



## Aloe Vera

### What is Aloe?

Aloe is a succulent plant widely used in alternative medicine. There are at least 420 different plant species of Aloe. Aloe vera specifically refers to the Aloe barbadensis Miller plant, which is the most common form used in Aloe-based products.

### How is Aloe used?

Traditionally, the clear gel from the Aloe plant is rubbed on the skin as an ointment to treat wounds and burns. The green part of the leaf can be made into a juice or dried and taken orally as a laxative. Aloe vera is used in many commercial products in various forms, including drinks, concentrates, capsules, powders, and as a flavoring.

### Why did NTP study Aloe?

The nomination to study Aloe vera came from the National Cancer Institute, because of Aloe's widespread use and concern that some components may cause cancer. The NTP studies on Aloe vera were conducted in collaboration with the U.S. Food and Drug Administration (FDA) National Center for Toxicological Research.

### What did the NTP study find?

The two-year NTP study of a non-decolorized whole leaf extract of Aloe vera given in an animal's drinking water found clear evidence of carcinogenic activity in male and female rats, based on tumors of the large intestine. There was no evidence of carcinogenic activity in mice.

NTP did not conduct two-year studies of ingestion of the Aloe vera gel or of the plant's decolorized whole leaf extracts.



### What is the difference between decolorized and non-decolorized Aloe?

The difference between decolorized and non-decolorized whole leaf extracts is mostly in how the leaf is processed or filtered. In many cases, manufacturers of oral products containing Aloe vera use a charcoal filtration process to decolorize and remove some of the components from the leaf, including anthraquinones, which act like laxatives. Some anthraquinones have previously been shown to be carcinogenic.

### If I use Aloe vera gel on my skin, will it cause me harm?

Applying Aloe vera gel on the skin is not likely to cause harm. Although these particular NTP studies only looked at oral exposure to Aloe vera, other NTP studies examined the effects of the gel on skin, and did not find a strong link between Aloe vera in skin care products, sunlight, and the development of skin cancer. The results of the skin studies were reported in NTP Technical Report 553 at [http://ntp.niehs.nih.gov/ntp/htdocs/LT\\_rpts/TR553.pdf](http://ntp.niehs.nih.gov/ntp/htdocs/LT_rpts/TR553.pdf).

### Why would people consume drinks that have Aloe in them?

Product advertisements claim the drinks can be used to cleanse the digestive system or relieve constipation.

### What makes Aloe act like a laxative?

An organic component in the outer leaf pulp of Aloe leaves, known as the latex, contains anthraquinones. Aloin is an example of an anthraquinone found in the latex that may give the plant its laxative qualities.

### How much aloin is in products in the U.S. that may be consumed by the public?

There are very little data about what the levels of aloin are in consumer products. According to published research, levels of aloin in most liquid products are less than one part per million (ppm). However, levels in solid or semisolid products may be 10 to 100 times higher.

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**The two-year NTP study on consumption of non-decolorized whole leaf extract of Aloe vera found clear evidence of carcinogenic activity in male and female rats, based on tumors of the large intestine. More information, including how individuals use different types of Aloe vera products, is needed to determine the potential risks to humans.**

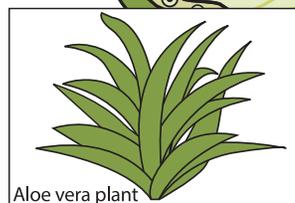




## Aloe Vera Plant

The outer leaf pulp contains latex and anthraquinones, such as aloin

The green rind or cuticle of the plant



The inner leaf stores the gel

### How much aloin is in a typical drink?

This is not clear. Industry usually processes the Aloe vera leaf to make a decolorized whole leaf extract to remove the aloin. Industry has a self-regulated upper limit standard of 10 ppm of aloin in orally ingested products, but there are no labeling requirements for aloin content.

### What are the adverse effects of excessive Aloe exposure in humans?

More research is needed to answer this question. In laboratory rats, a non-decolorized whole leaf extract of Aloe vera caused intestinal tumors.

If you are concerned, have a medical condition, or are taking other drugs, herbs, or supplements, you should speak with your physician before altering existing treatments or starting any new treatment.

### How similar are the doses of aloin in the drinking water fed to the animals to those found in Aloe vera products?

This is not clear, as there are no labeling requirements to list aloin content in consumer products. The concentration of aloin in the water rodents drank in the NTP study is similar to that found in some Aloe vera products, but higher than in other products.

NTP wanted to test an Aloe preparation that included all components that may be in products on the market. The NTP study used a whole leaf extract of Aloe barbadensis Miller that did not undergo charcoal filtration during processing. Many commercial producers of Aloe vera beverages use charcoal filtration to reduce the levels of aloin in their products.

### Is Aloe vera regulated?

Aloe vera is regulated by the FDA as a dietary supplement and not a regulated drug.

### What do the NTP rodent studies mean for humans?

The NTP rat studies give cause for serious concern. Some questions that need to be answered before their importance can be fully appreciated include what products are actually in the marketplace; what are the aloin levels across a broad spectrum of products; and what are the patterns of human exposure. There is not enough information currently available to know how much Aloe vera people are consuming or for how long.

Based on what we know right now, there is nothing that would lead us to believe this finding would not be relevant to humans.

### Do you have any idea what may be causing the tumors and the other effects?

We suspect it may be the aloin, but we don't know for sure. We hope to do more studies to determine what may be causing the tumors.

An independent study showed that decolorized whole leaf Aloe vera with low levels of aloin did not cause adverse effects in rats (see <http://www.ncbi.nlm.nih.gov/pubmed/23500775>). This reinforces the idea that aloin may be responsible for the adverse effects seen in the colon of rats in the NTP study of non-decolorized whole leaf Aloe vera.

### I thought drinking Aloe products was good for me. Should I stop drinking Aloe?

That is a decision you may want to make with your health care provider. Like any personal decision, the more information you have the better. Currently, manufacturers are not required to label aloin concentration in Aloe vera products. If aloin is the cause of the tumors in rats, then, generally speaking, the lower the concentration of aloin in a product, the lower the possibility that it may cause harm. Tumors developed in animals that drank water containing 60 ppm of aloin daily for nearly their entire lifetime.



**Aloe vera**

**Where can I find out more about Aloe vera?**

**The NTP data and reports are available at**  
[http://ntp.niehs.nih.gov/ntp/htdocs/lt\\_rpts/tr577\\_508.pdf](http://ntp.niehs.nih.gov/ntp/htdocs/lt_rpts/tr577_508.pdf)

**National Center for Complementary and Integrative Health**  
<http://nccih.nih.gov/health/aloevera>