

Butyric-Cal-Mag™

BUTYRIC ACID WITH NUTRIENT SYNERGISTS
TO SUPPORT GUT HEALTH

Clinical Benefits†

- Butyrate, a short-chain fatty acid (SCFA), is the primary fuel for epithelial cells of the colon and helps to maintain intestinal barrier integrity.
- Tributyrin is a highly bioavailable form of butyrate, providing a superior half-life and increase in plasma levels compared to supplementation with sodium butyrate.
- The sustained increase in plasma levels of butyrate with tributyrin supplementation may allow for more systemic and epigenetic effects of butyrate.
- In addition to maintaining the intestinal barrier and reducing intestinal inflammation, butyrate has also been associated with multiple metabolic effects, and may play a role in weight and glycemic control, as well as supporting insulin metabolism.
- Multiple models suggest tributyrin protects the liver and intestinal barrier from a variety of insults, including ethanol and bacterial toxins.

Butyric-Cal-Mag™ supplies tributyrin, as ButyraGen™ a butyrate generator. Upon breakdown by gut enzymes, it supplies the postbiotic butyrate, the primary fuel of colonic cells. Butyric acid is a naturally-occurring 4-carbon fatty acid formed in the healthy colon from the fermentation of dietary fiber by friendly bacteria. **Butyric-Cal-Mag™** also contains complementary antioxidants in the form of mixed carotenoids (a source of vitamin A), calcium and magnesium. In addition, this product provides pantothenic acid, necessary for the synthesis of acetyl CoA.¹ Inhibition of the acetyl CoA pathway has been associated with impaired butyrate synthesis.²

ButyraGen™ – Tributyrin Complex

ButyraGen™ is an innovative ingredient. With its ability to work as a direct butyrate generator, it is able to produce high levels of butyrate directly in the colon.

In pre-clinical studies of ButyraGen™ Tributyrin Complex has been shown to:

- Generate butyrate and other short chain fatty acids³
- Significantly lower gas production when compared to other prebiotics⁴
- Help reduce oxidative stress⁵



Butyric-Cal-Mag™
available in a
60 capsule
bottle (#7810)

Butyrate, a type of short-chain fatty acid (SCFA), is produced by commensal bacteria in the colon from the fermentation of dietary fiber, primarily indigestible plant polysaccharides and resistant starches. In addition to its well-recognized role as the preferred energy source for colonocytes, butyrate has now been shown to have a much broader physiological role that extends beyond the colon, influencing systemic metabolic and immune function, as well as reducing intestinal permeability and inflammation.

Tributyrin contains three butyrate moieties esterified with glycerol, which is rapidly absorbed and hydrolyzed to butyrate when metabolized by pancreatic lipases. Found in honey and dairy products such as butter, tributyrin has several advantages when compared to supplementation with butyrate alone. Tributyrin is more bioavailable, is better tolerated, and allows for significantly higher plasma levels, with approximately three times the serum half-life (demonstrated in animal studies).⁶ Additionally, in contrast to tributyrin, it is not clear that oral butyrate reaches colonocytes, as most of it is taken up by enterocytes in the proximal intestine.⁷



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†These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent any disease.

Tributylin overcomes the limitations imposed by the short half-life of butyrate and has shown promising results for wide-ranging effects in experimental models. Tributylin has been shown to prevent fat accumulation and support liver function compromised by alcohol toxicity, in part mediated through epigenetic mechanisms, including inhibition of histone deacetylases, and activation of PGC-1 α expression, an essential inducer of mitochondrial biogenesis.⁸ Tributylin also protects the liver from damage in response to lipopolysaccharide (LPS)-induced liver injury, an effect mediated through attenuation of several inflammatory mediators, including NF- κ B, a critical regulator of inflammation.^{9,10} It has also been shown to prevent oxidative stress in the colon and preserve intestinal immune function in response to ethanol-induced injury.¹¹ Tributylin has been shown to modulate PPAR γ and AMPK, with favorable effects on memory and cognitive function in animal models of memory impairment, consistent with the generally beneficial effect of SCFAs on the gut-brain axis.^{12,13} Activation of AMPK also appears to be one mechanism by which butyrate enhances intestinal barrier function, as AMPK activation increases the assembly of epithelial tight junctions.^{14,15} Protection from toxins, such as *C. difficile* toxins, also appears to be another mechanism by which butyrate reduces intestinal inflammation.¹⁶

Metabolic Health

In addition to its ability to help maintain intestinal barrier integrity and support immune function, butyrate has emerged as a potential link between diet and intestinal flora, and the dysbiosis-associated inflammation linked to both obesity and metabolic disturbances.^{17,18} The Western diet has been associated with a reduction in the richness and diversity of intestinal bacterial species, including a decrease in species known to synthesize butyrate. Metabolic syndrome, hypertension, type 2 diabetes, and obesity have all been associated with a decrease in the abundance of butyrate-producing bacteria, such as *F. prausnitzii*, and *A. muciniphila*, as well as reduced intestinal levels of butyrate.^{19,20,21} In a proof-of-concept study, supplementation of insulin resistant and overweight/obese participants with *A. muciniphila* reduced body weight, inflammation, and fat mass, while improving insulinemia and insulin resistance, effects likely related to the increase in butyrate synthesis.²² Furthermore, supplementation with butyrate directly has been associated with improvements in weight, glucose metabolism, and inflammation in a quadruple-blinded trial of pediatric obesity, further supporting the case for butyrate as a regulator of energy intake and metabolism.²³ Multiple mechanisms likely underlie these clinical benefits, including improved insulin sensitivity, upregulation of mitochondrial activity and fat oxidation, decreased energy intake, and stimulation of leptin expression.^{24,25,26}

References

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Supplement Facts

Serving Size: 2 Capsules
Servings Per Container: 30

	Amount Per Serving	% Daily Value
Vitamin A (as natural mixed carotenoids and acetate)	975 mcg RAE	108%
Pantothenic Acid (as calcium pantothenate)	16.7 mg	334%
Calcium (as calcium citrate)	40 mg	3%
Magnesium (as magnesium citrate)	40 mg	10%
ButyraGen™ Tributyrin Complex	1,000 mg	*

*Daily Value not established

Other ingredients: Capsule shell (gelatin and water), gum arabic, guar fiber, rosemary extract, silica and cellulose.

This product is gluten and dairy free.

ButyraGen™ is a trademark of NutriScience Innovations LLC.

RECOMMENDATION: Two (2) capsules as a dietary supplement or as otherwise directed by a healthcare professional.

KEEP OUT OF REACH OF CHILDREN

Store in a cool, dry area. Sealed with an imprinted safety seal for your protection.



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