical trials.* Eur J Nutr. 2022.
3. Healthline Review: Maltodextrin and Blood Sugar Response.
4. Glycemic Index Database: Maltodextrin GI ≈ 95.
5. Biology Insights. Maltodextrin and Diabetes Risk Review.
6. Verywell Health. Maltodextrin and Blood Glucose Effects.
7. Health.com. Maltodextrin Safety and Metabolic Concerns.
8. EatingWell. Glycemic Index and Blood Sugar Management.