

# Calcium D-Glucarate SAP

Science-based calcium D-glucarate for optimal detoxification\*

Calcium D-glucarate is a calcium salt of D-glucaric acid, which is a naturally occurring substance. Glucaric acid is found in several fruits and vegetables, with its highest concentration being found in cruciferous vegetables, apples, oranges, and grapefruits, and it is also made in small amounts in the human body.<sup>[1]</sup> D-Glucarate is an important substance that assists the body in its quest to detoxify and eliminate various toxins, hormones, and carcinogens from the system.\* Two of the mechanisms that the body uses to detoxify are conjugation and glucuronidation, by which the body binds water-soluble substances to hormones or carcinogens, making it easier for them to be excreted. The enzyme  $\beta$ -glucuronidase breaks the bonds formed during the detoxification process, which allows substances to recirculate in the body instead of being excreted. D-Glucarate inhibits  $\beta$ -glucuronidase, therefore encouraging the elimination of the potentially harmful toxins, carcinogens, or hormones.

## SUPPLEMENT FACTS

Serving Size: 1 Capsule		Servings: 60
	Amount Per Serving	% Daily Value
Calcium (from 650 mg of calcium D-glucarate)	84.5 mg	7%

\*\*Daily Value not established

**This product is non-GMO.**

**Contains no:** Gluten, soy, wheat, corn, eggs, dairy, yeast, citrus, preservatives, artificial flavor or color, starch, or sugar.

**Calcium D-Glucarate SAP** contains 60 capsules per bottle.

## DIRECTIONS FOR USE

**Adults:** Take 1 capsule one to four times daily or as directed by your healthcare practitioner.

## INDICATIONS

### Calcium D-Glucarate SAP:

- Can be used to enhance phase II detoxification by the liver.\*
- May help prevent various types of cancers, including breast, colon, and liver cancers.\*
- Helps reduce serum cholesterol levels.\*
- Can help prevent platelet aggregation via its antioxidant mechanism.\*
- May be a useful therapy for women with fibrocystic breast disease.\*

## SAFETY

**Calcium D-Glucarate SAP** may increase the excretion of some medications and hormones. Do not use if you are pregnant or breast-feeding. Consult a healthcare practitioner prior to use if you are taking any other medications.

## PURITY, CLEANLINESS, AND STABILITY

All ingredients listed for all **Calcium D-Glucarate SAP** lot numbers have been validated by an ISO 17025-accredited third-party laboratory for identity, potency, and purity.

**\* 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.**

Scientific Advisory Panel (SAP):  
adding nutraceutical research  
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## BIOCHEMISTRY

In the body, calcium D-glucarate is converted through a series of reactions to the active molecule D-glucaro-1,4-lactone, which inhibits  $\beta$ -glucuronidase.<sup>[1, 2]</sup> D-Glucaro-1,4-lactone has been found to be formed from D-glucarate salt in the stomach. It is absorbed from the intestinal tract and transported via the bloodstream to internal organs.<sup>[2, 3]</sup> It is mainly excreted via urine, but also to a smaller extent in bile.<sup>[2]</sup> Calcium D-glucarate works to enhance detoxification by increasing glucuronidation, and therefore enhancing excretion of potentially toxic compounds. Glucuronidation occurs during the second phase of liver detoxification, and is the process of taking hormones, carcinogens or other lipid-soluble toxins and conjugating them with glucuronic acid for them to be excreted via the biliary tract.<sup>[1]</sup>  $\beta$ -Glucuronidase can deconjugate these toxins, making it possible for the toxins to be reabsorbed into the body.<sup>[1]</sup> D-Glucaro-1,4-lactone is able to inhibit the functioning of  $\beta$ -glucuronidase, which results in an increase in excretion of the conjugated compounds and decreases the potential harm they could cause in the body.<sup>[1]</sup> Calcium D-glucarate has the ability to reduce the  $\beta$ -glucuronidase activity of intestinal bacteria, which enhances enterohepatic circulation; this results in a reduction of cholesterol synthesis, and decreased serum cholesterol levels.<sup>[1]</sup>

## CALCIUM D-GLUCARATE AND CANCER

Elevated activity of  $\beta$ -glucuronidase is associated with an increase in risk for several different cancer lines, but in particular hormone-dependent cancers like breast and prostate.<sup>[2, 3]</sup> Calcium D-glucarate is a precursor for D-glucaro-1,4-lactone, which increases the processing of carcinogens as well as other tumour promoters, by inhibiting  $\beta$ -glucuronidase.<sup>[2, 4]</sup> D-Glucaro-1,4-lactone and its precursors alter steroidogenesis, which changes the hormonal environment and proliferative status of the target organs, which is one of the mechanisms that they work to exert their anticancer action.<sup>[2]</sup> D-Glucarate has the ability to suppress cell proliferation and inflammation, and can also induce apoptosis.<sup>[2, 4]</sup> In an animal model, researchers found that calcium D-glucarate was able to inhibit carcinogenesis during the initiation and promotion phases, by inhibiting protein tyrosine kinase-C activity and inducing transformation growth factor  $\beta$ .<sup>[5]</sup> Supplementing the body with D-glucarates improves the natural defense system of the body for eliminating tumour promoters and carcinogens.<sup>[2]</sup>

## CALCIUM D-GLUCARATE AND OXIDATIVE STRESS

A study examined the role of D-glucaro-1,4-lactone, sodium D-gluconate, and calcium D-glucarate on blood platelets that were under oxidative stress.<sup>[6]</sup> It is known that platelet activation is essential in tumour progression, inflammation, allergic reactions, and haemostasis.<sup>[6]</sup> The study measured in vitro levels of specific oxidative stress markers including superoxide anion, carbonyl groups, 3-nitrotyrosine protein,

thiobarbituric acid reactive substances, and low-molecular-weight thiols.<sup>[6]</sup> Each of the substances tested significantly inhibited thrombin-induced arachidonic peroxidation as well as platelet protein oxidation/nitration induced by peroxynitrite — a strong oxidant formed intravascularly in vivo.<sup>[6]</sup> In the presence of the glucose derivative, there was a significant decrease seen in nitrotyrosine formation, thiol oxidation, and carbonyl group generation.<sup>[6]</sup> These results indicate that gluconate salts may be helpful, via antioxidant mechanisms, in preventing excessive platelet activation.<sup>[6]</sup>

## CALCIUM D-GLUCARATE AND FIBROCYSTIC BREAST DISEASE

Researchers examined fluid removed from cysts from women with fibrocystic breast disease (FBD) and compared the fluid with that of a control group of women who did not have benign breast disease. Results demonstrated that in selected cyst fluids, the level of  $\beta$ -glucuronidase significantly influenced the ratio of unconjugated to glucuronidated estradiol.<sup>[7]</sup> Patients with fibrocystic breast disease fell into one of two distinct subpopulations, based on their level of  $\beta$ -glucuronidase activity. One group had close to normal activity; however, the second group had an average serum  $\beta$ -glucuronidase activity that was three times higher than the healthy controls.<sup>[7]</sup> This is an area that requires further research to determine what the cause of this variation is in the subgroups of women with FBD, but it does appear that elevated  $\beta$ -glucuronidase activity may contribute to fibrocystic breast disease in some women.

## SAFETY OF CALCIUM D-GLUCARATE

No side effects have been reported with calcium D-glucarate. Many pharmaceuticals, especially hormones, are metabolized in the liver by binding to glucuronic acid. It is therefore possible that taking calcium D-glucarate may increase the elimination of certain pharmaceuticals and hormones from the body.

## REFERENCES

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