

# The Antidiabetic Activity of Aloe Vera

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ARTICLE TOOLS

Statistics compiled by the American Diabetes Association (ADA) show diabetes was the sixth leading cause of death in 2000. It is estimated that 18.2 million people in the United States have diabetes. ADA reports heart disease is the leading cause of diabetes-related deaths, citing adults with diabetes have heart disease death rates and risk of stroke from two to four times higher than adults without diabetes. Diabetes has been linked to factors associated with a Western lifestyle, but the reality is diabetes is one of the leading causes of death worldwide. Research has shown that being overweight or obese are leading risk factors for developing Type II diabetes. The ADA Web site ([www.diabetes.org](http://www.diabetes.org)) offers information on weight loss and a brochure with advice on how to start losing weight and become more active.

Diabetes is a deficiency or absence of the hormone insulin, which is the main hormone responsible for the control of sugar in the blood. Research indicates that even moderately elevated blood sugar levels can increase the risk of cardiovascular disease, morbidity and mortality, even in non-diabetics. Research also shows that elevated blood sugar leads to increased oxidative stress and there is evidence that increased production of free radicals may be a contributing factor in the complications seen in diabetes. According to the National Institutes of Health (NIH), studies have shown that patients with diabetes appear to have decreased antioxidant defense capability with lower levels of specific antioxidants such as vitamins C and E, or reduced activities of antioxidant enzymes such as catalase, superoxide dismutase (SOD) and glutathione peroxidase.

People with Type I diabetes must take insulin because their bodies do not make enough of it, whereas people with Type II diabetes benefit by reducing blood sugar levels through exercise and a healthy diet. However, it is not uncommon for people with Type II diabetes to require medication to stimulate the pancreas to produce more insulin, decrease the amount of glucose made by the liver, slow the absorption of starches in the diet, or take a combination of medications to control blood sugar. But the management of diabetes without any side effects is still a challenge and has increased the demand for research on natural products with antidiabetic activity.

A growing body of *in vitro* and *in vivo* research shows Aloe vera has significant antidiabetic activity. In a human clinical trial conducted at the Mahidol University of Bangkok, Thailand, 72 patients with high fasting blood sugar and typical diabetic curve of glucose tolerance who had never been treated with hypoglycemic drugs were selected to participate in the study.<sup>1</sup> The placebocontrolled, single blind trial was conducted to evaluate the effects of oral aloe supplementation on blood sugar, cholesterol and triglycerides. The treatment group received 15 milliliters of aloe gel twice a day, in the morning and before bedtime, for 42 days.

Blood samples were taken weekly for measurement of fasting blood glucose levels and every two weeks for triglyceride and cholesterol analyses. Before treatment, the patients in the control and treated groups showed no significant differences in blood markers. After treatment, blood sugar in the treatment group had been reduced 43 percent, blood triglycerides were reduced by 44 percent and there was no change in cholesterol. No adverse side effects were reported due to aloe supplementation, and there was no difference in weight or appetite in the treatment group. The authors note that this trial confirmed a report published in 1985.

In that study, 5,000 patients with atheromatous heart disease were studied over a five-year period.<sup>2</sup> Out of 5,000 patients, 3,167 were diabetics, 2,572 had a history of smoking and 2,151 had evidence of hypertension. All patients were instructed not to consume alcohol during the study and smoking was not allowed. All patients were instructed to take 100 g of Aloe vera gel and 20 grams of Husk of Isabgol (for fiber), mixed with wheat flour and prepared in bread, that was consumed at lunch and dinner daily for the five-year period of the study. During the initial phase of the study participants remained on the same schedule of medications they were on prior to the study.

According to the researchers, patients experienced positive improvements as early as the second week after the treatment with aloe was initiated. The disappearance of chest pains associated with heart disease, as well as improvement in their electrocardiogram results, even after treadmill tests, were seen in patients after three months, and none of them suffered fresh heart attacks during the study. After three months, the lipid profile of patients also improved. Serum cholesterol and triglyceride levels of 93 percent of the patients returned to normal and out of the 3,167 diabetic patients, 94 percent of the patients' blood sugar levels returned to normal. Of the 2,990 diabetic patients responding to the treatment, all the oral hyperglycemic medications had to be withdrawn by the end of two months' treatment with aloe. All patients taking beta blockers, calcium channel blockers and diuretics for hypertension and angina control had their medications reduced to half the dose they were taking prior to the study. Hypertensive patients did not show any significant change in blood pressure levels. At the conclusion of the study all 2,990 diabetic patients responding to the treatment remained on diet control alone. The study concluded aloe had a definite role in the prevention and management of atherosclerotic heart disease and in controlling the blood sugar level in diabetic patients.

At Mahidol University, a second trial with Aloe vera was conducted to determine the effect of aloe treatment in patients unresponsive to glibenclamide, an antidiabetic medication used to lower blood sugar levels by stimulating the production and release of insulin from the pancreas.<sup>3</sup> In this study, levels of fasting blood glucose, cholesterol and triglycerides were unchanged when glibenclamide was used alone.

Results for the aloe treatment group were similar to the first study with a 48 percent decrease in blood sugar levels, a 52 percent decrease in triglycerides and no change in cholesterol. The results of treatment with glibenclamide and aloe in combination were the same as treatment with aloe juice alone. Even after 42 days, blood sugar levels had not dropped to normal values, which suggested that the dose may not have been high enough.

Supporting evidence for the antidiabetic activity of Aloe vera has also been reported from animal studies. One study reported lifelong dietary aloe supplementation results in suppressed free radical-induced oxidative damage and age-related increases in hepatic cholesterol.<sup>4</sup> In this age-related study on the hepatic cholesterol and oxidative status of rats it was found that hepatic cholesterol of aging animals in the control group was significantly increased in contrast to the aloe treated group, which showed a 30 percent lower cholesterol level. Superoxide dismutase (SOD) and catalase activity were both increased in the aloe treatment group and signs of oxidative tissue damage, such as lipid peroxidation, were decreased. Another study found similar results in the treatment of neonatal streptozotocin-induced Type II diabetic rats.<sup>5</sup> The author reported treatment with aloe decreased damage to the liver, increased glutathione and decreased lipid peroxidation, and concluded aloe gel has a protective effect comparable to glibenclamide against hepatotoxicity produced by diabetes when used in the treatment of Type II diabetes.

The control of blood sugar is critical in the management of diabetes. Research has shown elevated blood sugar increases oxidative stress and the risk of cardiovascular disease, and patients with diabetes have decreased antioxidant defenses with lower levels of antioxidants such as vitamins C and E, or reduced activities of antioxidant enzymes such as catalase, superoxide dismutase and glutathione peroxidase. In the studies reported here, oral treatment with Aloe vera gel has been shown to aid in the normalization of blood sugar, stimulate the body's own antioxidant defenses and increase the bioavailability of antioxidant supplements. These studies indicate that aloe gel has a beneficial effect on the liver, as a hypoglycemic agent, and in cardiovascular disease by reducing oxidative stress.

A dosing study has not yet been conducted to establish the optimum daily intake of aloe as a functional food in conjunction with the studies cited here. General recommendations for aloe as a supplement range from 1-oz. to 2-oz. of single strength juice or 150 mg to 300 mg of gel powder twice a day, in the morning and before bed. Single strength aloe gel is typically standardized to 0.5 percent solids and gel powders are commonly referred to as a 200X or 200-to-1 concentration. Whole leaf products are usually standardized to 1 percent solids and whole leaf powders are a 100X or 100-to-1 concentration.

Aloe polysaccharides are thought to be the essential bioactive compound present in aloe. Selection of a quality product should be based on total polysaccharide content, and ultimately, research-proven efficacy. Aloecorp offers a standardized product (ACTIVE ALOE®) with a polysaccharide content guaranteed to be 10 percent by dry weight; the ingredient is manufactured by a patent protected process that preserves and enhances the native biological activity of the aloe plant and ensures batch to batch consistency.

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