

EVERYTHING YOU NEED TO KNOW ABOUT AHAS

(ALPHA HYDROXY ACIDS)

The guide to
success with
AHAs

INTRODUCTION

Beauty brands face many challenges in today's fast moving cosmetic Industry. The market is saturated. Consumers are confused. There are too many brands to follow. That's why it's even more important to always focus on the right trends – especially for established components of many products like like alpha hydroxy acids (AHAs). This can be a challenge for innovative and aspiring beauty brands.

As a beauty brand you may need some support with your first pilot, launch roll-out or additional product lines? Evonik helps to transform your beauty concepts into developed formulations and finished products.

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Rely on the guidance of an experienced ingredient supplier like Evonik to

- enrich the process.
- provide access to knowledge and expertise.
- get insights on cutting edge formulations and ingredients.

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As navigating the ingredient supplier landscape is often challenging, we've put together this guide to give you the need to knows about contract manufacturing, and to support you in creating and sustaining a thriving beauty brand.

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Our alpha hydroxy acid technology guide for beauty brands will give you industry insights on:

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- Renew your proactive skin regimen with TEGO® RenewHA Malto
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- Renew your skin's glowing appearance with TEGO® RenewHA Cap
- Renew your skin's ambitions with TEGO® RenewHA HODA



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WHAT ARE ALPHA HYDROXY ACIDS AND HOW DO THEY WORK IN COSMETIC PRODUCTS?



WHAT EXACTLY ARE ALPHA HYDROXY ACIDS?

Alpha hydroxy acids (AHAs) are a group of natural and synthetic ingredients that, when properly formulated, can exfoliate the uppermost layers of the skin. Doing so reveals fresher, refined skin that appears much smoother, is more hydrated, and, over time, becomes visibly firmer.

THERE ARE SIX MAIN AHAS COMMONLY FOUND IN SKINCARE PRODUCTS:

- Glycolic acid
- Lactic acid
- Citric acid
- Malic acid
- Mandelic acid
- Tartaric acid

The two most known AHAs are glycolic and lactic acid. Glycolic acid is the smallest alpha-hydroxy acid and the most popular of the AHA's, as it penetrates the skin easily. It is commonly found in topical skincare products to gently dissolve away the outermost dead skin cells to reveal fresh, glowing skin.

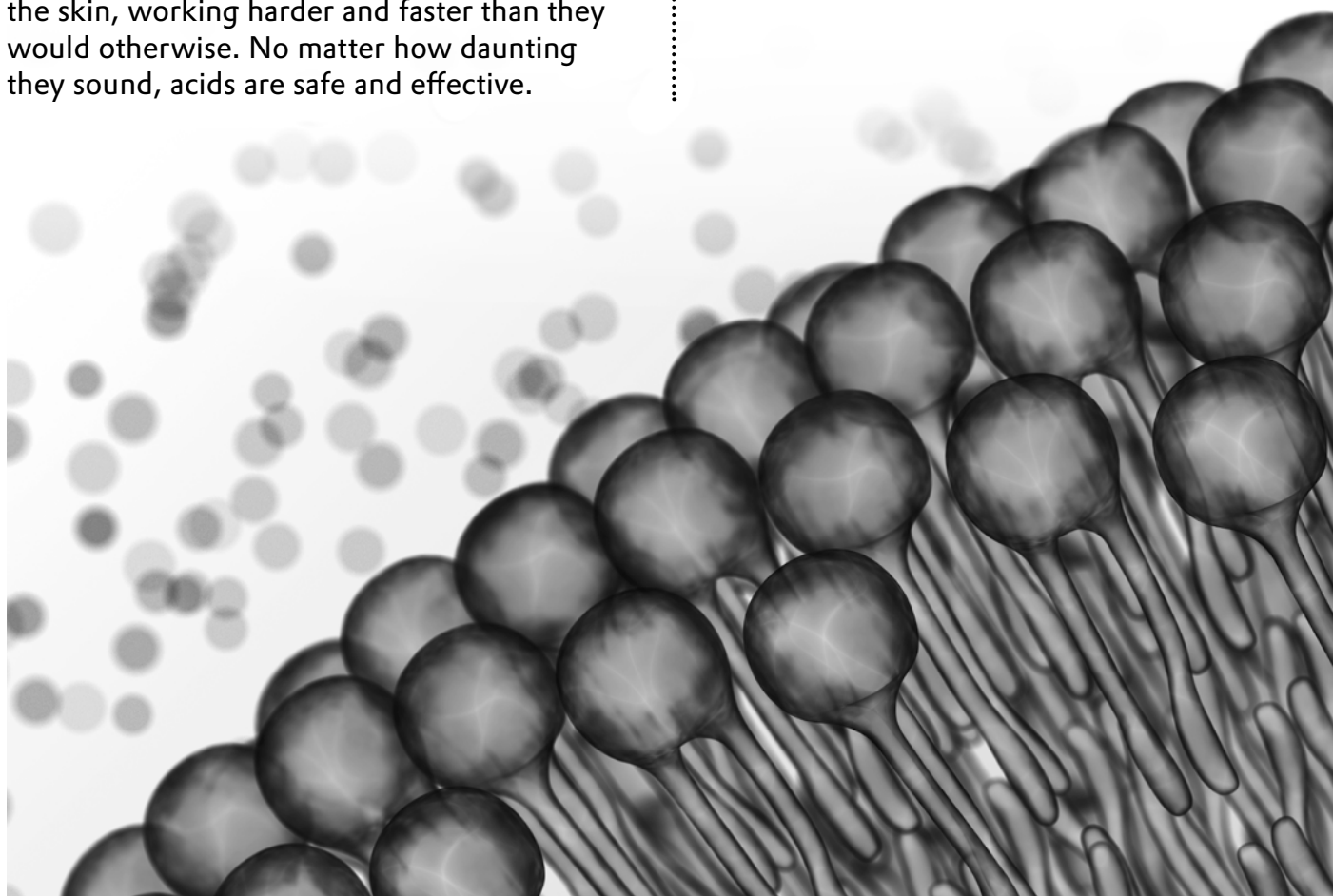
All AHAs are water soluble and their ability to penetrate your complexion varies by molecule size. The smaller the AHAs, the more they penetrate deep into the skin. Bigger AHAs such as mandelic, lactic, and malic acid penetrate the skin at slower rate and are therefore known to be more gentle.



WHAT DO AHAs DO?

The word 'acid' has a slightly negative connotation, which may prevent some people from diving into acid-based skincare products. But by avoiding acids, some of the most effective and transformative skincare ingredients on the market are skipped. Acids are multi-beneficial; not only do they exfoliate by sloughing away dead skin and pore-clogging debris, but they also encourage cellular turnover, boost collagen production, and provide substantial brightening effects. Acids even allow other skincare products to penetrate deeper into the skin, working harder and faster than they would otherwise. No matter how daunting they sound, acids are safe and effective.

AHAs are typically found in fruits, milk, and sugarcane. Depending on the specific acid that's used, AHAs can treat everything from wrinkles to hyperpigmentation. The acids exfoliate skin by decreasing corneocyte cohesion within the stratum corneum, driving forward the desquamation process of the skin. This helps make way for newer, healthier looking skin to manifest itself. Additional mechanisms of action leading to moisturization and skin protection have also been hypothesized.



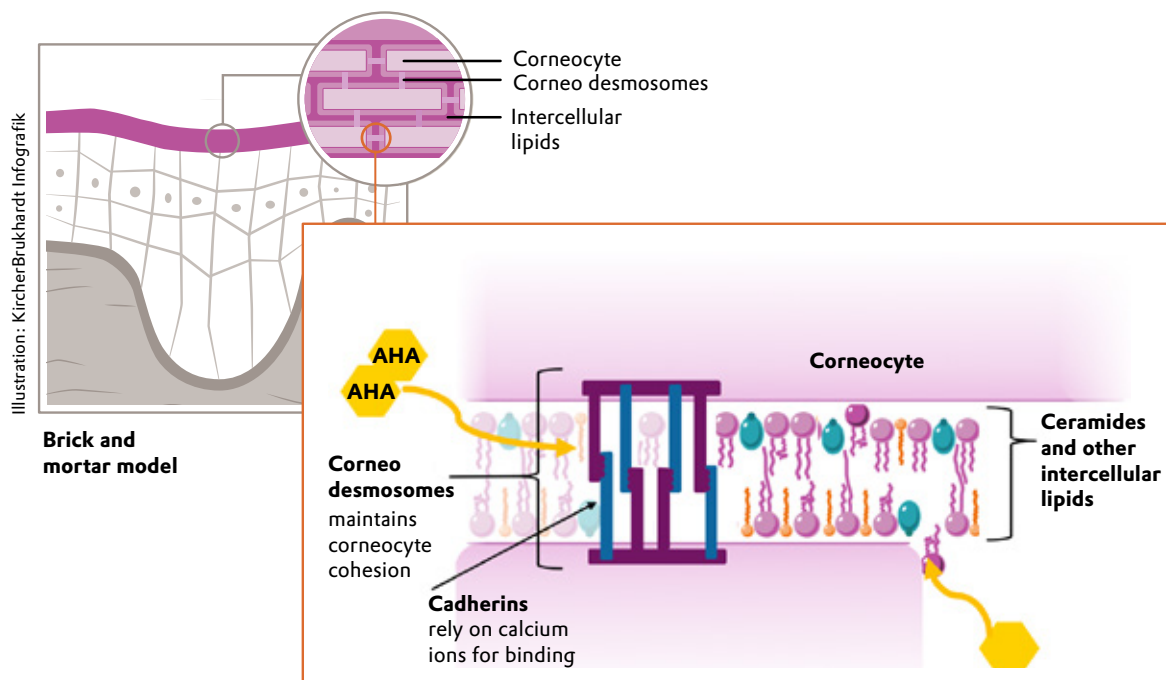
THE SCIENCE: EXFOLIATION

AHAs LOOSEN CORNEOCYTE COHESION, PROMPTING SKIN RENEWAL

AHAs exfoliate skin by decreasing corneocyte cohesion within the stratum corneum, driving forward the desquamation process of the skin, which leads to skin renewal

This process is hypothesized to happen in three possible ways:

- **Reduction of calcium ion concentration by chelation.** The loss of these calcium ions from the corneodesmosomes (and other cellular junctions) disrupts cell adherence
- **Separation of cadherin protein chains linked by hydrogen bonds.** As concentration of AHAs increase, these protein hydrogen bonds become sufficiently separated to result in cellular desquamation
- **Disruption of ceramide and other lipids between corneocytes.** AHAs can impact the ester bonds (or their formation) of ceramide and other lipids, and the reduction of such lipids leads to acceleration of the desquamation process



WHAT ARE THE BENEFITS OF AHAs?

Alpha hydroxy acids (AHAs) are recognized as effective exfoliators with several additional benefits, but one significant drawback: skin irritation. There are a variety of reasons for having a reaction to an acid or any skincare product, including allergy, excessive application or using active ingredients in the wrong combination. But when used properly, AHAs have a wide range in terms of efficacy in cosmetic products and applications:

- **Exfoliation:** During exfoliation the skin cells on the surface are shed off. AHAs are primarily used for this process, which helps to remove dead skin cells to make way for new ones. In fact, this is the main benefit AHAs offer. Our natural skin cell cycle slows down as we age. That leads to a build up of dead skin cells. Too many of them can make our complexion look dull and enhance other underlying skin issues, such as age spots, wrinkles or acne. Not all AHAs have the same exfoliating power. It is determined by the type of AHA you use. The more AHAs contained in a product, the more powerful the exfoliating effects are.
- **Promote collagen production:** Collagen is a protein-rich fiber that helps to keep the skin plump and smooth. It is in the middle layer (dermis) of our skin. When we age, these fibers break down. Sun damage may

also accelerate collagen destruction. This can result in sallow, sagging skin. AHAs may help to promote collagen production by destroying old collagen fibers to make way for new ones. When the upper layer (epidermis) is removed products like AHAs can work on the dermis.

- **Reduce surface lines and wrinkles:** AHAs are known for their anti-aging effects. Though they do not work on deeper wrinkles, AHAs can do a great job on fine lines.
- **Minimize discoloration:** The risk of skin discoloration increases with age. Age spots (lentigines) may develop as a result of too much sun exposure, melasma, post-inflammatory-hyperpigmentation or acne scars can be visible. AHAs promote a skin cell turnover. New cells are evenly pigmented.

- **Treat and prevent blemishes:** Pimples often occur when pores are clogged with dead skin cells, too much oil or bacteria. Exfoliating with AHAs can help to remove the clog. A continued use of AHAs can prevent future clogs and reduce the size of enlarged pores, which are commonly seen in blemish-prone skin.

- **Increase product absorption:** AHAs can make existing products work better by increasing their absorption into the skin. If there are too many dead skin-cells the daily moisturizer can't hydrate the new skin-cells. AHAs can break through the layer of dead cells, enabling the moisturizer to hydrate the new skin cells very effectively.



WHICH AHA FOR WHICH SKIN TYPE?

Exfoliating the skin regularly is an easy way to keep it soft and smooth but the inclusion of AHA-heavy products can also take care of other concerns, from acne to hyperpigmentation: But which AHA is right for different skin types?

GLYCOLIC ACID

For more mature and resistant skin types.

It has the smallest molecular structure of all Alpha-Hydroxy Acids meaning it can penetrate the skin incredibly quickly and get to work on loosening all the dead cells from the surface of the epidermis. Regular application of a Glycolic Acid based product can help to improve natural cell turnover and increase collagen production, so the skin becomes smoother, firmer and more radiant after just a few days. It can also draw moisture to the skin, preventing it from drying out and reducing the amount of recovery time needed following the initial application.

LACTIC ACID

For sensitive, dry and mature skin types.

Some AHAs can be quite intense and drying on the skin making them unsuitable for more sensitive complexions but not Lactic Acid. Extracted from soured milk, Lactic Acid is gentler and less aggressive in terms of exfoliation so it can be used by those with sensitive skin or who are new to chemical exfoliators. It has quite a large molecular structure so the skin absorbs it very slowly which reduces the possibility of it causing a reaction or irritation. Lactic Acid is great for brightening dull complexions and correcting hyperpigmentation but its antibacterial properties mean it can also be used on acne-prone skins.

MANDELIC ACID

For dark and blemished skin or body applications.

Mandelic Acid is one of the lesser known AHA: It's the best choice for those with very oily, congested or acne-prone skin types due to its ability to reduce sebum production without drying out the skin. It also has anti-inflammatory properties that calm angry breakouts and pigment correcting properties that help reduce old blemish marks and sun damage - especially in darker skin tones. Mandelic Acid is perfect for those who have experienced irritation from other exfoliating acids or whose skin tends to react badly to grainy face scrubs.

POLYHYDROXY ACIDS

For all skin types, particularly those lacking moisturization and radiance.

Game-changers, aka aldobionic acids (ABA), these PHAs have a monosaccharide in their molecule which brings chemical exfoliation to the next level, offering additional benefits to the skin such as excellent moisturization, inhibition of glycation (process that can weaken skin collagen and elastin) and antioxidant for skin protection. All that combo with very low skin irritation potential due to their larger molecules. Lactobionic acid (milk) and maltobionic acid (corn) are two examples of ABA.

LONG-CHAIN AHAS

For sensitive skin types.

Much less irritating than conventional AHAs, long-chain AHAs are specially recommended for sensitive skin. Even though they are significantly milder, they still provide exfoliation benefits, leading to a more renewed skin appearance. Studies also suggest that their higher molecular weight doesn't impact on the effective absorption of those molecules into the skin. Formulating with them can be challenging due to solubility limitation but optimized solutions are available for balance performance and easier incorporation.

5 REASONS FOR BEAUTY BRANDS TO BOOST BUSINESS WITH AHAS:

I

Global market acceptance and approval of AHAs in cosmetic products.

IV

AHAs can offer your customers a choice of effective skin renewal.

II

Proven technologies and formulations convince customers of the value of your products.

V

Well suited products meet your customers goals and expectations.

III

Differentiate your beauty brand from the competition with AHAs.



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EVONIK'S STRONG PRODUCTS FOR BEAUTY BRANDS



EVONIK – THE BEAUTY BRAND PARTNER FOR NEXT GENERATION AHAS

Skin exfoliation is a well-understood approach to achieve a more radiant, healthy looking skin. Traditional AHAs are recognized as effective exfoliators. Evonik's next generation AHAs can offer consumers a choice of effective skin renewal that is nonetheless sensitive to the skin.

CONSUMER INSIGHTS:

Youthful pro-aging

The search for youth continues even as consumers recognize that skin aging is unavoidable. Aging gracefully through solutions proven to be able to return skin to a more youthful appearance are therefore of continued interest. AHA benefits, such as increased skin turnover and radiance, complement this narrative.

Nature-mimetic

Consumers continue to seek solutions based on nature, although greater acceptance is emerging of the environmental damage that some natural sourcing practices may pose.

Although originally based in nature, most AHAs used in cosmetics today are synthetically derived. This proves a perfect balance between limited environmental impact and nature-inspired solutions.

Sensitive skin and safety

Consumers are looking for solutions that enhance the healthy appearance of their skin, without the harsh drawbacks and "chemical feel" of some solutions. AHAs' pedigree of efficiency, coupled with the low irritation potential by the next generation polyhydroxy acids, make these products well-suited to meet consumer goals and expectations.

EVONIK'S AHA TECHNOLOGIES – A WIDE VARIETY OF APPLICATIONS

Evonik continues to develop new products based on market trends and customer needs. See how we can cover your needs with our technologies on the following pages:

- I Renew your sensitive skin with **TEGO® RenewHA Lacto**
- II Renew your proactive skin regimen with **TEGO® RenewHA Malto**
- III Renew your skin game plan with **TEGO® RenewHA Mandelic**

- IV Renew your skin's glowing appearance with **TEGO® RenewHA Cap**
- V Renew your skin's ambitions with **TEGO® RenewHA HODA**

EVONIK SPECIALTY ALPHA HYDROXY ACIDS

Our **next generation AHAs** offer a **more gentle, sensitive skin solution** while still leveraging the mechanism of action that made the „first generation“ AHAs so effective.



I RENEW YOUR SENSITIVE SKIN WITH TEGO® RENEWHA LACTO

TEGO® Renewha Lacto is an aldonic acid obtained from the oxidation of lactose and comprises of a galactose moiety linked to a gluconic acid molecule via an ether-like linkage. Owing to the high number of hydroxyl groups, LBA is a very hygroscopic and forms gels containing about 14% water with atmospheric moisture. This performance is reportedly better than some traditional humectants such as glycerin and sorbitol.

INCI:
Lactobionic acid

TEGO® RENEWHA LACTO HAS THE FOLLOWING BENEFITS:

- Excellent skin moisturization and humectancy benefits
- Antioxidant, chelating, and other skin protective benefits
- Improvement in the appearance of skin clarity, thickness, and quality
- Protective benefits for photoaged skin
- Milder with low irritation

APPLICATIONS INCLUDE:

- Body care
- Face and neck care
- Hand and foot care



II YOUR PROACTIVE SKIN REGIMEN WITH **TEGO®** **RENEWHA MALTO**

TEGO® Renewha Malto is an aldonic acid obtained from the oxidation of maltose. It is comprised of one molecule of D-glucose attached to D-gluconic acid. In addition to skin exfoliation benefits, the material can provide several addition skin protective benefits.

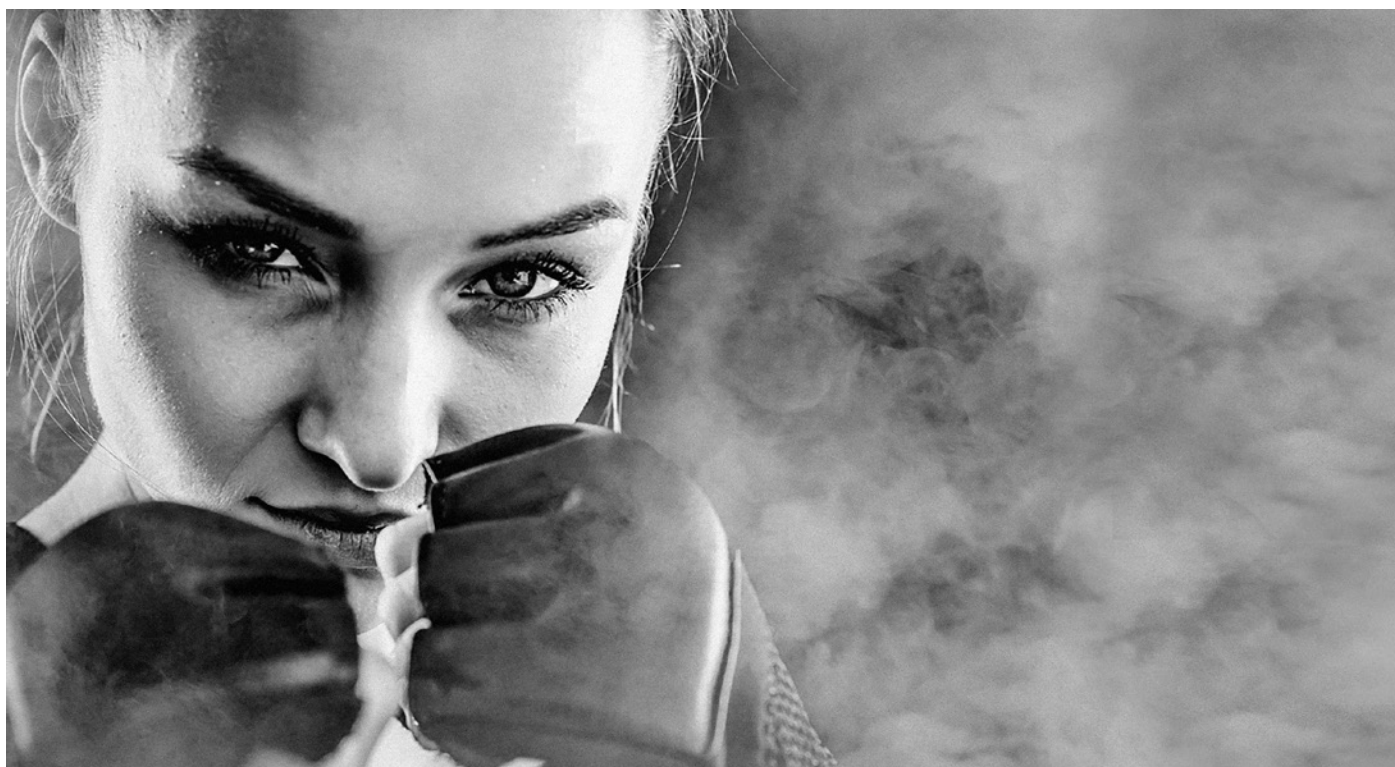
INCI:
Maltobionic acid

TEGO® RENEWHA MALTO HAS THE FOLLOWING BENEFITS:

- Skin firmness, thickness, and smoothing benefits
- Protective benefits for the skin, including inhibition of glycation and other deleterious skin effects
- Skin exfoliation benefits, promoting a renewed skin appearance
- Milder with low irritation compared to traditional AHAs

APPLICATIONS INCLUDE:

- Body care
- Face and neck care
- Hand and foot care



III RENEW YOUR SKIN GAME PLAN WITH TEGO® RENEWHA MANDELIC

TEGO® Renewha Mandelic is an aromatic alpha hydroxy acid (AHA). Although originally derived from amygdalin, an extract from almonds, most mandelic acid today is synthetically produced. Because of its larger molecular structure relative to other AHAs like glycolic acid, mandelic acid is known to have slower penetration into the skin, which in part moderates its irritation potential to the skin. By implication, the speed of action from a mandelic acid application may be slower or more gradual than some other AHA acids, and its use may be more appropriate for sensitive skin applications. Mandelic acid has been found useful to improve various skin conditions including UV-driven lentigenes, darkening of skin seen with melasma, inflammatory acne, wrinkles, and fine lines

INCI:
Maltobionic acid

TEGO RENEWHA MANDELIC HAS THE FOLLOWING BENEFITS:

- For darker skin types, particularly where pigmentation from other AHAs may occur
- Antibacterial with benefits for the reduction in the appearance of skin blemishes
- Skin exfoliation benefits, which promote a renewed skin appearance
- Less irritating than conventional AHAs

APPLICATIONS INCLUDE:

- Body care
- Face and neck care
- Hand and foot care

IV RENEW YOUR SKIN'S GLOWING APPEA- RANCE WITH **TEGO®** **RENEWHA CAP**

TEGO® RenewHA Cap is an alpha-hydroxy acid (AHA) with a ten carbon chain length. Because of its longer carbon chain relative to other AHAs, the material is known to absorb more slowly into the skin, thereby reducing overall irritation potential.

INCI:
Hydroxycapric acid

TEGO® RENEWHA CAP HAS THE FOLLOWING BENEFITS:

- Good humectancy benefits
- Especially for sensitive skin - much less irritating than conventional AHAs
- Other AHA benefits, such as skin exfoliation

APPLICATIONS INCLUDE:

- Body care
- Face and neck care
- Hand and foot care



V RENEW YOUR SKIN'S AMBITIONS WITH TEGO® RENEWHA HODA

TEGO® RenewHA HODA is a blend of alpha-hydroxy acid (AHAs), hydroxycapric acid and hydroxycaprylic acid in butylene glycol. Besides facilitating the incorporation of the AHAs into formulations, the product's longer carbon chain length AHAs are able to provide a good balance between low skin irritation and appearance benefit performance.

INCI: Butylene glycol;
hydroxycapric acid;
hydroxycaprylic acid

TEGO® RENEWHA CAP HAS THE FOLLOWING BENEFITS:

- Formulated to balance performance with lower irritation profile than conventional AHAs
- Skin exfoliation benefits, leading to a more renewed skin appearance
- Solution in butylene glycol for easy incorporation into formulations

APPLICATIONS INCLUDE:

- Body care
- Face and neck care
- Hand and foot care



FURTHER INFORMATION REQUIRED?

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