

TAGATOSE

Health Benefits
Scientific Bibliography

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TAGATOSE IS A PREBIOTIC

Fermented in the Gut

- Increases hydrogen production ^{3,14,22}
- Low small intestinal digestibility, high large intestinal fermentability^{5,6,7,14,53}

Increases Beneficial Bacteria

- Promotes *Lactobacillus* and lactic acid bacteria growth ^{1,2,4,8,9,11, 16, 21,22, 28,93}

Increases Short-Chain Fatty Acids

- Boosts butyrate production in human samples^{10,11,22}
- Boosts butyrate production in pre-clinical samples^{2,6,19}
- Increases total SCFA in human samples¹⁸

Synergizes with Probiotics

- Enhances viability of *L. rhamnosus* GG and *L. casei*^{4,8,20}
- Stabilizes probiotics in milk, yogurt, and chocolate^{15,16,17}

GUT PATHOGEN DEFENSE, DIGESTIVE HEALTH & PROBIOTIC SYNERGY

Clostridium difficile Defense

- Inhibits *C. difficile* toxin production^{30,31}
- Decreases *C. difficile* viability³¹
- Reduces symptom severity in mouse model of infection¹²
- Potential component of patented treatment²⁵

Maintains Microbiome Diversity

- Preserves microbial diversity during *C. difficile* challenge¹²
- Promotes *Firmicutes*, *Lachnospirales* bacteria; inhibits *Proteus* bacteria¹²

Ulcerative Colitis & IBD

- Alleviates colonitis via MLCK-MLC2 signaling pathway⁷¹
- Synbiotic combination with *L. rhamnosus* attenuates colitis in mice⁹
- Potential component of patented treatment²³

Potential Probiotic-Mediated Benefits

- May regulate glycemia and inflammation via promotion of *F. prausnitzii*, *D. welbionis*, *L. rhamnosus*⁸¹⁻⁸⁴
- May improve mental health via *L. rhamnosus* promotion²⁶
- May improve antibiotic tolerance via promotion of *L. casei*²⁷
- May improve vaginal health via promotion of *L. gasseri*²⁸
- May reduce carcinogen risk via promotion of *A. halii*⁹⁶

TAGATOSE PROMOTES DENTAL HEALTH

FDA-Approved Health Claim (21 C.F.R. § 101.80): “Frequent eating of foods high in sugars and starches as between-meal snacks can promote tooth decay. Tagatose, the sugar used to sweeten this food, unlike other sugars, may reduce the risk of dental caries.”

EFSA-Approved Claim (Commission Regulation (EU) No. 432/2012): “Consumption of foods/drinks containing **D-tagatose instead of sugar** contributes to the maintenance of tooth mineralization.”

Supports a healthy oral environment

- Reduces *Streptococcus* growth ³³⁻³⁶
- Reduces harmful reductions in oral pH ^{32, 33, 36}
- Tagatose saliva content inversely related to dental plaque ³⁴

Prevents & Removes Plaque

- Reduces production of water-insoluble glucan ³⁶
- Inhibits biofilm (dental plaque) formation ^{33, 34, 37}
- Reduces demineralization ¹³
- Reduces bacterial coaggregation to remove plaque ³⁷

Cleans & Protects

- Effective in teeth cleaning and polishing ^{39, 41}
- Air polishes gingiva; cleans implants ⁴⁰

Chewing Gum RCT: Synergistic effect with xylitol to reduce salivary *S. mutans* in healthy adults ³⁵

Modulates Inflammatory Response: Increasing amounts of tagatose associated with less tooth demineralization and less systemic inflammation in mice ¹³

TAGATOSE PROMOTES GLYCEMIC CONTROL

EFSA-Approved Claim: “Consumption of foods/drinks containing **D-tagatose** instead of sugar induces a lower blood glucose rise after their consumption compared to sugar-containing foods/drinks.”

Fasting Glucose

- Reduces in Type 2 diabetes patients ^{42,43}
- Does not increase in healthy subjects ^{3,14,44-54}
- Glycemic index of 3 ⁸⁵

Post-prandial Glucose

- Blunts spikes when consumed with meals in both diabetic and healthy subjects ^{14,45,48,50,56,57,59, 94}

HbA1c

- Reduces over 6 months in patients with mild Type 2 diabetes ^{42,43,51}

Fasting Insulin

- Does not increase in healthy and diabetic subjects ^{3,42,43,45,47-53, 59}

Post-prandial Insulin

- Reduces in healthy and hyperglycemic subjects ^{14,44,45,56,59,85}
- Reduces C-peptide in healthy subjects ⁵⁶
- Does not increase C-peptide in hyperglycemic subjects ⁵⁷

HEALTHY LIPID PROFILE

HDL Cholesterol (Good)

- Increases in Type 2 diabetes patients⁴⁷
- Does not decrease^{46,49}

LDL Cholesterol (Bad)

- Reduces in patients with mild Type 2 diabetes⁴²
- Does not increase in healthy and diabetic subjects^{43,46,47,49,51-53}

Total Cholesterol

- Reduces in patients with Type 2 diabetes and hypercholesterolemic mice^{42,62}
- Reduces compared to sucrose or western-diet^{52,63}
- Does not increase in healthy and metabolically-compromised subjects^{3, 43, 47, 49,51,54,59, 95}

Triglycerides

- Reduces triglyceride levels in atherosclerosis models^{62,63}
- Does not increase in healthy and metabolically-compromised subjects^{3, 46, 47,49, 51, 95}

FURTHER REDUCES CARDIOVASCULAR DISEASE RISK

Body Weight & Fat

- Reduces body weight in patients with Type 2 diabetes human and animal studies ^{43,47,51}
- Reduces body weight compared to fructose and a Western-diet ^{46,49,63}
- Reduces body fat compared to fructose ⁴⁹

Atherosclerosis

- Reduces atherosclerotic lesion development compared to sucrose and a Western-diet in animal models ^{52,63}
- Reduces atherogenicity of oxidized cholesterol ⁵⁴

Inflammation & Oxidative Stress

- Reduces systemic inflammation in mice ¹³
- Reduces inflammation compared to sucrose and fructose ^{46,49,52}
- Reduces oxidative stress compared to fructose ^{46,49}

Organ Protection

- Preserves kidney function compared to fructose ⁴⁶
- Reduces fatty liver (hepatosteatosis) ⁵⁴
- Does not increase heart ischemia/reperfusion injury ⁴⁹

TAGATOSE INCREASES SATIETY

Food Intake

- Reduces in healthy humans⁷⁸
- Does not increase in healthy humans^{45,57}
- Reduces in animal models^{61,77}

Hormonal Mechanisms

- Increases GLP-1 and other satiety hormone levels^{45,61}

Increases Satiation

- Increases satiety compared to water in humans⁵⁷
- Induces similar satiety as sucrose in cupcakes⁷⁹

Anti-Obesity Synergy: Satiety and prebiotic actions of low-calorie (1.5 kcal/g) tagatose suggest a **multi-pathway approach to weight management.**

PRELIMINARY HEALTH FINDINGS

Antioxidant & Cytoprotective

- Increases antioxidant capacity (free radical scavenger) ^{68,54}
- Reduces cell death in hepatocytes via iron chelation ^{65,66,67,68}

Anti-Cancer Potential

- Reduces cancer cell growth ^{69,70}
- May alleviate colorectal cancer via MLCK-MLC2 pathway ⁷¹
- May reduce radiation therapy side effects ⁷⁶

Respiratory Health

- Protects against acute respiratory distress syndrome ⁷²
- May reduce asthma-induced airway inflammation ²⁴

Digestive Health

- Relieves constipation ⁹³
- May alleviate inflammatory bowel disease ^{9, 71}
- Anti-microbial properties ^{16, 80, 86}

Metabolic Health

- Inhibits carbohydrate transport and metabolism ^{29,38,55,58,64,74}
- Activates glycogen synthase in hepatocytes ⁶⁰
- May contribute to anti-diabetic actions of herbal medicine ⁷⁵

Other Findings

- Promotes fetal development (patented) ⁷³
- Improves antibiotic efficacy; reduces infection risk ³⁷

SUGGESTED REVIEW ARTICLES



Tagatose-Specific Reviews

- [87] De Cassia Ortiz A et al. D-tagatose: A Rare Sugar with Functional Properties and Antimicrobial Potential against Oral Species. *Nutrients*, 2024, 16(12):1943.
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