



HAIR PRODUCT

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Abstract

Hair cosmetics are an important tool that helps to increase patient's adherence to alopecia and scalp treatments. This article reviews the formulations and the mode of action of hair cosmetics: Shampoos, conditioners, hair straightening products, hair dyes and henna; regarding their prescription and safetiness. The dermatologist's knowledge of hair care products, their use, and their possible side effects can extend to an understanding of cosmetic resources and help dermatologists to better treat hair and scalp conditions according to the diversity of hair types and ethnicity.

INTERRODUCTION

Human hair serves a biological purpose of protecting the scalp, as well as physical attractiveness to the perception of beauty. Hair loss, graying of hair, dandruff and other conditions affecting hair conditions can be distressing to patients, as hair condition is often considered important in people's own assessment of physical beauty. Hair is an important part of the body appeal and its look is a health indicator. Accordingly, recent advances in hair science and hair care technologies have been reported in literature claiming Innovations and strategies for hair treatments and cosmetic products. The treatment of hair and scalp, primarily, involved the use of shampoo for an effective, but gentle cleansing; however, for years, the shampoo is considered not only as a cosmetic product.

Product Description ALOE VERA

Aloe vera contains numerous active constituents and minerals that help strengthen your hair. It protects against ultraviolet(UV) radiation that comes from the sun. Aloe Vera contains numerous active constituents and minerals that help strengthen hair.

It contains adipose acids and amino acids and is rich in vitamins A, B12, C, and E. Aloe Vera cleanses the hair shaft veritably and effectively. Aloe Vera contains proteolytic enzymes that regain deads It contains vitamins A, C, and E. All three of these vitamins help to cell turnover, promoting healthy cell growth and shiny hair.

kin cells on the scalp TULSI Tulsi helps maintain moisture in your scalp and enhances blood circulation.



Figure: Aloe Vera

ALOE VERA IS A CACTUS LIKE A PLANT IN THE LILY FAMILY THAT HAS TRINGULAR LEAVE. BECAUSE OF THESE MOISTURIZING PROPERTIES, IT HAS MANY USES IN THE SKIN AND HAIR CARE INDUSTRY.

Aloe has long been a remedy for sunburnt skin because of its cooling and hydrating properties, and we have definitely been seeing amazing benefits to using it on your hair and scalp," says Kerrie Urban, an L.A.-based celebrity hairstylist. "The hype is true—aloe contains vitamins, antioxidants, and amino and fatty acids that moisturize your hair and scalp and reduce breakage. It's also chock-full of minerals like copper and zinc that have been proven to promote healthy hair growth.



COMPOSITION OF ALOE VERA:

Structural Composition

The aloe leaf can be divided into two major parts, namely the outer green rind, including the vascular bundles, and the inner colourless parenchyma containing the aloe gel. Description of the inner central part of the aloe leaf may sometimes be confusing, due to the different terms that are used interchangeably such as inner pulp, mucilage tissue, mucilaginous gel, mucilaginous jelly, inner gel and leaf parenchyma tissue. Technically, the term ‘pulp’ or ‘parenchyma tissue’ refers to the intact fleshy inner part of the leaf including the cell walls and organelles, while ‘gel’ or ‘mucilage’ refers to the viscous clear liquid within the parenchyma cells.

The three structural components of the *Aloe vera* pulp are the cell walls, the degenerated organelles and the viscous liquid contained within the cells. These three components of the inner leaf pulp have been shown to be distinctive from each other both in terms of morphology and sugar composition as shown in The raw pulp of *A. vera* contains approximately 98.5% water, while the mucilage or gel consists of about 99.5% water. The remaining 0.5 – 1% solid material consists of a range of compounds including water-soluble and fat-soluble vitamins, minerals, enzymes, polysaccharides, phenolic compounds and organic acids. It has been hypothesized that this heterogenous composition of the *Aloe vera* pulp may contribute to the diverse pharmacological and therapeutic activities which have been observed for aloe gel products.

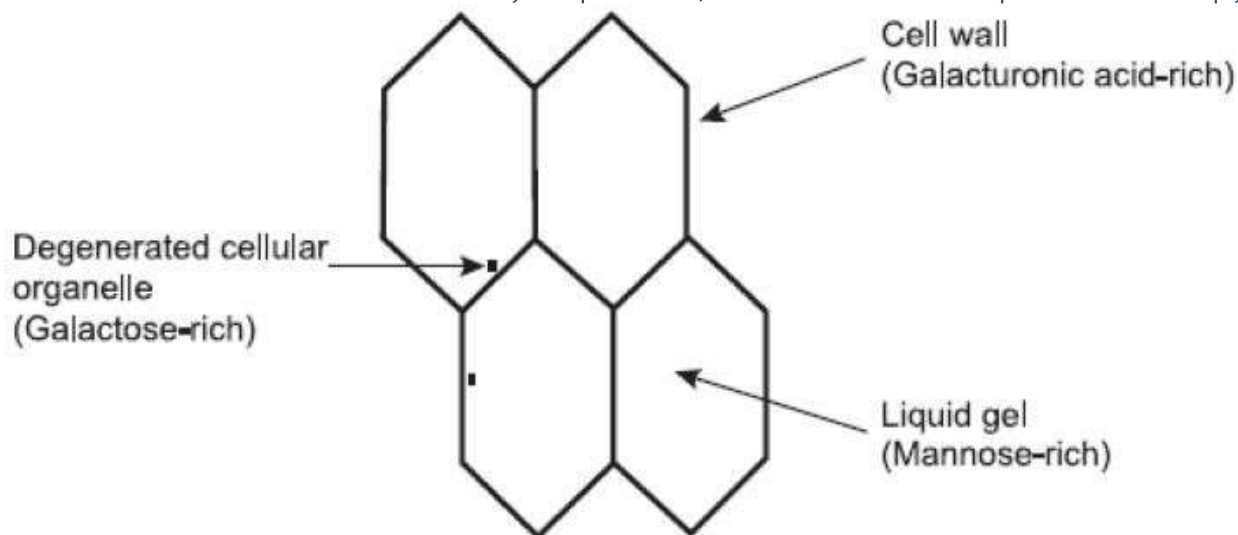


Figure: Schematic Representation Of Aloe Vera Pulp Structure and Its Component.

Chemical Composition

Many compounds with diverse structures have been isolated from both the central parenchyma tissue of *A. vera* leaves and the exudate arising from the cells adjacent to the vascular bundles. The bitter yellow exudate contains 1,8 dihydroxyanthraquinone derivatives and their glycosides, which are mainly used for their cathartic effects. The aloe parenchyma tissue or pulp has been shown to contain proteins, lipids, amino acids, vitamins, enzymes, inorganic compounds and small organic compounds in addition to the different carbohydrates. Some evidence of chemotaxonomic variation in the polysaccharide composition of aloes exists.

The large fluctuations in polysaccharide composition of *A. vera* fillet as found in the literature has been explained by the fact that the mannosyl residues are contained in a reserve polysaccharide with a significant seasonal influence, as well as large variations between cultivars in terms of the quantities of mannose-containing polysaccharides within the parenchyma cells. The chemical constituents of *A. vera* leaves including the pulp and exudate are given.

Polysaccharide composition

Polysaccharides make up most of the dry matter of the *A. vera* parenchyma. A storage polysaccharide, acetylated glucomannan, is located within the protoplast of the parenchyma cells and a variety of polysaccharides are present in the cell wall matrix. An overall carbohydrate analysis of the alcohol insoluble residues showed that the cell walls in the fillet of the aloe leaf hold mainly mannose-containing polysaccharides, cellulose and pectic polysaccharides whereas the skin of the leaf contains in addition significant quantities of xylose-containing polysaccharides.

Many investigators have identified partially acetylated mannan (or acemannan) as the primary polysaccharide of the gel, while others found pectic substance as the primary polysaccharide. As mentioned before, this discrepancy in polysaccharide composition was initially explained by differences in geographical locations of the plants and seasonal changes but later it was found that extraction and processing of the parenchyma tissue are also very important variables that contribute to the differences in the results. Other polysaccharides such as arabinan, arabinorhamnogalactan, galactan, galactogalacturan, glucogalactomannan, galactoglucoarabinomannan and glucuronic acid-containing polysaccharides have been isolated from the *Aloe vera* inner leaf gel part.

Mannan

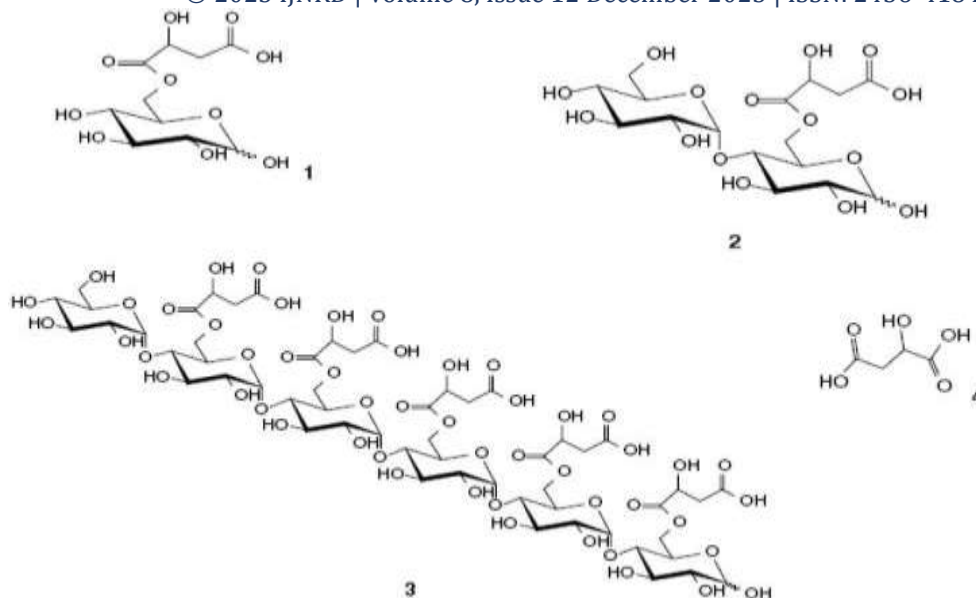
In general, mannans play a structural role in plants by acting as hemicelluloses that bind cellulose. They also fulfil a storage function as non-starch carbohydrate reserves in seeds and vegetative tissues. In addition, evidence was found that it may act as a signalling molecule in plant growth and development. Linear mannans are homopolysaccharides that are composed of linear chains of β -(1 \rightarrow 4)-Dmannopyranosyl residues with less than 5% galactose.

Although different results on the composition of polysaccharides in aloe pulp have been described in the literature, the consensus among most authors is that acetylated glucomannan molecules are mainly responsible for the thick, mucilage like properties of the raw aloe gel. Acemannan found in *A. vera* gel is also known as carrysin and has a backbone of β -(1 \rightarrow 4)-D-mannosyl residues acetylated at the C-2 and C-3 positions that exhibit a mannose monomer:acetyl ratio of approximately 1:1 and contains some side chains of mainly galactose attached to C-6. The molecular weights of these polysaccharides range from 30-40 kDa or greater and is usually as high as 1000 kDa in fresh aloe leaf material. The repeating units of glucose and mannose exist in a ratio of 1:3, but other ratios of 1:6, 1:15 and 1:22 have also been reported. These discrepancies in glucose to mannose ratios have been explained by differences between species as well as due to sample processing and treatment.

Maloyl glucans

Three malic acid acylated carbohydrates were isolated from *A. vera* gel and characterised as 6-*O*-(1-L-maloyl)- α -, β -D-Glcp (termed veracylglucan A), α -DGlcp-(1 \rightarrow 4)-6-*O*-(1-L-maloyl)- α -, β -D-Glcp (termed veracylglucan B) and α -DGlcp-(1 \rightarrow 4)-tetra-[6-*O*-(1-L-maloyl)- α -D-Glcp-(1 \rightarrow 4)]-6-*O*-(1-L-maloyl)- α -, β -DGlcp (termed veracylglucan C).

Veracylglucan A (C₁₀H₁₆O₁₀), with a molecular weight of 296 Da was only detected in very small quantities in the *A. vera* gel and was very unstable with hydrolysis of the ester group [6-*O*-(1-L-maloyl)-Glcp-] that occurred after only one week at a temperature of 7 °C. Veracylglucan B (C₁₆H₂₆O₁₅) has a molecular weight of 458 Da and pH of 3.8, while veracylglucan C (C₅₆H₈₂O₅₁) has a molecular weight of 1570 Da and a pH of 4.7. The chemical structure of the three different veracylglucans are shown.



Pectic substance

Pectic substance is a term that refers to a group of closely related polysaccharides including pectin, pectic acid and arabinogalactan. Pectin is a polysaccharide consisting of α -(1 \rightarrow 4) linked polygalacturonic acid with intra-chain rhamnose insertion, neutral sugar side-chains and methyl esterification.

Arabinan and arabinogalactan

Arabinogalactan contains mainly arabinose and galactose, but also other sugars including glucuronic acid and/or galacturonic acid. Certain arabinans and arabinogalactans sometimes form the neutral side chains of pectins.

Arabinogalactan is present in a much lower concentration in aloe gel compared to acemannan.

Other polysaccharides

Aloeride is a polysaccharide that comprises only 0.015% of the crude *A. vera* juice material (dry weight). It has a molecular weight between 4 and 7 million Da with its glycosyl components containing glucose (37.2%), galactose (23.9%), mannose (19.5%) and arabinose (10.3%). Polyuronide has a molecular weight between 275 and 374 kDa, while that of aloeferon is 70 kDa. Another biologically active polysaccharide with a molecular weight between 420 and 520 kDa was isolated from aloe gel that comprises equal amounts of glucose and mannose.

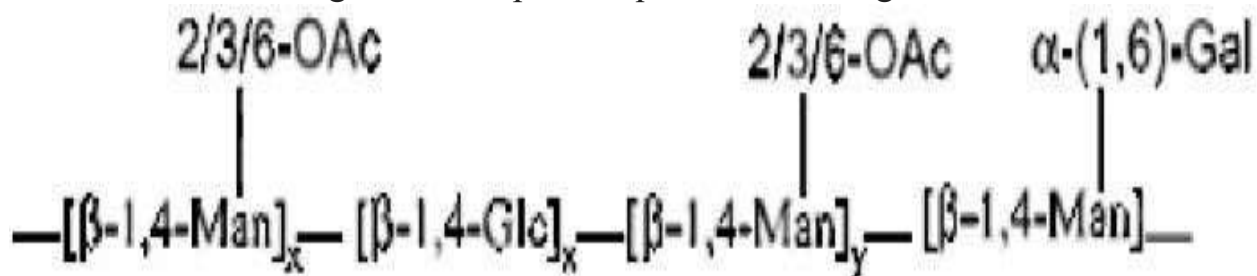


Figure: chemical structure of acemannan

BENEFIT OF ALOE VERA FOR HAIR:

Aloe promotes scalp health

Aloe is a natural anti-inflammatory that helps to soothe and nourish the scalp in the same way it does the skin on your face. "It's a great natural conditioner that can penetrate into the hair and scalp to hydrate strands and moisturize the scalp, helping to alleviate inflammation, itching, or irritation," says celebrity hair stylist Sally Hershberger. It's no wonder you'll find it in popular drugstore shampoos like Herbal Essences Bio:renew Scalp Balance. Aloe's powerful woundhealing properties also help treat and improve any irritations, itchiness, or dry patches that may appear on the scalp, helping to maintain a healthy foundation that promotes healthy hair growth.² That doesn't mean it will cure your hair loss, but when applied directly to the scalp, it can serve as an effective scalp treatment and pampering conditioner that improves overall hair health.

Aloe gently cleanses and hydrate

While aloe is more commonly known as a hydrator, its natural antibacterial and antimicrobial properties also make it a gentle cleanser that effectively removes grease without stripping natural oils.³ "One of the most common mistakes that causes further damage to color-treated hair is over-shampooing, so aloe can be an effective way to get rid of excess oils and buildup without hurting the strands," says Gloria Bonilla, colorist at Sally Hershberger Nomad in New York City.

Aloe preserve hair colour

Speaking of hair color, "that's greatly impacted by sun exposure, too," says Urban. "Color can fade, become brassy, and dry out, causing strands to become more fragile and prone to breakage. Similar to your skin, using aloe on the hair and scalp helps alleviate some of the damage caused by UV rays."⁴

"Since aloe doesn't contain all of the additional parabens, sulfates, and synthetic fragrances in traditional shampoos, it provides a much gentler cleanse that preserves color and keeps hair healthy," says Bonilla.

Skin hydration effects

In a study where the moisturising effects of cosmetic formulations containing different concentrations of lyophilised *A. vera* gel were studied, showed that only formulations with higher concentrations (0.25 % w/w and 0.5 % w/w) increased the water content of the stratum corneum after a single application. When the formulations were applied twice daily for a period of 2 weeks, all the formulations (containing concentrations of 0.1 % w/w, 0.25 % w/w and 0.5

% w/w of *A. vera* gel powder) had the same effect. However, the transepidermal water loss was not changed by inclusion of the *A. vera* gel in the formulations compared to the vehicle used in the formulations. It was proposed that the *A. vera* gel containing products improved skin hydration possibly by means of a humectant mechanism.

Anti oxidant effect

It has been reported by several authors that different fractions of *A. vera* as well as unfractionated whole gel have anti-oxidant effects. Glutathione peroxidase activity, superoxide dismutase enzymes and a phenolic anti-oxidant were found to be present in *A. vera* gel, which may be responsible for these anti-oxidant effects. It was shown in two cell-free *in vitro* systems and by incubation with inflamed colorectal mucosal biopsies that *A. vera* gel has a dose-dependent anti-oxidant effect. The cell-free techniques used in this study assessed the scavenging of both superoxide and peroxy radicals. The *A. vera* gel in a concentration of 1 in 50 also inhibited prostaglandin E₂ production from inflamed colorectal biopsies, but had no effect on thromboxane B₂ release.

Anti inflammatory effect

Inflammation is a reaction by the body due to injury and is characterised by swelling, pain, redness, heat and loss of function. This natural response can delay healing, but it may also be detrimental to suppress inflammation before its purpose is accomplished. The anti-inflammatory activity of mannose-6-phosphate is believed to resemble the effects observed for acetylated mannan in aloe gel. Aloe gel reduces inflammation that is induced by agents via promotion of prostaglandin synthesis as well as increased infiltration of leucocytes, but is less effective against inflammation caused by agents that produce allergic reactions.

The effects of aqueous, chloroform and ethanol extracts of *A. vera* gel were investigated on oedema in the rat paw as well as neutrophil migration into the peritoneal cavity induced by carrageenan. Both the aqueous and chloroform extracts were found to inhibit the oedema formation close to that of well established anti-inflammatory agents (i.e. indomethacin and dexamethasone). Furthermore, the anti-oedema effects of these two extracts correlated well with their abilities to decrease the number of neutrophils migrating into the peritoneal cavity. The ethanol extract did not show an effect on the oedema, but reduced the number of migrating neutrophils. Further experimentation on the mechanism of action suggested that the anti-inflammatory activity of the extracts of *A. vera* gel probably occurs via an inhibitory action on the arachidonic acid pathway through cyclooxygenase.

Cleaning hair

Aloe vera can be used to give hair a really good clean and it turns out, you can use aloe vera for scalp cleaning too. It works by removing oil and residue left behind on your scalp and hair, from hair product that may have built up over time.

Aloe vera is a natural ingredients that is not too harsh that can help to repair hair , but more on this below. **Aid hair strength**

just when you thought aloe vera could not get more impressive , we tell you this-it can help to strengthen hair strands. It contains vitamin A, C and E which can lead to healthy , shiny looks.

Aid hair growth

It is not a magic hair growth potion, but you can try aloe vera for hair growth. Aloe vera can as we have just mentioned, help cleanse and condition hair.

which Advocates of using aloe vera for hair health point to its plentiful supply of vitamins, minerals, and other ingredients linked to hair growth. They say these properties are signs of its ability to promote healthy and abundant hair.

Lane explains that aloe vera has a host of benefits for hair, whether you're looking to heal your scalp or simply pamper your tresses. She says that the ingredient is a humectant, a substance that reduces moisture loss and has the ability to draw moisture from one's environment into skin and hair.

"Aloe is amazing at providing long-lasting moisturization that you can see and feel," Lane says. "For the hair, you'll notice an increase in softness and manageability." She also notes that aloe creates a subtle glow for the skin. However, aloe's healing properties go beyond kicking dryness to the curb.

Lane says, "Aloe has the ability to promote pH balance to the hair, scalp and skin. [This] plays a huge role in the health of our body, and unfortunately, a lot of scalp issues arise due to pH imbalances. Adding aloe vera to your regimen will definitely be an asset." However, she notes that everyone responds differently to various ingredients—even natural ones—and it's important to go with the products and treatments your hair best responds to.

To reap the most benefits when using aloe as a hair treatment, it's recommended for application as a weekly deep conditioning mask to replenish moisture, soothe scalp irritations, and restore vibrancy to both natural and color-treated hair. To apply, saturate the hair and scalp with a thin layer of aloe, and let it sit for 20 to 30 minutes before rinsing thoroughly. "No need to shampoo after; just make sure the hair feels like it's completely rinsed and no residue is left behind," says Urban



Figure: Aloe vera

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