Peer Review of Clinical Research on Lily of the Desert Aloe Vera Demonstrating Immune Enhancement, Increased Antioxidant Ability and Decrease in Toxins in Humans Conducted by Fenestra Research

by Lisa Tully, PhD
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The practical goal of dietary supplement clinical testing is to determine whether the supplement achieves the intended or claimed results. Clinical research is used to promote new products that benefit consumers and to support the reasoned and supportable marketing of dietary supplements to consumers. Research is performed by a rigorous and meticulous means of testing the product to determine the effect of a supplement.

The purpose of this review is to evaluate research performed by Fenestra Research Labs. Fenestra Research Labs conducted a clinical trial to examine the effects of Lily of the Desert Aloe Vera Juice enhanced with Aloesorb™ on subjects as measured by blood cell counts (to determine immune system function) and the Optimal Wellness Test.

The Optimal Wellness Test was developed by Fenestra Research Labs. The Optimal Wellness Test measures 39 standard biochemical parameters in urine and saliva. These measurements are well documented in many biological sciences as an assessment of cellular and organ function. Therefore, the Optimal Wellness Test can be used to determine how a product alters cellular metabolism, which can be extrapolated to organ system function.

Aloe vera has been used externally to treat various skin conditions such as cuts, burns, and eczema. The sap from Aloe vera eases pain, promotes wound healing, and reduces inflammation. Aloe has been marketed as a remedy for coughs, wounds, ulcers, gastritis, diabetes, cancer, headaches, arthritis, immune -system deficiencies, and many other conditions when taken internally.

Aloe contains over 200 biologically active, naturally occurring constituents, including vitamins, minerals, amino acids, anthraquinones, enzymes, and saccharides. Aloe vera's beneficial properties may be attributed to polysaccharides present in the inner gel of the leaf, especially acemannan (acetylated mannans), which has been demonstrated to be an immunomodulator. The medium sized polysaccharides in aloe that have molecular weights of 200,000-1,000,000 (acemannan is in this size range) support increased immune system function (Djeraba and Quere, 2000; Karaca et al, 1995; Liu et al, 2006; Zhang and Tizard, 1996; Zhang et al, 2006). As the polysaccharides increase in size to over 1,000,000, there is an even higher immune support.

Aloe extracts have also been demonstrated to have antioxidant abilities in humans and animals (Kardosova and Machova, 2006; Loots et al 2007; Lim et al, 2003; Hu at al, 2003; Singh et al, 2000; Malterud et al 1993; Rajasekaran, 2005; Wu, 2005; Zhang et al, 2006).

Aloe is established as a digestion aid (Danhof, 1987). A previous report by Fenestra Research Labs for Lily of the Desert showed a 20–fold increase in Vitamin C absorption by Whole Leaf and Fillet Aloe Juice enhanced with Aloesorb™ and almost 50% increase in absorption of vitamin B12.

Less is known about detoxification properties of aloe extracts. Aloe has been shown to be protective of the liver, a major detoxification organ (Can et al, 2004; Chandan et al, 2007) and improve liver enzyme functions that are associated with carcinogen metabolism (Singh et al, 2003).

Lily of the Desert has quantified by High Performance Liquid Chromatography polysaccharides ranging from 200,000 to over 2 million Daltons and it is their assumption that these polysaccharides increase immune system function. Lily of the Desert has developed Aloesorb™, a high molecular weight (between 500,000-5,000,000 Daltons) polysaccharide rich product containing all of the biologically active components of aloe. Lily of the Desert enriches their Whole Leaf and Fillet Aloe Juice with 60 mg (per 2 ounce serving) of Aloesorb™.

The purpose of the study by Fenestra Research Labs was to determine if Lily of the Desert Aloe Juice enhanced with Aloesorb™ increases immune system function and to determine how the systems measured by the Optimal Wellness Test are affected by consuming Lily of the Desert Aloe Juice.

Aloe vera leaves have three layers; the leaf or outer rind, the inner gel, and the Aloin or thin, slimy mucilage layer commonly known as the “yellow sap”. Fillet aloe vera products are made by filleting off the outer rind of the aloe leaf and processing only the inner gel. Whole Leaf products are made by processing the entire leaf and filtering out the unwanted bitter constituents.

Lily of the Desert Aloe Vera Juice is an all-natural certified organic dietary supplement and there are two types of juice, whole leaf and aloe fillet. Since each type of aloe juice contains different molecular weight polysaccharides, both types were tested for their efficacy in improving immune system function and other system functions as measured by the Optimal Wellness Test.

Fenestra Research Labs is an independent research facility that performed objective clinical trials on 50 subjects taking Lily of the Desert Aloe Vera Juice enhanced with Aloesorb™ over a 30- day period. There was a 25 subject control group that received a placebo (consisting of tap water) in this study. The research reported by Fenestra Research was conducted by a credentialed investigator with experience in the type of research being conducted.

Neither the owner of Fenestra Research nor any of its employees have financial ties to Lily of the Desert, the manufacturer of Lily of the Desert Aloe Vera Juice, and therefore Fenestra Research provided a non-biased study on Lily of the Desert Aloe Vera Juice in terms of not having a financial interest in producing a desired outcome.

The ingredients of Lily of the Desert Aloe Vera Juice have no documented, historical, or ill–effects on consumers and thus met Fenestra Research's criteria for clinical research.

The Optimal Wellness Test analytically measures 39 parameters in urine and saliva to mathematically determine how close to wellness particular organ systems are functioning. Although this test is unique, it is based on well-established biochemical, biophysical and electrical measurements that have been standardized for measurements of cellular and organ function in biomedical research for decades. The measuring equipment is calibrated to .02 % accuracy and each test is obtained in triplicate, which greatly diminishes the error in measurements. Most clinical trials do not measure in triplicate and this feature of Fenestra testing gives them a great deal of accuracy and credibility.

The stringent inclusion and exclusion requirements were appropriate for the study and rigorous enough to prevent study bias. Furthermore, interviewer bias (where an investigator conducts interviews that are influenced by his or her subjective judgments) was prevented by using objective guidelines for inclusion and exclusion of subjects. These guidelines prevented selection of people who have an underlying condition that might be worsened by the research and may cause those subjects harm. To further protect the subjects, all were required to give their informed consent, via a signature, to participate in the study.

The study by Fenestra Research was a randomized, double blind, placebo–controlled study. Randomized, placebo–controlled, blinded trials are those that typically decide if a new drug will make it into the marketplace and are generally reported in scientific literature. This type of study is a Gold–Standard trial in pharmaceutical testing. All Gold–Standard trials include: randomization, placebo–controlled, blinding, physician oversight, and biweekly status reports. Fenestra Research met all of these requirements for the Lily of the Desert Aloe Vera Juice study.

The 75 subjects were divided into 50 who received Lily of the Desert Whole Leaf Aloe Vera Juice enhanced with Aloesorb and 25 subjects who received placebo. They were properly randomized into each group. Using this method, a group with similar characteristics is selected and randomly assigned to receive a placebo or to receive the supplement being tested. This serves to remove the possibility of psychological factors affecting the results because the subjects do not know whether they are getting the placebo or the supplement.

Dosing instructions were provided by the manufacturer and the duration of study was 30 days, which is long enough to reliably gauge whether a product related to these changes has an effect. To protect the subjects, they were instructed to contact their regular healthcare professional if they had any unusual or uncomfortable symptoms during the course of this study. All subjects in the study were instructed to make no changes to their daily consumption of food or liquid relating to the amount, volume, or type consumed, which eliminated diet as a confounding variable. A confounding variable is a variable that may influence study outcomes but may not have been acknowledged or accounted for in original research.

Standard Optimal Wellness Test measurements and blood cell counts were taken at the beginning, time 0 and one week later to establish a baseline. After product consumption, measurements were taken again at 14 and 30 days. These time points are adequate to follow the progress of how the supplement is working. The tests were run in triplicate and averaged for the report, which greatly reduces chances for error.

Compliance to the protocol was monitored and maintained through bi-weekly phone calls with Fenestra Labs personnel as well as in-person office visits that carefully follow the subjects during the course of the trial to ensure their health and safety. This is an important component of a clinical trial. There were no dropouts during the study and no adverse effects, both are which are desirable in clinical trials.

Since none of the ingredients have a history of harmful effects, Lily of the Desert Aloe Vera Juice most likely does not produce any side effects.

There did not appear to be any systematic bias in the Lily of the Desert Aloe Vera Juice study by Fenestra Research. Systemic bias occurs when the study is flawed in its overall procedure thereby resulting in a study that does not actually measure the desired factors. This is prevented by expert study design and implementation, which was performed by Fenestra Research.

Additionally, there were no observed confounding variables in the study. In a study where it appears that there are positive results due to the product studied, confounding variables can contaminate the study findings because they bring up another potential cause for the positive results instead of the product being tested.

The study measured multiple outcomes, which is necessary to determine the overall effects of a dietary supplement. In the Fenestra Research report reviewed here, the measurements with significant results were in Oxidative and Reductive Potential, immune system function and toxicity.

The results of the trials by Fenestra Research Labs demonstrated an 11% increase in immune system function from baseline (as measured by white blood cell counts), a 40% improvement in Oxidation and Reductive Potential (an antioxidant indicator)

and an 11% decrease in toxicity (nitrate measurements). When compared to the 25 subject control group, these improvements jump to over 16% increase in immune system function.

The improvement in the immune system function was measured by white blood cells counts, in particular, macrophages and neutrophils. Macrophages play a crucial role in initiating an immune response. As secretory cells, macrophages are vital to the regulation of immune responses and the development of inflammation. Neutrophils are the most abundant type of white blood cells in humans and form an integral part of the immune system. Neutrophils are phagocytes, capable of ingesting microorganisms or particles. They can internalise and kill many types of pathogens. Therefore, increases in macrophages or neutrophils indicates and stimulation of the immune system (Abbus et al, 2007, Mak and Saunders, 2003, Make 2005).

An 11% rise in the immune system of healthy humans is substantial, because any further stimulation of immune function in healthy subjects could develop into an autoimmune disorder. Although immune compromised individuals were not tested in this study, it is likely that a larger increase would be seen in this population.

Reduction potential (also known as redox potential, oxidation/reduction potential or ORP) is the tendency of a chemical species to acquire electrons and thereby be reduced. Each species has its own intrinsic reduction potential; the more positive the potential, the greater the species' affinity for electrons and tendency to be reduced by oxiding agents.

The Oxidation -Reduction potential is a true value. It is the actual measure of the fluids milli-volt (mV) potential; the measurement of the fluid's ability to donate or accept electrons. The higher the ORP, the more reduced intermediates are in the specimen, meaning the fluid is active, charged, and has the ability to create energy. When the fluid is oxidized, the fluid has lost its capacity to create energy and more damaging free radicals are present (Beckman and Ames, 1998).

Therefore, the ORP measurement reflects the antioxidant status of the body. The importance of antioxidants in humans is well-established and many antioxidant products are currently being marketed. However, natural product companies do not test their "antioxidants" for antioxidant ability against free radicals. The ORP test by Fenestra gives the most scientifically accurate measure of protection from free radical damage. The Oxygen Radical Absorbance Capacity (ORAC) test is a method of measuring antioxidant capacities of different foods. A wide variety of foods has been tested using this methodology, with certain spices, berries, and legumes rated very highly. Correlation between the high antioxidant capacity of fruits and vegetables, and the positive impact of diets high in fruits and vegetables, is believed to play an important role in the free- radical theory of aging. However, the relationship between ORAC values and health benefits has not been established.

Recently, a number of health food companies have capitalized on the ORAC rating, with dozens selling concentrated supplements that they claim to be "the number one ORAC product". Most of these values have never been published in the scientific literature so are difficult to evaluate. It is not known whether such values are accurate or how absorbable and functional these concentrated antioxidants are in the human body. The ORP test is in contrast to this and therefore a much more accurate measure of antioxidant ability than the ORAC.

The 40% improvement in Oxidation and Reduction Potentials indicates the subjects have reduced free radicals, which is related to an increased antioxidant ability of the aloe juice. This is a dramatic change from baseline and of major importance in maintaining health.

High nitrate particle numbers are the result of poor digestion. The liver treats the undigested nitrates as toxins. If the undigested nitrates are not removed, damage can occur. Many recent scientific publications are identifying nitrative stress (similar to oxidative stress) as playing a role in tissue injury and disease (Akuto et al, 2006; Giasson, 2002; Hamon, 2007; Kawanishi et al, 2006; Maréchal et al, 2007; Pavlovic and Santaniello, 2007; Rubbo and Radi, 2008). Nitrates have also been linked to cancer (Hamon, 2007; Irigeray et al 2007).

The 11% decrease in nitrate levels primarily means is that digestion and assimilation of nutrients is increased. A by-product of poor digestion and assimilation is nitrate accumulation. Therefore, a decrease in nitrates suggests improved absorption after consuming aloe (which has been previously shown) in addition to detoxification. Considering the importance of lowering toxins in the body, this finding is substantial. It could be explored further to assess what types of detoxification are produced by Lily of the Desert Aloe.

In conclusion, the clinical trial performed by Fenestra Research met the criteria for the Gold-Standard trial, which is the most rigorous standard to meet. Furthermore, Lily of the Desert Aloe Vera Juice products produced positive results in increasing immune system function. Lily of the Desert Aloe Vera Juice enhanced with Aloesorb™ is also a very promising product to support antioxidant, digestion, and detoxification claims.

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