PROTOCOL FOR LIFE BALANCE®

Dietary Supplement Information
for Physicians with Naturokinetics®
PRODUCT CODE: P3097
CATEGORY: DETOXIFICATION*

Calcium D-Glucarate

TECHNICAL SUMMARY

Naturally found in certain fruits and vegetables, calcium-d-glucarate is a biochemical compound that supports healthy glucuronidation, a natural process by which normal cells eliminate microscopic waste and the by-products of detoxification.* In this way it is especially helpful in promoting cellular health in liver, prostate and breast tissues.* Taken as a supplement, calcium-d-glucarate encourages elimination of typical environmental toxins and normal hormone metabolites through its support of healthy detoxification mechanisms.*

Structure Formula: Calcium D-glucarate is the calcium salt of D-glucaric acid. D-glucaric acid is naturally present in small quantities in fruits and vegetables (for reference one orange, the richest fruit source, has around 5 mg glucaric acid).

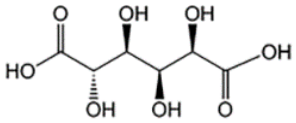

Figure 1. D-glucaric acid

Chemical Name: (2S,3S,4S,5R)-2,3,4,5-tetrahydroxyhexanedioic acid

Allergen and Additive Disclosure: Not manufactured with wheat, gluten, soy, milk, egg, fish, shellfish or tree nut ingredients. Produced in a GMP facility that processes other ingredients containing these allergens. The D-glucaric acid present in this product is derived from cane sugar.

Delivery Form: Vegetable capsule.

ROLE AS NUTRIENT/FUNCTION

In order to understand the mechanism of action of calcium d-glucarate, a short overview of one aspect of the body's detoxification system is detailed below.

In the liver, part of the normal phase II detoxification process consists of transferring glucuronic acid to potentially harmful xenobiotics and steroid hormones. This process allows for rapid elimination of these conjugated compounds through urine and bile.

Beta-glucuronidase is an enzyme naturally present in the small intestine, the general circulation, and all tissues. It is able to deconjugate xenobiotics and steroid hormones. Thus, deconjugation allows these compounds to be reabsorbed in the intestinal tract and to recirculate in the body as "free" deconjugated (aglycone) compounds.

The body normally maintains a balance between conjugation (in the liver) and deconjugation (via beta-glucuronidase). However, in certain circumstances†, levels of beta-glucuronidase are elevated, which offsets the natural balance towards more deconjugation, and in turn can lead to an increased presence of free steroid hormones and xenobiotics.

When beta-glucuronidase levels are high, calcium D-glucarate supplementation may be useful. Indeed, calcium D-glucarate is metabolized into D-glucaro-1,4-lactone (see Naturokinetics section for more details about the metabolism of calcium D-glucarate), which is known to decrease beta-glucuronidase activity.* By reducing the activity of beta-glucuronidase, D-glucaro-1,4-lactone may help to rebalance the conjugation/deconjugation detoxification system of the body towards conjugation and thereby promote normal, healthy elimination of steroid hormones and everyday xenobiotics.*

† Some epidemiological data suggest that older men with higher BMI and certain diet patterns have higher beta-glucuronidase levels. Beta-glucuronidase levels are increased in the blood of individuals submitted to high levels of certain environmental toxins. Some bacteria, as part of the normal GI microbiota, produce different amounts of beta-glucuronidase. Finally, in some animal models, higher beta-glucuronidase levels are observed in situations of localized alteration of cell multiplication.

Supplement Facts

Serving Size 1 Veg Capsule

	Amount Per Serving	% Daily Value
Calcium (from Calcium D-Glucarate)	60 mg	5%
Calcium D-Glucarate (Tetrahydrate Form)	500 mg	†

† Daily Value not established.

Other ingredients: Hypromellose (cellulose capsule), Microcrystalline Cellulose and Stearic Acid (vegetable source).

- Supports Healthy Detoxification*
- Promotes Breast and Prostate Health*

SUGGESTED USAGE: Take 1 capsule 3 times daily, or as directed by your healthcare practitioner.

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Liberation: Calcium-D glucarate vegetable capsules dissolve within 60 minutes in a USP method of disintegration in water.

Absorption: In animal models, d-glucaric acid and D-glucaro-1,4-lactone are absorbed in the intestine.

Distribution: Both D-glucaric acid and D-glucaro-1,4-lactone are endogenously produced in the body. The body distribution of these compounds after oral ingestion of calcium-D glucarate has not been evaluated.

Metabolism: In the acid environment of the stomach, calcium D-glucarate is metabolized into D-glucaric acid, which is further metabolized into D-glucaro-1,4-lactone and D-glucaro-6,3-lactone.

Elimination: D-glucaric acid is eliminated in urine. D-glucaro-1,4-lactone is eliminated in urine and, to a lesser extent, in bile.

CLINICAL VALIDATION

- In a Phase I, dose-ranging, clinical study on healthy individuals receiving from 1.5 to 9.0 g/d calcium d-glucarate for six weeks, blood

levels of D-glucaric acid and beta-glucuronidase were measured at baseline and every two weeks. Researchers observed a consistent reduction of beta-glucuronidase levels as well as increased d-glucaric acid levels.*

SAFETY INFORMATION

Tolerability: No unusual toxicity was encountered in a phase I dose escalation study at up to 9.0 g/d, and calcium d-glucarate was well-tolerated, even at the highest dose.

Contraindications: None known. Due to the potential interference with hormonal metabolism this product is not recommended for pregnant/nursing women.

INTERACTIONS

Drug Interactions: As per mechanism of action, calcium d-glucarate intake may interfere with any medication metabolized through phase II glucuronidation in the liver. Healthcare practitioners should take this effect into consideration when initiating calcium d-glucarate supplementation.

Supplement Interactions: As per mechanism of action, calcium d-glucarate intake may interfere with any supplement metabolized through phase II glucuronidation in the liver. Healthcare practitioners should take this effect into consideration when initiating calcium d-glucarate supplementation.

Interaction with Lab Tests: None known.

STORAGE

Store at ambient conditions in a tightly sealed container.