

# Supplements to help manage Blood Sugar Health

## Cinnamon

**COMMON NAME:** Cinnamon, cinnamonbark, Ceylon cinnamon (“true” cinnamon), cassia cinnamon

**SCIENTIFIC NAME:** *Cinnamomun verum* (also known as *Cinnamomum zeylancium*), *Cinnamomum cassia*

### RECOMMENDED WITH CAUTION

#### LEVELS OF EVIDENCE



**Recommended:**

Several well-designed studies in humans have shown positive benefit. Our team is confident about its therapeutic potential.



**Recommended with Caution:**

Preliminary studies suggest some benefit. Future trials are needed before we can make a stronger recommendation.



**Not Recommended - Evidence:**

Our team does not recommend this product because clinical trials to date suggest little or no benefit.



**Not Recommended – High Risk:**

Our team recommends against using this product because clinical trials to date suggest substantial risk greater than the benefit.

#### Evaluated Benefits

Lowers fasting and postprandial blood sugar in Type 2 diabetics

Lowers fasting and postprandial HbA1c in Type 2 diabetics

## Source

Preparation of cinnamon involves stripping of the outer bark of the tree, allowing the inner bark to dry and curl into commonly recognized “cinnamon quills.”

## Indications/Population

Lowers fasting and postprandial blood sugar and HbA1c

Patients with diabetes, metabolic syndrome, and reproductive metabolic syndrome (formerly known as polycystic ovarian syndrome)

## Mechanism of Action

Cinnamon is thought to improve insulin sensitivity, which improves insulin efficiency and reduces the levels required for equivalent metabolic effect. In the in vitro model, cinnamon’s insulin-potentiating activity is found in the aqueous (water-soluble) fraction. In contrast, cinnamon oil and its major components, which include cinnamaldehyde, cinnamic acid, eugenol, and coumarin, lack in vitro insulin-enhancing activity.

Research using the rat model suggests that cinnamon extract may interfere with the development of insulin resistance by enhancing insulin signaling, possibly through involvement of the nitric oxide pathway in skeletal muscle.

Aqueous cinnamon extract has been shown to improve insulin sensitivity in humans, and to increase glucose uptake and GLUT4 expression in 3T3-L1 adipose cells. Cinnamon extract inhibited retinol-binding protein 4 (RBP4), a novel adipokine that contributes to insulin resistance in plasma and adipose tissues. Cinnamon extract consumption also appears to regulate glucose uptake-related genes, including GLUT1, GLUT4, glycogen synthase 1, and glycogen synthase kinase 3B mRNA expression in adipose tissue.

In a small crossover study of 14 healthy subjects, the addition of 6 grams of cinnamon to rice pudding significantly delayed gastric emptying and lowered postprandial glucose levels. Possibly due to water-soluble procyanidin type A polymers, a polyphenolic component, cinnamon appears to inhibit intestinal glucosidases and to enhance the ability of pancreatic amylase to delay gastric emptying.

## Side Effects

Isolated cases of a specific cinnamon-induced contact allergy termed “stomatitis venenata” (inflammation of the oral mucosa) have been reported with consumption of cinnamon spice. However, no specific studies of adverse effects with oral administration of cinnamon extract have been published to date.

In vivo animal studies are also notable for a lack of significant toxic effects on liver and kidneys, with a therapeutic dosing window of consumption quantity much higher than would typically be expected.

## Dosing

Doses have been studied in the range of up to 1–6 grams daily. The effect appears to be dose dependent.

## Drug Interactions/Cautions

- Careful glucose monitoring indicates its glucose-lowering effect may cause hypoglycemia in patients on other antidiabetic or hypoglycemic medications.
- Although short-term trials have demonstrated no significant adverse outcomes with *Cinnamomum cassia*, its relatively high coumarin content is a possible concern with prolonged use. In comparison, the low coumarin content of *Cinnamomum zeylanicum* makes it potentially more useful for long-term use, although this formulation may have a lesser effect on insulin function. Coumarins are naturally occurring plant compounds with anticoagulant, carcinogenic, and hepatotoxic properties. A daily intake greater than 0.1 mg/kg body weight can have a measurable effect on blood coagulation in patients on blood-thinner medications such as warfarin. The addition of coumarin to food products is therefore prohibited, and, further, patients with diagnosed hepatic disorders are generally advised to avoid cinnamon.

## Notes

In the majority of studies that did not find a beneficial effect from taking cinnamon or its aqueous extract, diabetic subjects' blood sugars were already well controlled with therapeutic doses of appropriate medications.

## References

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