

# *Aloe vera L.*

*Simply, the most extensively tested Aloe vera available*



## Aloecorp, Inc

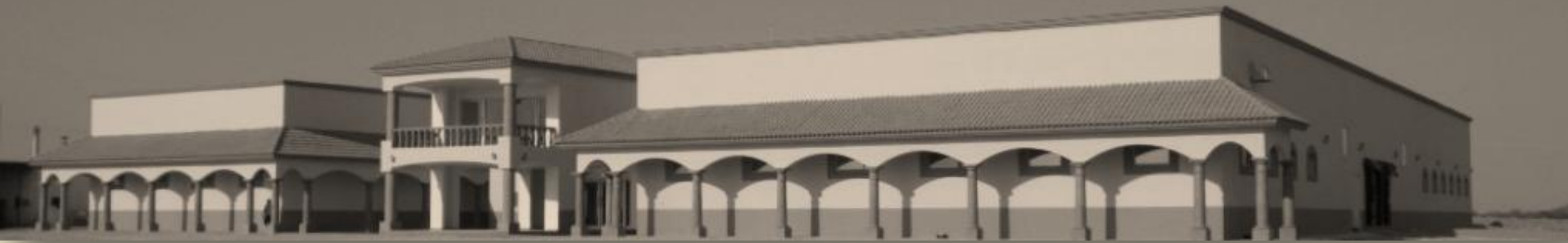
International Aloe Science Council Certified Facility and Products

# The Aloecorp Global Family

Aloecorp is a global resource company with a single goal...

*"To Bring the best of nature to Mankind"*





Our mission as an industry leader is to provide the highest quality aloe vera ingredients for Food, Cosmetic and Pharmaceutical Industries around the world. By continuously improving our operations and quality systems, conducting scientific research, maintaining clean efficient operations and providing excellent customer service we consistently exceed expectations.



# A Brief History of Aloecorp

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- 1988 Grand Opening of Aloecorp
  - 1989 Purchased Lake Farm 333ha in Gonzalez, Mexico
  - 1990 Completed Manufacturing facility in Mexico
  - 2002 Aloecorp China
  - 2004 Acquired Organic farm Certification
  - 2007 Panuco Farm 193ha in Veracruz, Mexico
  - 2008 GMP Facility in Hainan, China
  - 2010 Self Affirmed GRAS, USA
  - Rayon Farm 246ha in Gonzalez, Mexico
  - Shanghai Sales Office, China
  - Dong Fang Farm 136ha, China
  - 2011 International Office, The Netherlands
  - New GMP manufacturing facility in Mexico

**2,600 acres**

450 Employees strong

# GMP Processing Facilities



# GMP Processing Facilities

Quality inspected product is shipped globally.



HPLC-SEC – Polysaccharide  
HPLC-UV – Anthraquinone/Preservatives  
RT-PCR – R&D technology  
ELISA – R&D technology  
FTIR – Identity testing  
ICH cGMP compliant stability testing  
Microbiology



# GRAS Aloe vera food ingredients\*

Highly Purified *Aloe vera* L.

Conducted extensive scientific studies for over 2 years

Formed independent panel to determine safety

Achieved fully defensible position on ingredient safety

*Simply, the most extensively tested Aloe vera available*



\* Safety Studies Conducted on a Proprietary High-Purity Aloe Vera Inner Leaf Fillet Preparation, Qmatrix<sup>®</sup>. *Regul Toxicol Pharmacol*. June 2010. Epub Jan. 2010

# *Aloe vera* (L.) Burm.f.

Syn: *Aloe barbadensis*, Acemannan, Aloeverose

Aloe vera contains vitamin, mineral, sugar, amino acid and protein nutrients as well as polysaccharides consisting of mannan, glucomannan and pectins.

The major carbohydrate fraction isolated from aloe vera to which most of aloe vera benefits are attributed to is the beta-(1,4)-linked acetyl mannan polysaccharide.

Acetyl mannan is the primary marker of aloe vera quality.

Acetyl mannan in a range of molecular weights is linked to...

- Immune function
  - Macrophage activation
  - Cytokine production
  - Nitric oxide release
  - Phagocytic activity
- Intestinal gut flora (pre-biotic)
- Wound repair



# *Aloe vera* (L.) Burm.f.

## The Importance of Acetyl Mannan Polysaccharide

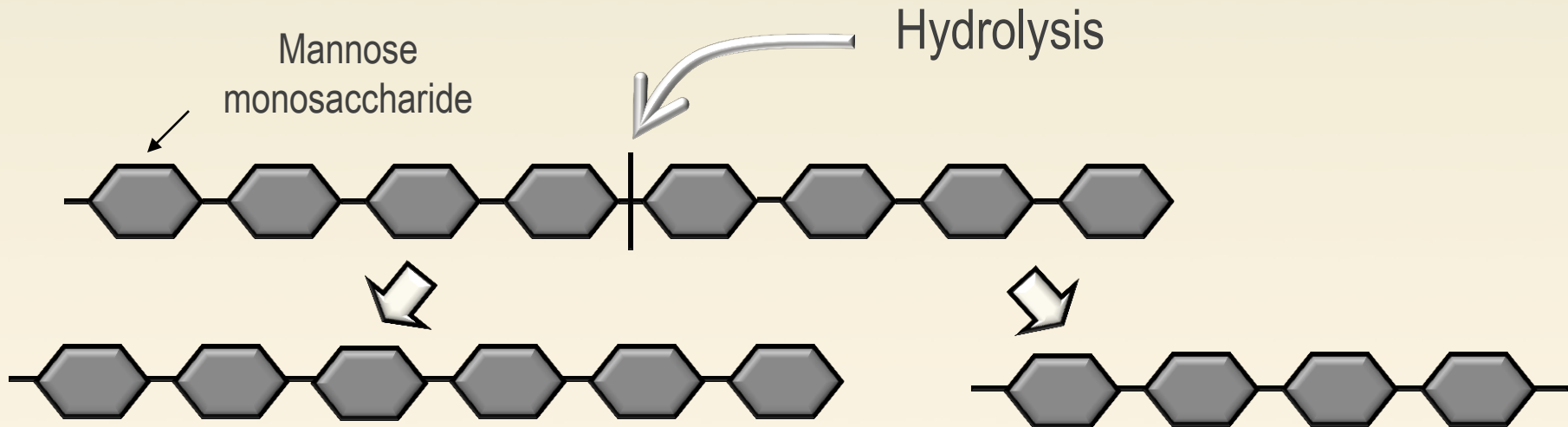
1. The major carbohydrate fraction isolated from aloe vera to which most of aloe vera's benefits are attributed is the beta-(1,4)-linked acetyl mannan polysaccharide.
2. It is the principle component of aloe and the primary marker of quality.
3. It follows then that the polysaccharide content and batch to batch consistency of an aloe ingredient is critical to finish goods manufacturers because...
4. The success of a product is directly influenced by the polysaccharide content in delivering the intended benefits to the customer.
5. This why we offer ingredients with quantified polysaccharide content and that content is listed on every certificate of analysis on every batch.
6. Moreover, our aloe ingredients are produced by a patented process, called the MAP process, that increases the most highly bio-active molecular weight fraction of the polysaccharide by three fold.

# Key Ingredients

## The Patented MAP manufacturing process

Only at ALOECORP

The Acetyl Mannan Polysaccharide is Hydrolyzed to Increase the Highly Active MWF



**Modified Aloe Polysaccharide**  
(MAP) 50 – 200kDa with greater than 50% < 400kDa

Published studies show that our patented manufacturing method retains and ENHANCES aloe vera biological activity.  
Aloecorp patented MAP process: patent # 6,133,440 & 6,436,679

# Patented Processing

Only at ALOECORP

MAP Processing Increases the highly active polysaccharide molecular weight fraction by **3X**

Molecular Weight Distribution and Total Polysaccharide Content (percent by dry weight)								
Product*	>2000 kDa	2000-1000	1000-500	500-200	<b>200-50</b>	50-10	<10 kDa	Total PS
Native Aloe	64.30	8.70	3.80	6.80	<b>10.20</b>	4.50	1.70	11.60
MAP Products	8.86	7.07	9.71	16.46	<b>30.13</b>	24.27	4.19	11.05

Results are typical of molecular weight distribution and total polysaccharide content.  
Batch to Batch variation does occur.

Enhancing aloe products through  
bioactivity guided manufacturing

# Key Function

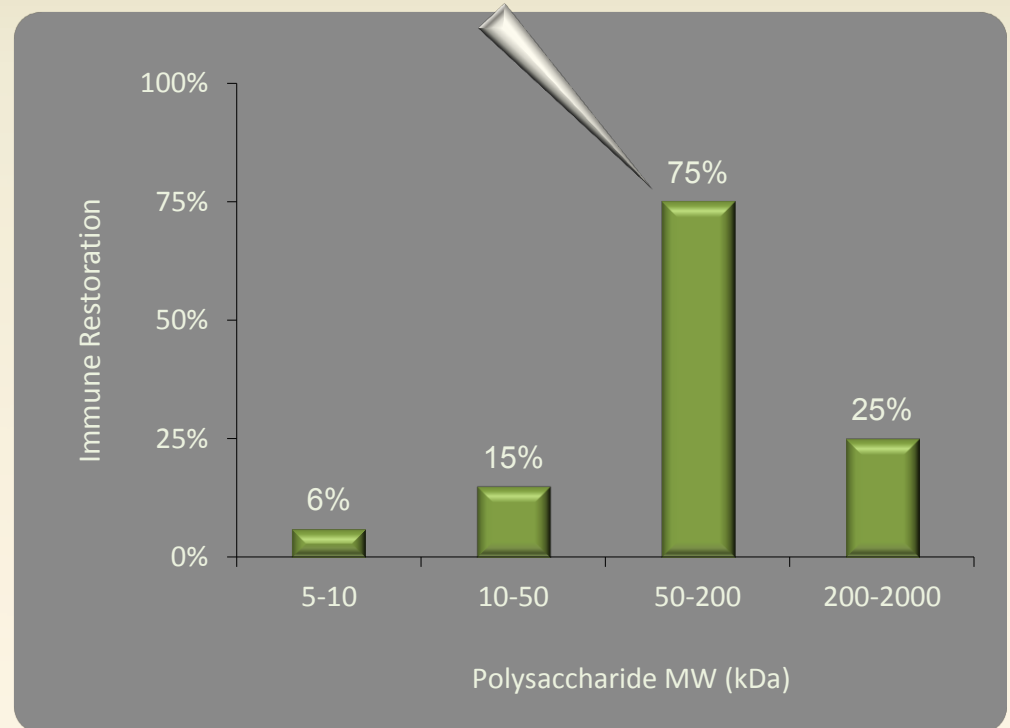
Only at ALOECORP

Modified Aloe Polysaccharide (MAP) with Immunoregulatory activity.

Qiu, Jones et al. *Planta Medica* 2000

Immunoregulatory  
activity of MAP  
polysaccharide

## Restores Immune Function



Identification of optimal molecular size of modified Aloe polysaccharides with maximum immunomodulatory activity.

Sun-A Im, Sun-Tack Oh, Chong-Kil Lee, et al. *International Immunopharmacology* 2005

# Patented MAP Ingredients

Only at ALOECORP

The logo for ACTIV aloe features a green curved line above the word "ACTIV" in blue and "aloe" in green, with a registered trademark symbol.

The logo for AloPol features a green curved line above the word "Alo" in blue and "Pol" in green, with a registered trademark symbol.

The enhanced bio-activity of MAP polysaccharide is supported by published research

ACTIV aloe® and AloPol® products contain specified content of the principle bioactive component of aloe vera, MAP polysaccharide.

- MAP polysaccharide is produced through controlled hydrolysis of naturally occurring aloe vera acetyl mannan (also known as Acemannan)
- The content of MAP polysaccharide is specified for each Aloecorp product
- Every batch is analyzed and the content shown in the Certificate of Analysis.

## **Modified Aloe barbadensis Polysaccharide (MAP) with Immunoregulatory activity.**

Qiu, Jones et al. *Planta Medica* 2000

## **Identification of optimal molecular size of modified Aloe polysaccharides with maximum immunomodulatory activity.**

Sun-A Im, Sun-Tack Oh, Chong-Kil Lee, et al. *International Immunopharmacology* 2005

# Standardized MAP Ingredients



Brands prosper or suffer based on the consistency of their ingredients.



Aloecorp provides the polysaccharide content of every batch and offers specifications of 5%/10%/15%/20% and 30% polysaccharide by dry weight.

The polysaccharide content of aloe ingredients has been shown to vary greatly among suppliers. This inconsistency affects the performance of finished products in the benefits derived by the customer.

## Finished Products Comparative Analysis

Vendor	ACFP1 Lot 1	ACFP2 Lot 2	ACFP3 Lot 3	CFPa	CFPb	CFPc	CFPd	CFPe	CFPf	CFPg	CFPh Lot 1	CFPh Lot 2
Total PS (%)	<b>11.32</b>	<b>10.56</b>	<b>11.4</b>	0.1	8.4	0.2	0.2	3.6	5.8	3.9	<b>8.2</b>	<b>4.7</b>

ACFP Aloecorp Finished Product (customer formulated with Qmatrix) CFP Competitor Finished Product (formulated with another supplier's aloe) CFP Lot 1 & 2 Two different lots of the same brand Finished Product

Other publications

Turner CE, Williamson DA, Stroud PA. Evaluation and comparison of commercially available Aloe vera L. products using size exclusion chromatography with refractive index and multi-angle laser light scattering detection. *International Immunopharmacology*. 2004.



# Technology Advances

Only at ALOECORP



## Qmatrix Refractance Window Dehydration Process



Proprietary Processing

Efficient Green Technology

Small carbon footprint

Superior retention of

Color

Flavor

Nutrients

# Technology Advances

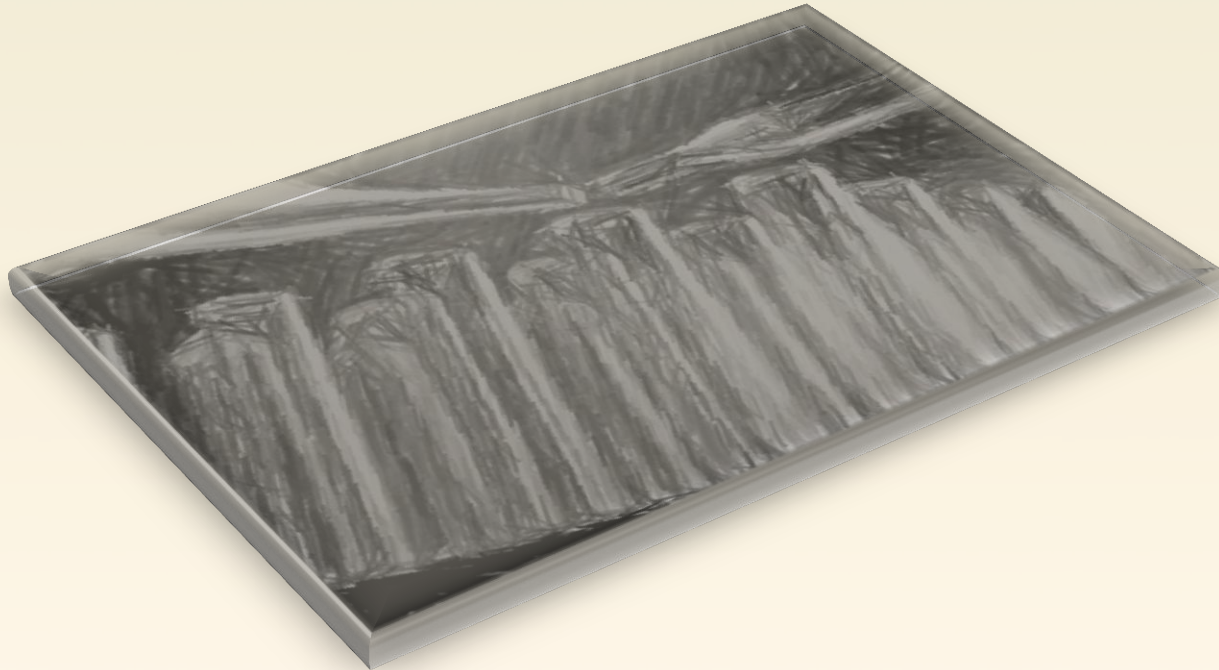
Only at ALOECORP

## Qmatrix Refractance Window Dehydration Process

Value Factors	Qmatrix	Freeze Drying	Spray Drying
Nutrient Retention	High	High	Moderate
Flavor Retention	High	Moderate	Low
Color Retention	High	High	Moderate
Energy Costs	Low	High	Moderate
Pre-processing	Low	Moderate	High
Processing time	Moderate	High	Low



## Research Report



# Disclaimer

The information in this presentation is provided for scientific and education purposes only.

Indications and claims relating to health benefits of products are governed in accordance with country-specific laws or regulations. In the United States, it is your responsibility as manufacturer or marketer of consumer products to ensure that product claims and indications are in compliance with laws and regulations, including the Federal FD&C Act and the FTC Act. In all other countries, please consult with a local regulatory or legal professional who may provide you with competent advice and guidance regarding acceptable claims.

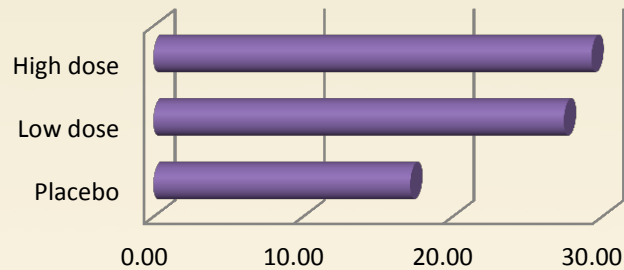
# Aloe Juice

Made with Qmatrix® GRAS Ingredient

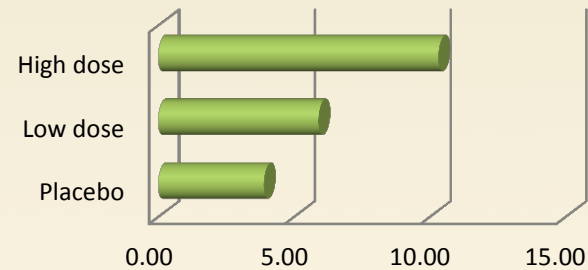
A Single Center, Randomized, Double-Blind, Placebo Controlled Human Test to Evaluate the Efficacy and Safety of Aloe regarding the Immunity Enhancing Effect. (Phase IV)

Percent Change Week 8 vs. Pre-dosing (n=102)

Cell-Killing Capability by NKC Cells



Peripheral Blood Monocytes CD56

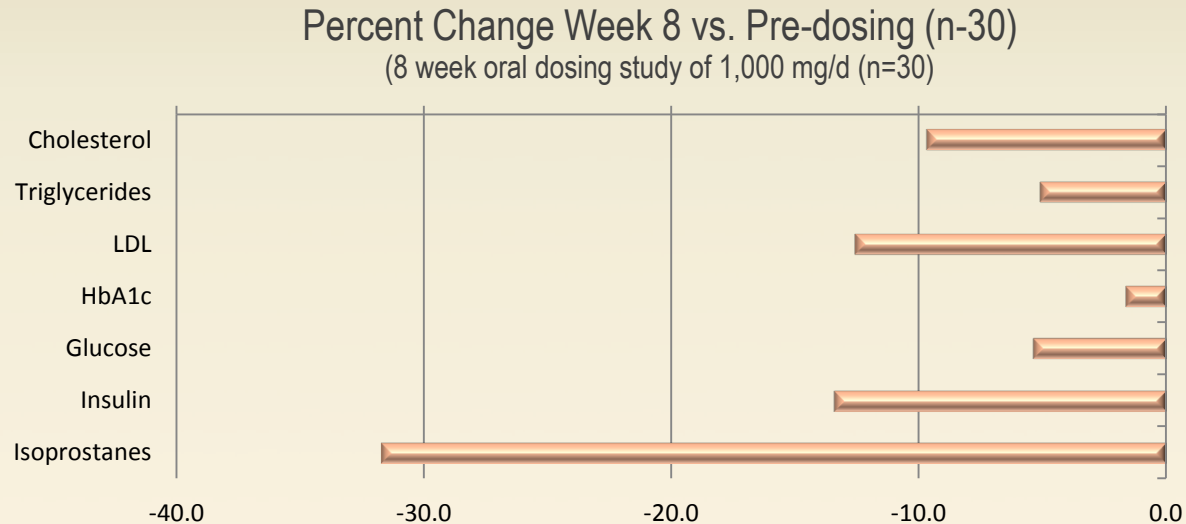


- Cell-Killing Capability of Natural Killer Cells increased significantly
- PBM CD56 increased significantly in both low and high-dose groups
- No side effects in either the low-dose (0.6g BID) or high-dose (1.2g BID) groups after 8 weeks

The Korean FDA concluded from this study that functional health foods containing aloe taken orally supports immune function

# Qmatrix<sup>®</sup> GRAS Ingredient

An 8-Week, Double-Blind, Placebo-Controlled Pilot Trial of the Safety and Effects of Qmatrix *Aloe vera* in Subjects with Pre-Diabetes/Metabolic Syndrome.



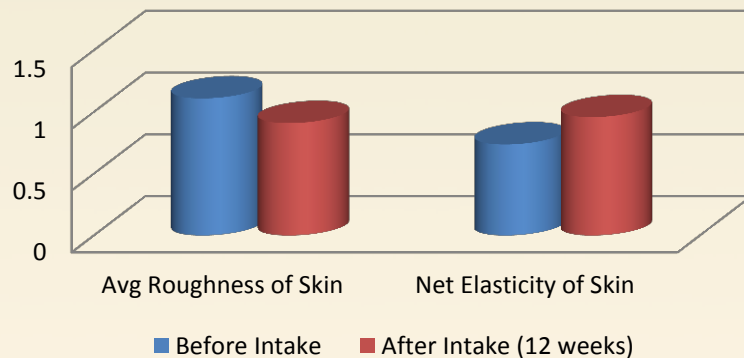
- Cholesterol , triglyceride and LDL levels are used to assess cardiovascular health
- HbA1c is an indicator of average blood glucose concentration over prolonged periods of time
- Fasting blood glucose and insulin are a measure of metabolic homeostasis
- Isoprostanes are indicators of oxidative stress status

# Qmatrix<sup>®</sup> – Skin Function Beverage

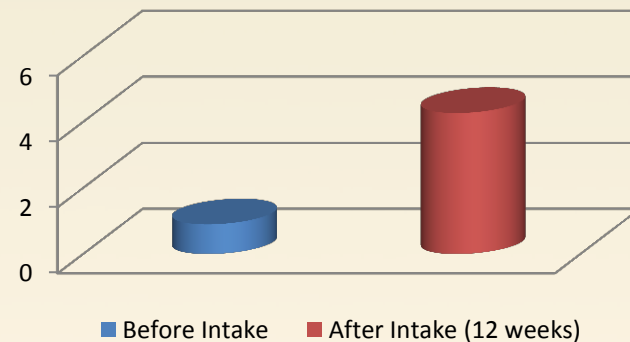
Dietary Aloe Vera Supplementation Improves Facial Wrinkles and Elasticity and Increases Type I Procollagen Gene Expression in Human Skin *in vivo*

Percent Change Week 12 vs. Pre-dosing  
(12 week oral dosing study of 1,200 mg/d and 3,600 mg/d. n=30)

Effect on Wrinkles & Elasticity



Effect on Procollagen

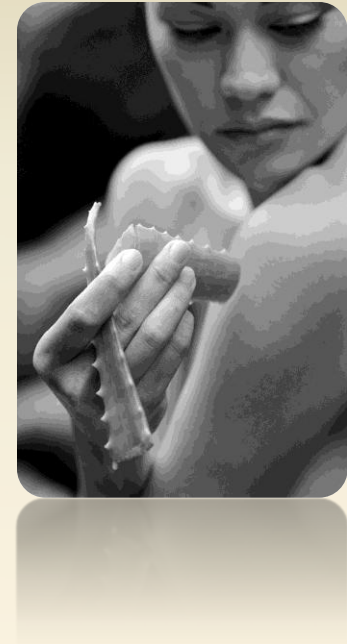


Type I procollagen mRNA levels increased 4.74 times the baseline level ( $p > 0.05$ )

The Korean FDA concluded from this study that functional health foods containing aloe taken orally supports skin function

Qmatrix®

Qmatrix hydrates the skin in as little as one hour



Moisturizing Effects of Cosmetic Formulations Containing *Aloe vera* Assessed by Skin Bioengineering Techniques.

Dal'Belo et al. *Skin Research & Technology* 2006

# Prebiotic Performance

## Qmatrix® GRAS Ingredient

Qmatrix Increases SCFA Production Without Significant Gas Production

	Qmatrix	Nutraflora	Beneo p95	Fructose 190	Oligo-Fiber	Beneo Synergy	Agave inulin
Gas Production (ml/g)	84	148	141	143	115	146	148
pH Change	-0.41	-1.32	-1.23	-0.96	-0.95	-1.19	-1.21
Acetate (mg/g)	312	265	263	278	169	229	187
Propionate (mg/g)	197	77	67	71	5	52	63
Butyrate (mg/g)	115	152	149	141	163	172	185
Total SCFA (mg/g)	625	495	479	490	384	452	435

## Qmatrix Increases Healthy Gut Bacteria

Microbiota	Qmatrix	Nutraflora	Beneo p95	Fructose 190	Oligo-Fiber	Beneo Synergy	Agave inulin
Bifidobacteria (log10 cfu/tube)	8.95	8.5	8.5	8.4	7.4	8.3	7.6
Lactobacilli (log10 cfu/tube)	10.58	9.2	8.6	9.2	9.3	9.3	9.3

12 hour fermentation study

# Prebiotic Performance

## Composition of Qmatrix in this study

Qmatrix	Aloecorp N=5
Total Dietary Fiber	21%
Acetyl mannan	13%
Total Fiber	34%
Fructose	3.6%
Glucose	17.8%
Sucrose	0.6%
Protein	1.1 %
Carbohydrates	65%
Calcium	3.9%
Potassium	6.9%

Prebiotics stimulate the growth of beneficial gut bacteria and the subsequent fermentation of carbohydrates produces short chain fatty acids (SCFA) that support a healthy mucosal lining in the gut.



# Key Ingredient Guide

Select the Best Ingredient for Your Product

**Qmatrix ACTIValoe® powder** – Highly purified, Exceptional benefits

- Proven efficacy – significant body of original scientific evidence
- Patented MAP processing for bio-activity boost
- Product specifications include > 10% polysaccharide by dry weight
- Exclusive Qmatrix dehydration technology provides superior stability and ease of formulation
- Price premium

**ACTIValoe® powder and liquid** – Highly purified, Great benefits

- Patented MAP processing bio-activity boost
- Product specifications include > 10% polysaccharide by dry weight
- Price competitive

**Purified Leaf powder or liquid** – Highly purified, Good benefits

- Patented MAP processing bio-activity boost
- Product specifications include polysaccharide content by dry weight
- Price competitive, economical

**AloPol®** (15%/20% or 30% polysaccharide) – Specialty products – Ultra purified

- Specially developed for enhanced MAP and medical applications

# Natural Juice with Pulp

For Distinctive Aloe Beverages

NJP is as close as you can get to fresh aloe vera inner fillet.

Aloe juice with pulp is produced by high speed slicing of the fillet into bits with an average length of ~1 cm although quite variable.



Great Mouth Feel

Pasteurized, preserved and ready to bottle



# Quality

*Simply, the most extensively tested Aloe vera available*

## Bioactivity guided manufacturing design



Safety  
and  
Efficacy

# The Booming Beverages



The winner of BevNET's best enhanced water of 2011 is Aloe Gloe. The product -- which is positioned as an "aloe water" -- is the most innovative and well executed product that entered into the enhanced water category this year.

*As for some of the other functional beverage opportunities that have the potential to go mainstream, Datamonitor's Mr. Vierhile said, "Aloe is starting to get some real traction. It has always been highly regarded in Asian specialty stores but Americans haven't really known what to do with it (from an ingestible standpoint). Recently launched Aloe Gloe is the first attempt to Americanize it. Given the buzz surrounding it, aloe seems to be where coconut water was four years ago."*

Aloe ranks #2 as the most traditionally and frequently used ingredient in Hispanic culture

In its latest report, "State of the Hispanic Consumer: The Hispanic Market Imperative", the market researcher said that addressing the Hispanic market is vital to business growth. The US Hispanic population numbers more than 52 million, and is set to represent the majority of population growth in the United States in the next five years. In addition, its collective buying power is projected to grow by 50% during that time, from \$1 trillion in 2010 to \$1.5 trillion by 2015. (Nielson)

# ACTIValoe around the World



# Con *sábila* vivimos

With Aloe we live



# Aloecorp Original Research

Study Type	Product	Conclusions
<b>Skin</b>		
In vitro model	Aloe extract: Aloesin Jones 2002	Aloesin modulates melanogenesis via competitive inhibition of tyrosinase. Aloesin shows promise as a pigmentation altering agent for cosmetic or therapeutic applications.
Human Clinical	Aloe extract: Aloesin S. Choi 2002	Aloesin treatment showed pigmentation suppression in a dose-dependent manner. These results raise the possibility that aloesin may be used as an agent that inhibits melanin formation induced by UV radiation
Animal Model	Aloecorp high polysaccharide product: Immuno-10 E. A. Wooldroof 2010	A purified fraction of Aloe vera (Immuno-10) is a key component of AWBAT Plus burn wound dressing shown to stimulate the proliferation of human skin fibroblasts and keratinocytes improving wound healing.
Human clinical	Aloecorp Aloe vera D.P. West 2003	Dry-coated aloe vera gloves provide gradual delivery of aloe to skin and produced a uniformly positive outcome of improved skin integrity, decreased appearance of fine wrinkling, and decreased erythema in the management of occupational dry skin and irritant contact dermatitis
Human Clinical	Aloecorp Aloe vera S.E. Dal Belo 2006	Aloe vera is a natural effective ingredient for improving skin hydration. Consequently, it may be used in moisturizing cosmetic formulations and also as a complement in the treatment of dry skin.
Human Clinical	Aloecorp Aloe vera S. Cho 2009	Aloe gel significantly improves wrinkles and elasticity in photoaged human skin, with an increase in collagen production in the photoprotected skin and a decrease in the collagen-degrading MMP-1 gene expression
<b>Diabetes</b>		
Animal model	Aloecorp Aloe vera Eunju Shint 2011	Dietary aloe formulations reduce obesity induced glucose tolerance not only by suppressing inflammatory responses but also by inducing anti-inflammatory cytokines.
Animal Model	Aloecorp Aloe vera Kim 2009	Oral administration of Qmatrix prevents the progression of diabetic symptoms in high-fat diet-fed mice, and suggest that it could be useful for treating non-insulin dependent diabetes
<b>Cardiovascular</b>		
Human Clinical	Aloecorp Aloe vera S.S. Shah 2010	

# Aloecorp Original Research

Antioxidant	Product	Conclusions
Animal Model	Aloecorp Aloe vera B.O. Lim 2003	Life-long dietary aloe supplementation suppresses free radical-induced oxidative damage and age-related increases in hepatic cholesterol
Animal Model	ACTIValoe Kim 2009	ACTIValoe N-931 complex prevented acute hepatotoxicity and liver fibrosis, increases in serum aminotransferase and lipid peroxidation levels. The ACTIValoe®N-931 complex attenuated the increase in tumor necrosis factor- $\alpha$ (TNF- $\alpha$ ), and inducible nitric oxide synthase (iNOS), and cyclooxygenase-2 (COX-2), mRNA expressions in acute hepatotoxicity. In antifibrotic experiments, tissue inhibitor of metalloprotease-1 (TIMP-1) mRNA expression was attenuated by treatment with ACTIValoe®N-931 complex. The ACTIValoe®N-931 complex decreased the hepatic hydroxyproline content and the transforming growth factor-beta1 levels.  These results suggest that the ACTIValoe®N-931 complex has hepatoprotective effects in both acute and chronic liver injuries.
In vitro Model	Aloecorp Aloe vera Kim 1999	Aloe polysaccharides were found to be the most effective in anti-genotoxic and anti-tumor promoting activities
<b>Pharmacokinetics</b>		
Animal Model	Aloecorp Aloe vera Yagi 1999	FITC-AM labeled aloemannan was metabolized into smaller molecules that mainly accumulated in the kidneys. Aloemannan was catabolized by the human microflora into molecular weight of 30 and 10 kDa.
<b>Immune</b>		
Animal Model	Aloecorp Aloe vera Byeon 1998	Aloe oligosaccharide treatment reduced IL-10 and blocked suppressive activity of supernatants indicating that aloe contains multiple immune-protective factors
Animal Model	Qmatrix/MAP S.Im 2010	Oral administration reduced the growth of <i>C. albicans</i> in Streptozotocin-induced diabetic mice. Oral administration did not increase ovalbumin (OVA)- specific cytotoxic T lymphocyte (CTL) generation in normal mice, but did increase it in high fat diet induced diabetic mice. These findings provide the first clear evidence for the immunomodulatory activity of orally administered Aloe vera gel.
In vitro and Animal Model	Aloecorp aloe vera MAP processing IM 2005	We found that modified aloe polysaccharides (MAP) exhibit the most potent macrophage-activating activity as determined by increased cytokine production, nitric oxide release, expression of surface molecules, and phagocytic activity
In vitro and Animal Model	Aloecorp aloe vera MAP processing Z. Qiu 2000	Stimulatory activities on macrophage activation and cell proliferation implicate that modified aloe polysaccharides (MAP) broad application to boost human immunity heal wounds.
<b>Toxicity</b>		
Animal Model	Qmatrix/MAP GRAS L.D. Williams 2010	Qmatrix is not genotoxic in vitro or in vivo and; has an oral NOAEL greater than 2000 mg/kg bw/day following 90 days of oral exposure.



# Aloecorp Original Research

	Product	Conclusions
Animal Model	Aloecorp Aloe vera Y. Ikeno 2002	Lifelong aloe vera feeding does not cause any harmful and deleterious side effects and could also be beneficial for prevention of age related pathology
In vitro and Animal Model	Aloesin	Aloesin does not have genotoxic activity either in vitro or in vivo
Animal Model	Aloesin B. Lynch 2011	The no-observed-adverse-effect level was considered to be 1000 mg/kg body weight/day, the highest dose tested. The results support potential use of aloesin as a functional food ingredient
<b>Antiviral</b>		
In vitro model	Aloecorp Aloe vera (fractionated) JK Lee 2001	Acemannan induces functional and phenotypic maturation of dendritic cells, that may be important implications in understanding antiviral and antitumoral activities
<b>Antibacterial</b>		
Animal Model	Aloecorp Aloe vera N. Yun 2009	Aloe vera therapeutically reverses the lethality induced by cecal ligation and puncture (CLP), a clinically relevant model of sepsis. The administration of Aloe vera ameliorated the multiple organ dysfunction syndrome, as evidenced by the serum levels of biochemical parameters and histological changes. In vivo administration of Aloe vera also markedly enhanced bacterial clearance. These findings suggest that Aloe vera could be a potential therapeutic agent for the clinical treatment of sepsis
<b>Processing</b>		
Review	Qmatrix C.T. Ramachandra 2008	Technologies like the Qmatrix process and ACTIValoe process are innovative technologies.

# Aloecorp Original Research

J.K. Lee 2001 Journal of International Immunopharmacology  
C.T. Amachandra 2008 American Journal of Agricultural and Biological Sciences  
Byeon 1998 Journal of Investigative dermatology  
Eunju shin 2011 Immune Network  
S. Choi 2002 Clinical and Experimental dermatology  
BO Lim 2003 Journal of nutritional Science and Vitamnology  
D.P West and Y.F. Zhu 2003 Assoc of Proff infection control and epidemiology  
S.Kim 2009 J. Phrmacol  
K. Kim 2009 Phytomedicine  
B. Lynch 2011 Regulatory Toxicology and Pharmacology  
H.S. Kim 1999 Carcinogenesis  
S. Im 2010 Ach Pharm Res  
A. Yagi 1999 Planta Medica  
Y Ikeno 2002 Phythother  
S. Im et al 2005 International Immunopharmacology  
K.Jones 2002 Pigment Cell Res.  
S.E. Dal Belo 2006 Skin Research and Technology  
N. Yun et al 2009 Food and Toxicology  
L.D. Williams 2010 Regulatory toxicology and pharmacology  
S. A. Shah 2010 Am J. Health Syst. Pharm.  
B. Lynch 2011 Regulatory and toxicology