

# Skin Care with Herbal Exfoliants

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## ABSTRACT

Exfoliation is the process of removal of removing the old, dead skin cells that cling to the skin's outermost surface. The two types of exfoliation are mechanical and chemical. People's opportunities for seeking dermatological assistance for a myriad of conditions, including acne, rosacea, striae, photodamage, and skin cancers have increased in recent years. Chronological aging is a process of intrinsic or normal aging of the skin. Chronic exposure to ultraviolet (UV) light leads to photodamage of the skin, which is the leading cause of extrinsic aging, or alteration of the skin due to environmental exposure. Management options for photodamaged skin include alpha-hydroxy acids, antioxidants, antiandrogens, moisturizers and exfoliants. Many treatments are available to reverse the damage, but their efficacy remains to be proven and they may also produce unwanted side effects. Herbal Exfoliant is a cleansing formula and treatment mask that detoxifies the skin and stimulates its metabolism. It enhances absorption and retention of moisturizing agents and restores the skin's own natural moisture factor. Skin exfoliation improves the quality and tone of skin by assisting in the removal of dead skin cells from the surface. Herbal Exfoliant produces soft, supple, re-energized skin and prevents premature skin aging.

**Keywords:** antioxidant, desquamation, keratinocytes, melanocytes

## INTRODUCTION

Human skin undergoes modification throughout the course of life because of physiological and external stimuli. Both the Intrinsic (chronological) and extrinsic (environmental) overlap during a person's lifetime and both are responsible for dysfunction of the skin's natural self-protection mechanism and repair capability. Intrinsic aging involves genetic components, while photoaging or environmental aging is caused by exposure to unfavorable skin conditions during a person's lifetime. To maintain health and beauty as you age, the skin requires supportive care. Herbal exfoliants (HEs) alleviate age-related changes and neutralize environmental attacks by removing dead skin cells from the epidermis, exposing newly formed skin cells on the surface and stimulating cell growth in the subepidermal layer. This shedding of the outer dead cell layer also helps to unclog skin pores and keeps skin clean (Dumas *et al.* 2008).

As new skin cells are generated, the external layer of skin cells becomes dense and rigid and loses moisture. This layer eventually detaches from the skin cells beneath allowing newly formed cells to surface in a process called desquamation. Desquamation also eliminates damaged and contaminated cells that carry body toxins, pollutants and microorganisms from the environment. These dead skin cells can take a long time to exfoliate naturally and this leads to clogging of the skin pores, which in turn causes skin congestion. The rate at which natural exfoliation takes place depends on internal factors such as health, age, and the amount of moisture in the skin, as well as on external factors such as protective covering, temperature, and weather conditions (Panda 2001). HEs can help to remove these dead cells.

## SKIN TYPES BENEFITTING FROM EXFOLIATION

### Aged and mature skin

In aged skin with a thin epidermis and atrophied dermis, the fatty tissues of the hypodermis may also decrease. The

texture of the dermal tissue changes as the collagenous fibers progressively organize in large bundles. Blood circulation decreases in the skin's microvessels, and sweat production decreases due to a reduction in the number of active sweat glands. Sebum production is lower and pigmentation changes occurs leading to age spots. In aging skin the natural sloughing of older cells from the skin becomes more difficult, causing a dull, thick skin with less tone. Exfoliation with a formulation containing skin nutrients and moisturizers is especially effective on prematurely-aged and mature skin, as it stimulates natural cell renewal (Ostacolo *et al.* 2007).

### Acneic skin

Acneic skin produces five times more dead skin cells than occur in other skin conditions and exfoliation can have great benefits for acneic skin. Hydroxy acids are effective in preventing dead skin cells from clogging hair follicles and contributing to acne.

### Hyperpigmentation

Hyperpigmentation is a darkening of skin color caused by either an increase in melanin or melanocytes, or from deposition of a colored substance in the skin. Exfoliation helps to shed these pigmented cells more quickly and lighten age spots. Special ingredients in the exfoliant allow it to effectively penetrate a hyper-pigmented area at its source (Ashawat *et al.* 2008).

### Dehydration

In dehydrated skin, the lack of moisture leads to fractures in the cellular barrier, leaving skin tight and stretched. Over-moisturization leads to a dull, uneven skin tone. By applying an exfoliant, the dying skin cells are effectively removed and moisturizing and hydrating ingredients can penetrate deeper into skin to help ease dry skin conditions (Sahl *et al.* 1994).

## Photodamage

Exposure of the epidermis and dermis to UV radiation from sunlight causes photodamage. UV radiation can induce acute and chronic changes in the DNA, protein and lipid building blocks. Acute effects include sunburn, photo toxicity, photo-allergy, cutaneous degeneration and actinic elastosis. Photodamaged skin appears thicker (actinic keratosis) and less elastic due to hypertrophy of elastic tissues and alterations in collagen fibers (Hawk 2001). Exfoliation may help people with sun-damaged skin containing potentially abnormal cells to eliminate these cells before they become dangerous, and this may help prevent skin cancer.

## Mechanism

Human skin is comprised of three layers, the epidermis, the dermis, and the subcutaneous layer. Skin varies in composition and thickness throughout the body. The process of exfoliation and skin cell renewal takes place in the epidermis, the outer layer, which is 0.5-1.0 mm thick. Skin contains about 70% water, 25% protein and 2% lipids, with the remaining 3% consisting of trace minerals, nucleic acids, glycosaminoglycans, proteoglycans and various other chemicals.

The cells of the uppermost layer of the epidermis, the stratum corneum or 'horny layer' comprise a protective layer of continually shedding dead cells known as keratinocytes, (the primary type of epidermal cells), hardened proteins known as keratins (protect against harmful substances), and lipids. Fibroblasts are connective tissue cells found in the dermis layer of the skin. These cells synthesize collagen, elastin and other structural molecules, and their proper functioning is crucial to overall skin health. After about fifty divisions, fibroblasts undergo cellular senescence in which they lose the ability to divide and their metabolic activity decreases. They tend to enlarge and accumulate lipofuscin, the pigment responsible for age spots (Hawk 2001).

The middle layer of the epidermis contains vital living keratinocytes, or squamous cells, which do the main work of protecting the body. The inner layer of the epidermis, the basal layer, consists of basal cells, which continually divide to form new keratinocytes. As they differentiate, they migrate into the middle layer to perform their protective functions. As they mature, keratinocytes lose water, flatten out and move upward, eventually reaching the stratum corneum where they are then shed, to be replaced by new cells moving upward from the middle layer (Tadokoro *et al.* 2008).

Epidermal cells adhere to each other on the tops, sides and bases of the cells via calcium-dependent desmosomes. As the cells move upward from the deeper layers of the epidermis to the outermost layers of the stratum corneum, the desmosome attachments become weaker.

This weakening is accelerated by enzymes, found only in skin and hair follicles that break the bonds of the desmosomes and free the cells to slough off (Hawk 2001).

While the exact mechanism is unknown, it is believed that cells are programmed when they are young and residing in the lower layers of the epidermis. Each cell has an internal clock that ensures that it is linked to other cells for a certain period of time. When the clock runs down, cell cohesion decreases and the cells slough off. Although the mechanism controlling the activation process is not well understood, the enzyme responsible for weakening the bonds between cells is inactive in the skin until activated by another enzyme. The complex process known as keratinization commences with the birth of a new daughter cell in the basal cell layer (stratum germinativum) and its progression upward until it is shed as a stratum corneum corneocyte. This normally takes about four weeks; however, it can take as much as seventy-five days depending on age and the condition of the skin. As expected, younger skin is more efficient than aged skin at this process of desquamation,

which stimulates the growth of new cells at a deeper level (Nina *et al.* 2009).

As we age, the glue-like intercellular cement holding the cells together becomes denser, causing a build up in the layers of cells; cell sloughing becomes more difficult resulting in a skin that appears dull, thick and with less tone. This may be exacerbated by environmental factors like exposure to sunlight, hormonal influences (androgens, estrogens, and epidermal growth factor) and deficiencies in various vitamins like A and D. With all of these influences affecting the desquamation process, it is apparent why exfoliation is so important to the skin. Removing this buildup of dead, damaged skin cells stimulates the regeneration of new cells improving the skin's appearance, feel and texture (Sahl 1994).

## EXFOLIATION METHODS

### Manual/mechanical skin exfoliation

Manual skin exfoliation refers to any type of topical skin exfoliation that is applied to the skin manually with fingers or applicator. It is suitable for normal skin. Mechanical exfoliation involves physically scrubbing the skin with a mild abrasive such as micro-fiber cloths, adhesive exfoliation sheets, micro-bead facial scrubs, crepe paper, crushed apricot kernels or almond shells, sugar or salt crystals, or pumice, or using abrasive sponges and brushes. Mechanical friction with abrasives exfoliates the outer corneocytes that comprise the stratum corneum layer and results will vary depending on the amount of friction and the nature of the abrasive used (Chattopadhyay 1998). As a mechanical process, gentle exfoliation can be achieved with micro-bead face scrubs that will remove the top layer of skin. A more extreme level of exfoliation is provided by dermabrasion which entails the use of a laser to remove upper layers of skin. Prior to the advent of laser technology, micro-sanders were used (under anesthesia) to aggressively abrade the skin surface.

### Chemical/herbal exfoliation

This type of exfoliation includes use of creams, lotions and gels. Chemical exfoliants include scrubs containing salicylic acid, glycolic acid, fruit enzymes, citric acid, or malic acid which may be applied in high concentrations by a dermatologist, or in lower concentrations in over-the-counter products (Ostacolo *et al.* 2007).

Chemical exfoliation may involve the use of products that contain alpha hydroxy acid (AHA) or beta hydroxy acids (BHAs) or enzymes that act to loosen the glue-like substance that holds the cells together allowing them to slough off. This type of exfoliation is recommended for people treating acne.

While the precise mechanism of action of hydroxy acids is still open to debate, there is a general consensus that exfoliating the outermost layers of the stratum corneum (the stratum disjunctum) results in improved skin texture, and a reduction in fine lines and hyperpigmentation.

It is thought that AHAs primarily affect the skin by normalizing cell turnover in the epidermis. This stimulates the formation of normal healthy skin, sloughing off of dead cells from the stratum corneum, a decreased formation of dry scales on the skins surface and stimulation of the cell cycle. While this is plausible, there are some researchers who believe the mechanism of action for AHAs cannot be tied solely to stimulation of the skin as measured by traditional cell renewal techniques. Studies on cell cohesion and skin pH changes indicate that keratin bonds may be affected and that low pH levels associated with active AHA solutions may dissolve the desmosome protein linkages causing a burst in skin exfoliation. It is often said that AHAs affect the skin from the inside out because of the suggestion that they influence coenocytes cohesion in the lower layers of the stratum corneum. The result is a thinner stratum cor-

neum that is more flexible and compact, reflects more light and overall gives the skin a more youthful appearance.

In recent years, retinol (vitamin A) has been included in exfoliation formulas because the skin can convert retinol to retinoic acid, a potent skin exfoliant and antiaging agent. Retinol has been shown to reduce the visible signs of both photoaging and normal chronological aging when used on a daily basis (Banerjee *et al.* 2005).

### Enzyme exfoliation

This type of exfoliation includes use of products such as cleansers, pads, masks and powders. Plant enzymes are different from AHAs or BHAs because they work by dissolving the top layer of dead skin cells. The main plant enzymes used in skin exfoliation are papain from papaya, bromelain from pineapple and an enzyme from pumpkin. Enzymes exfoliators can be used as an alternative to acid exfoliators and work well for people with sensitive skin who cannot tolerate acid. They should also be used by persons of darker skin tones and are generally recommended for acne treatment. Papain and bromelain are proteolytic enzymes that stimulate exfoliation by digesting intercorneocyte cohesion and softening of the skin. Unlike AHAs their activity is not pH dependent but is activated by water and limited in the amount of exfoliation that can be achieved (Ostacolo *et al.* 2007).

Recent studies on another enzyme, a protease from the microorganism *Bacillus subtilis*, have demonstrated that an enzyme extract is a beneficial keratolytic agent that helps eliminate desquamating corneocytes when applied topically (Singh *et al.* 2001).

## HERBAL EXFOLIATION

In India many HEs have been used traditionally for generations. They have stood the test of time and are safe to use.

### *Luffa aegyptiaca* (luffa)

This HE contains finely ground fibers and walnut shell powder. It gently exfoliates dull lifeless skin cells without being harsh or abrasive and allows new, healthy skin to appear (Wang *et al.* 2002).

### *Ahnfeltia concinna* (algae) extract

This extract is isolated from phytoplankton and sea algae (Mathieson *et al.* 1984) and is one of the ingredients in an HE preparation that provides the skin with an easily absorbed source of nutrients and moisturizers.

### Grapefruit seed extract

This extract together with essential oils boosts the immune system and creates a purifying environment for the skin. This helps oily, overactive skin to normalize itself (Sachs 1997).

### Apricot shell (*Prunus armeniaca* seed powder)

Finely ground pieces of the apricot seed shell are used as a gentle exfoliant in scrubs. The scrub combines the moisturizing benefits of the apricot extract with the exfoliating properties of finely ground apricot seeds. This advanced formula face and body scrub helps to exfoliate dead skin cells and leave the skin feeling fresh and smooth (Lauri *et al.* 1998).

### Lemon oil (*Citrus peel oil*)

This is obtained from the peel of the fruit, and contains citroflavonoids that affect vascular permeability and improve circulation and tone of capillaries and veins. It is an essential oil with anti-inflammatory and antioxidant pro-

perties that contains vitamin C and is also used as a natural fragrance (Homnava *et al.* 1990).

### Cucumber extract (*Cucumis sativus* fruit extract)

The juice of the fruit acts as a moisturizer, soothing and tightening the skin, and also has anti-inflammatory properties. It nourishes and softens the skin and when used in a scrub, helps to remove impurities, dead skin cells and dirt by gently unclogging pores. Thus, helps the skin stay fresh, healthy, clean, hydrated and blemish-free (Homnava *et al.* 1990).

### Papaya extract (*Carica papaya* fruit extract)

One of the active enzymes in papaya, papain, has antimicrobial as well as exfoliant properties. Papaya extract exfoliates the skin, but can also help reduce edema and promote wound healing (Stahl *et al.* 2005).

### Mung dal (*Phaseolus mungo* seed)

This traditional exfoliant is used widely in herbal cosmetology, since it helps to remove dead skin cells, retain a smooth skin texture and maintain healthy glowing skin (Swami *et al.* 2004).

### Pineapple extract (*Ananas comosus* fruit extract)

The extract of pineapple will promote skin elasticity while removing damaged and dead cells from the skin. It also helps to improve moisture and hydration of the skin and produces a clear complexion. A variety of ingredients, including enzymes such as bromelain found in pineapple are responsible for this action. Bromelain also has anti-inflammatory properties (Bakhr 1994).

### Rosehip seed powder (*Rosa canina*)

Finely and smoothly ground powder of rosehip seeds forms a natural exfoliating medium. This powder provides gentle removal of dead skin cells without causing injury to the skin (Lauri *et al.* 1998).

### Cranberry (*Cotoneaster apiculatus*)

The tocotrienols contained in cranberry are very nourishing to skin and have a moisturizing effect. They have antioxidant properties and help protect the skin from stress caused by sunlight. The omega oils contained in cranberry help to moisturize and strengthen the skin, while at the same time reducing inflammation. Apart from nourishing the skin, cranberry also helps to improve moisture retention and increase skin smoothness and skin elasticity (Stahl *et al.* 2005).

### Green tea (*Camellia sinensis*)

Extensive research has shown that this botanical extract not only has amazing antioxidant and cell protective qualities, but also protects the collagen by inhibiting collagenase. It is easily absorbed by the skin and protects the DNA and cells in general, which helps the skin fight inflammation that may cause premature aging. It has excellent astringent qualities and promotes the elasticity and firmness of the skin. It protects the cells in the skin from premature cell death, due to radiation or excessive free radicals (Kong *et al.* 2003).

### Tree tomato (*Cymphomandra betaceae*)

This edible red fruit is widely used as a skin colorant by native tribes. The rich content of flavonoids and pectin of this fruit has an antioxidant and cleansing action, which enhances the texture, smoothness and glossy appearance of the skin (Rodriguez *et al.* 1983).

## DOs AND DON'Ts IN HERBAL EXFOLIATION

Before using any exfoliating products, they should be tested on the skin to see if the type of exfoliation suits the individual skin type. Rubbing any exfoliating products on the face should be avoided. It loosens the facial skin and can cause wrinkles. Dabbing is a safer way to apply and rinse exfoliating products. Hot water should not be used directly on the face. It can harm the skin and dries it out too quickly. Lukewarm or cool water is recommended for rinsing the face. The skin should be exfoliated in the evening. Exfoliation of skin gives better results during summer than winter. Exfoliating the area around the eyes should be avoided since the skin is very thin and sensitive in this area. After exfoliation a good moisturizer containing nutrients, vitamins and antioxidants should be used to supply the required supplements to the skin lost in exfoliation.

### Advantages of HEs

Exfoliation removes the outer layer to reveal the newer skin beneath. This shedding of the outer layer unclogs pores, keeps skin clean and helps reduce acne breakouts. There are several reasons that exfoliation is good for the skin. Regular exfoliation gives the skin a more radiant look and a smoother feel. Over time, it can help to reduce the appearance of fine lines and will contribute to the skin's firmness and tone. It increases the blood circulation in the skin, helps to remove toxins, rid skin of dry, rough patches, and can even help to break down and lessen the appearance of cellulite. It also enhances the effects of daily moisturizing by allowing the moisturizer to penetrate the skin more deeply (Lauri *et al.* 1998).

HEs are beneficial in the following ways: Improves the texture of the skin; Makes the skin healthy; Makes the skin look more radiant; Reduces appearance of wrinkles and fine lines; Prevents acne; Prevents aging of the skin; Promotes collagen building; Clean clogged pores; Improve skin's thickness; Reduces brown spots; Improve skin cell renewal; Removes the dead skin layer and allows the active ingredients in skin care products to reach the inner layers of the skin to vitalize them; They are biodegradable.

### CONCLUSION

The key to healthy skin is daily exfoliation and hydration. The environment clogs the skin pores with dirt and toxins and our internal body excretion mechanism also tries to get rid of its toxic components of metabolism through the same pores. This leads to build up of dead skin cells. Daily exfoliation with a gentle, creamy herbal scrub accelerates new cell generation while decreasing the surface buildup of dead skin cells. Every day the skin is exposed to harmful rays from sunlight and attack by free-radicals. These daily assaults may intensify melanin formation and damage cells, hence accelerating the process of skin darkening and aging. The most serious form of skin cancer is caused by excessive exposure to the sun (ultraviolet radiation) and herbal exfoliation may help to prevent skin cancer. Skin cells that are damaged are at greater risk of becoming abnormal and cancerous. Sun damage can also cause other skin problems to develop such as premature skin aging and actinic keratoses. Herbal skin exfoliant enriched with herbal extracts penetrate deep into the skin to nourish it and make it blemish-free

by shielding the skin from damage by environmental pollution and preventing photo-damage such as discoloration and hyper-pigmentation. Herbal skin exfoliation is an important part of general skin maintenance. It smoothes and chemically balances the skin, unclogs pores and stimulates fresh cell growth, reducing blemishes, discoloration and wrinkles which helps the skin stays healthy clean, hydrated and blemish-free. Apart from removing dead skin cells, a gentle exfoliation of the skin will also positively help to create a smoother and finer skin texture, as well as reduce pore size when used over an extended period.

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