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THE COMPLETE STORY OF ALOE VERA

by The International Aloe Science Council, Inc.

The semi-tropical plant, Aloe Vera, has a long and illustrious history dating from biblical times. It has been mentioned throughout recorded history and given a high ranking as an all-purpose herbal plant.

Aloe's thick, tapered, spiny leaves grow from a short stalk near ground level. It is not a cactus, but a member of the tree family, known as Aloe Barbadensis. Aloes is related to other members of the Lily family such as the onion, garlic and turnip families. Aloe's relationship to the family is evident from the tubular yellow flowers produced annually in the spring that resemble those of the Eastern Lily.

There are over 250 species of aloe grown around the world. However, only two species are grown today commercially, with Aloe Barbadensis Miller and Aloe Aborescens, being the most popular. The Aloe plant is grown in warm tropical areas and cannot survive at freezing temperatures.

In the United States, most of the Aloe is grown in the Rio Grande Valley of South Texas, Florida and Southern California. Internationally, Aloe can be found in Mexico, the Pacific Rim countries, India, South America, Central America, the Caribbean, Australia and Africa.

The leaves of the Aloe plant grow from the base in the rosette pattern. Mature plants can grow as tall as two and a half inches to four feet with the average being around twenty-eight to thirty six inches in length. Each plant usually has twelve to sixteen leaves that, when measured, may weight up to three pounds. The plants can be harvested every six to eight weeks by removing three to four leaves per plant.

The original commercial use of the Aloe plant was in the production of a latex substance called Aloin, a yellow sap used for many years as a laxative ingredient. This product became synonymous with the name "Aloe" and recorded in the trade, technical and government literature during the early 20th century. This terminology created much confusion later when Aloe's other main ingredient, Aloe Gel, a clear colorless semi-solid gel, was stabilized and marketed. This Aloe Vera Gel, beginning in the 50's, has gained respect as a commodity used as a base for nutritional drinks, as a moisturizer, and a healing agent in cosmetics and OTC drugs.



Chemical analysis has revealed that this clear gel contains amino acids, minerals, vitamins, enzymes, proteins, polysaccharides and biological stimulators. Public interest in Aloe has grown quickly, and now there is a considerable amount of research into the various components of Aloe to find out more about their properties and to characterize these components. So that more specific research can provide clues to the “magic” That is attributed to Aloe Vera.

This “magic” concept brought the industry under the Federal Food and Drug Administration’s microscope in the late 70’s and early 80’s. The claims made to the consumer about uses and effectiveness of Aloe was exaggerated.

Aloe Vera gel, like most natural juices, both fruit and vegetable, is an unstable product when extracted and is subject to discoloration and spoilage from contamination by microorganisms. The great success of Aloe as a commodity for use in nutritional foods and cosmetics is due to the proper stabilizing procedures that enable processors to store and ship the Aloe Gel without fear of spoilage throughout the market places of the world. Research conducted around the world leaves little doubt that certain biochemical properties of Aloe will be proven facts. Such attributes as moisturizing and penetrating properties are known, but the attributes such as its healing abilities and analgesic action to bacterial activity have not been clearly defined and documented through properly controlled scientific research and testing.

Today, the Aloe industry has established high ethical standards for business and their Aloe products. Through the International Aloe Science Council Inc., the industry has solidified its dedication to providing the world with the highest quality Aloe. The wide acceptance of Aloe by society in so many consumer products suggests that the IASC is moving in the proper direction. The image of Aloe has never been higher. The IASC has a dedicated group of professionals committed to the further growth, research and marketing of quality Aloe Vera Gel and Aloe products made from this Gel. This is because the IASC knows the future of Aloe is full of promise for those willing to make the necessary effort.

CERTIFICATION STANDARDS SET FOR WHOLE LEAF AND GEL

ALOE VERA GEL		ALOE VERA WHOLE LEAF	
TEST	AVERAGE	TEST	AVERAGE
pH	3.8	pH	3.9
Solids	0.88%	Solids	1.2%
Calcium	241.3 mg/l	Calcium	565.1 mg/l
Magnesium	58.4 mg/l	Magnesium	82.5 mg/l
Malic Acid	2028.7 mg/l	Malic Acid	4287 mg/l
Specific Gravity	1.004		

TRADITIONAL METHODS OF PROCESSING ALOE VERA LEAVES

During the past several decades four basic methods of processing Aloe Leaves have been developed, namely:

1. Traditional Hand Filleted Aloe.
2. Whole Leaf Aloe.
3. Powdered Forms of Aloe:
 - a. Spray-Dried Aloe powder.
 - b. Lyophilized Aloe powder.
 - c. Dehydrated Aloe powder.
4. Total Process.

1. Traditional Hand Filleted Aloe

The Aloe Leaf consists of three layers:

- a. The outer thick green rind.
- b. Viscous, jelly-like mucilage layer, into which the vascular bundles attached to the inner surface of the rind protrude.
- c. The filler properly said, which has structural integrity consisting of hexagonal structures containing the fillet fluid.

The pericyclic cells located at the top of the vascular bundles contain a yellow liquid called the “Yellow Sap” or “Latex”. This material contains high concentrations of aloin, and similar anthraquinones, which exerts a powerful laxative action when taken internally. During the 18th to the early 20th centuries, this yellow sap was collected and processed into a hard blackish material, the major product of the “laxative trade” era, while the rest of the leaf and its other constituents were discarded.

In order to avoid contaminating the internal fillet with the yellow sap, the traditional hand-filleting method of processing Aloe leaves was developed. In this method, the lower one inch of the leaf base (the white part attached to the large rosette stem of the plant), the tapering (two to four inches) of the leaf top, and the short spines located along the leaf margins are removed by a sharp knife. Then the knife is introduced into the mucilage layer below the green rind avoiding the vascular bundles, and the top rind is removed. The bottom rind is similarly removed, and the rind parts, to which a significant amount of mucilage remains attached, are discarded. Another portion of the mucilage layer is accumulated on the top of the filleting table. This is of critical concern because the highest concentration of potentially beneficial Aloe constituents are found in this mucilage, as this layer represents the constituents synthesized by the vascular bundle cells empowered by energy developed in the green (chlorophyll-containing) rind cells through sun-induced photosynthesis.

As an additional procedure to limit the inadvertent anthraquinones, the fillets may be washed in water removing the majority of the deeper layer of mucilage attached to the outer surface of the structurally integral fillet.

INTRODUCTION ALOE VERA & ITS HEALING BENEFITS

The materials of the mucilage layer, subsequent to their synthesis, are distributed to the storage cells (cellulose-reinforced hexagons) of the fillet, a process which is accompanied by dilution owing to the water (the major fillet constituent), which is stored in the fillet cells. The fillet consists of more than 99% water.

As can be readily appreciated, the Hand-Filleting method is a very intensive labor. Due to these facts, machines have been designed and employed which attempt to simulate the Hand-Filleted techniques, but generally the product contains higher amounts of anthraquinones, laxatives than the traditional Hand-Filleted approaches.

2. Whole Leaf Aloe

In this process, the base, top and lateral spines are removed as previously delineated, then the leaf is cut into sections and ground into a particulate slurry. The material is then treated with special chemical to eliminate the hexagonal structure of the fillet, releasing the constituents by means of a series of coarse and screening filters. When passing through the juice press, the rind particles are removed, and then the expressed juice passes through various filtering columns will remove the undesirable laxative agents. This process, performed properly, can produce a constituent-rich juice (generally containing three or more constituents than Hand-Filleted juice) virtually free of the laxative anthraquinone. This process, developed in the 80's, is considerably less labor intensive and is more cost effective.

3. Aloe Powders

Variously processed aloe juices can be reduced to powder form, which improve shelf life compared to liquid products and eliminate the cost of shipping water.

- a) The Spray-Dried powder process entails the spraying of liquid aloe juice onto a matrix (usually high molecular weight maltodextrins which usually constitute 50% or more of the final product), and using high heat. The high heat exposure changes somewhat some of the potentially beneficial constituents.
- b) Lyophilized (Freeze-Dried) powder utilizes cold (about 85° Celcius) and vacuum (usually about 1/3 atmosphere), which causes evaporation and sublimations of only the water in the juice. Heat-induced changes are avoided, but the procedure is considerably more expensive than the spray-dried process.
- c) Fillets of Aloe can be reduced to dehydrated pellets by placing them in a commercial-scaled vegetable dehydrator at relatively low temperatures (slightly above body temperature) but for many hours. The dehydrated pellets are ground to a fine powder.

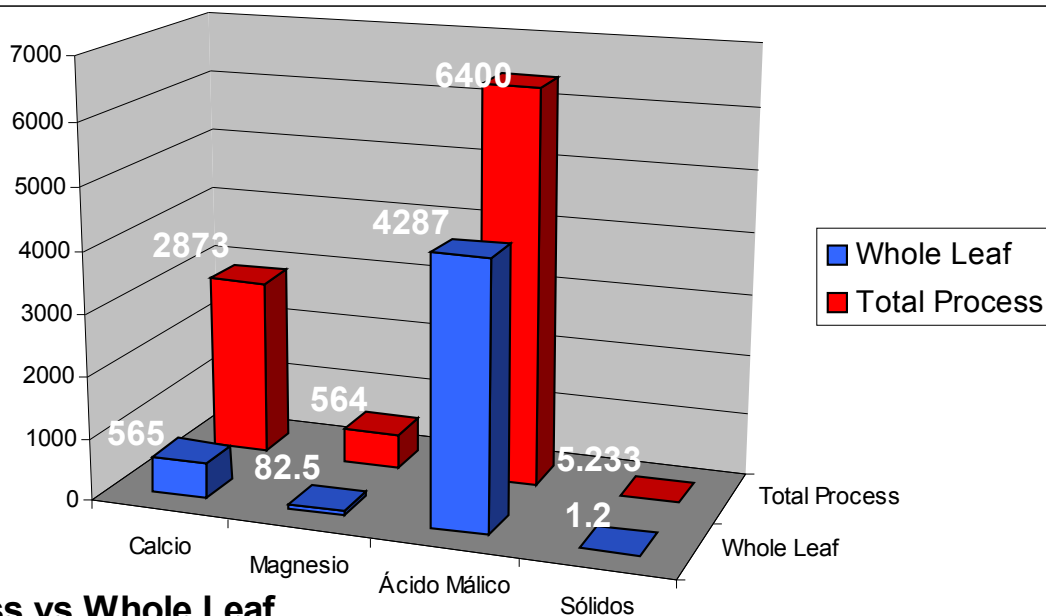
4. Total Process Aloe

In this revolutionary method, the aloe leaves are hand-filleted, as previously explained, and obtaining the aloe pulp. With the employment of high technology, all the properties of the aloe are preserved. This combination of these processes produces an aloe product called Total Process Aloe, which contains and enviably high concentrations of desirable constituents, which are virtually free of undesirable laxative anthraquinones.

In part, the high concentration of desirable constituents reflects the ideal growing conditions and soil factors of the aloe vera naturally grown in the Valley of Jaumave, located in a semi-tropical zone.

The traditional Hand-Fillet methodology, coupled with the newly developed and patented Total Process Aloe, with the geographical characteristics of the naturally grown aloes, have been combined to achieve the superior quality of Total Process aloe.

Total Process Aloe contains considerably higher concentrations of total solids, calcium, magnesium and malic acid, the major parameters of quality used and recommended by the International Aloe Science Council Inc. for certification.



Total Process vs Whole Leaf

POTENTIAL BENEFITS OF ORALLY INGESTED ALOE JUICE OR POWDER

Scientific evidence is accruing in both animal and human studies that suggest increasing credibility for the benefits of ingested aloe juice for a number of conditions:

1. Cardiovascular System

Aloe constituents include a salt, calcium isocitrate, which in animal studies possesses similar actions to digitalis and increases the force of cardiac contraction. Other constituents have been found to lower the cholesterol level as well as the triglyceride level. A large clinical study suggested that extant atheromatous cardiovascular disease could be reversed by the ingestion of aloe.

2. Gastrointestinal System

Gastrointestinal ulcers showed accelerated healing rates in animal models, and pre-treatment with aloe, prior to including ulcers in animal models, suggested a high degree of ulceroprotection. The triterpene, lupeol, documented as aloe constituent, has been implicated as a possible ulceroprotective agent. An uncontrolled human study, in which the aloe/petrolatum material was ingested, was interpreted by the authors as ulceroprotective. Administration of aloe provided protection of the liver cells against the cirrhosis-inducing agents.

3. Skeletal System

The most prevalent use of orally ingested aloe beverages anecdotally has been for arthritis and other inflammatory conditions experimental evidence corroborating anti-inflammatory activity in various animal models can be found reported in the scientific literature.

Acceleration of incorporation of calcium and phosphorus in callus formation in sites of experimental bone fractures has been demonstrated in animal models.

4. Endocrine System

Studies in both type 1 and type 2 diabetes mellitus in animal models reflect hypoglycemic activity of various aloe constituents. Other investigations suggest that aloe may contain constituents, which have the capacity of stimulating regeneration of cells in the islets of Langerhans, including the beta cells, the site of insulin synthesis and release. Recently published studies in humans given aloe preparations showed significant, long-lasting blood glucose control properties.