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Zinc Oxide: Historical Uses and Modern Benefits

by Rachelle Dupree



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Scientific advances in skin care production and new nano-sized zinc oxides have allowed this natural-skin healer and sun protector to show up in a plethora of skin care products that far outshine the goopy sunscreens of yesteryear.

Zinc is a naturally-occurring metallic element similar to magnesium or iron. Like iron and magnesium, zinc exists in the building blocks of the body and skin and is necessary for the maintenance of health and balance. It also contributes to the health of the immune system and maintenance of enzyme systems and cells. It is essential for protein synthesis, collagen formation, and helps skin heal. Zinc and one of its various compounds, zinc oxide, have been used in medicinal and industrial applications for centuries.

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Counter to common belief, zinc oxide is not a naturally-occurring element, but rather a result of chemically-heated zinc ore. The ore is processed with oxygen molecules until the substance is vaporized, condensed, and finally appears as a fine, white, crystallized powder. Only in this oxidized form can it be combined with base creams and other formulations to create skin care products used today.

History

As early as the first century C.E., Greek physician, pharmacologist, and botanist, Dioscorides, described the oxidation process of zinc in his writing, "De Materia Medica." Although it is unclear when the medicinal benefits of zinc compounds were discovered for the first time, the oldest and closest reference was found in an ancient Indian medical text, "The Charaka Samhita," which dates from 500

B.C.E. The text describes a healing salve called "pushpanjan," which was used to treat the eyes and open wounds.

It was not until the 1940s that zinc-based creams and ointments were available to the average consumer. Thirty years later, zinc lotions were used mainly to relieve symptoms of poison ivy, dandruff, and skin rashes. By the 1980s, new scientific studies on sun damage and skin health would change how this versatile compound was used.

Uses and Benefits

Zinc oxide as a compound is not water soluble, therefore, it cannot be applied topically in its pure form; it usually needs some form of carrier agent, like foundation, sunscreen, or moisturizer. As a topical ointment, zinc has been proven to treat a multitude of rashes, speed wound healing, and aid in tissue growth. Current research has also indicated it can help in the treatment and prevention of acne, among other benefits. The latest and most popular applications of zinc oxide products have been used heavily in the cosmetics industry to provide natural, broad-spectrum sun protection.

Zinc Oxide in Skin Care

Some of the earliest and most common skin care products containing zinc oxide may already be found in medicine cabinets. Zinc is the key ingredient in many diaper rash creams,

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calamine lotions, sunscreens, and vitamin supplements. Zinc oxide has several benefits, such as protecting the skin from harmful bacteria, soothing minor skin irritations, and accelerating tissue growth.

Mineral zinc supplements and compounded zinc oxide can be used both internally and externally to achieve maximum skin care benefits. Zinc has been shown to help heal skin ulcers, cold sores, abrasions, burns, and a variety of other skin irritations. Topical treatments have also been used for post-surgical wound healing and even some applications in dentistry.

The body requires zinc minerals, among others, for the synthesis of collagen the main component of connective tissue. Zinc also regulates enzyme functions needed to repair epidermal wounds.

Key Benefits of Zinc Oxide

Zinc oxide helps to aid in tissue growth and healing and is a natural antiseptic and antibacterial agent. It heals epidermal wounds and burns and treats and prevents skin rashes. This ingredient also protects against microbial pathogens. As a natural astringent, zinc oxide reduces acne-causing bacteria and minimizes pores. It also balances and regulates oil production, making it effective in the prevention and treatment of acne. Zinc oxide protects against UVA and UVB light rays

and is often used as a natural, non-toxic sunscreen to prevent photoaging and wrinkles. Due to the minimal risk of allergic reactions it is considered benign and safe for the skin.

Acne Treatment

Combinations of zinc oxide, along with zinc gluconate (a dietary supplement) or zinc sulfate (a salt-based form of the compound), have been shown to help heal acne blemishes, soothe inflammation, and reduce hormonal effects that contribute to acne breakouts.

The antimicrobial properties of zinc oxide help reduce acne-causing bacteria. Severe irritation can occur when bacteria invades a blocked pore, creating red and painful pimples. Treating acne-related bacteria with topical antibiotics can sometimes cause skin to become immune or resistant to treatment. Alternatively, these same bacteria have not shown a resistance to zinc oxide treatments, so it may work well for those who have become antibiotic-resistant.

The benefit of zinc oxide as a mild astringent is well noted. An astringent is a chemical substance that shrinks, constricts, or tightens body tissues. Some products containing zinc oxide work as a skin-drying agent and a natural anti-inflammatory. As a natural astringent, it minimizes pores and prevents future breakouts by balancing and regulating oil production; thus, making it very effective in the prevention and treatment of



acne. Zinc oxide moisturizers and sunscreens can be a good first step to treating acne and repairing scar tissue externally. Typical ingredient percentages range from five to 15 percent, depending on the product and combinations of other ingredients.

Sun Protection

Broad spectrum ultraviolet (UVA/UVB) sun protection is what zinc oxide is best known for today. New generations of zinc products have evolved from the simple sunscreen lotions of the 1980s to mineral makeup, foundations, moisturizers, BB creams, and even powders. Previous versions of zinc creams may have left a slight white tint on the skin, but microfine formulations have recently been developed to eliminate this chalky effect without changing the power of the sunscreen itself.

Skin care and sunscreen lotions containing zinc oxide have a superior ability to protect the skin from UVA and UVB radiation when compared to chemical formulations. The natural mineral properties of zinc act as an actual sun reflector or physical barrier on top of the skin to scatter ultraviolet rays and prevent sun damage. Most physical barrier sunscreens contain either a percentage of zinc oxide or a combination with titanium dioxide. Zinc-based products have become highly popular with skin care professionals and clients who are looking for more natural alternatives to chemical formulations.

Chemical sunscreens differ from physical barrier sunscreens. They chemically absorb ultraviolet rays before they can do any damage. The ultraviolet ray then stays trapped on the surface of the skin and can degrade with prolonged exposure. Single chemical ingredients protect against either UVA or UVB rays, but not both, requiring multiple chemicals for efficacy and broad-spectrum protection. Harmful chemical sunscreens (such as oxybenzone) can potentially be absorbed into the skin and are more likely cause irritation or toxicity.

Zinc oxide percentages can vary from five to 19 percent in some brands of BB creams and facial moisturizers. In formulations strictly marketed as a sunscreen or skin treatment, zinc oxide levels can go up to 25 percent. The percentage of



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zinc added to the final product determines its general SPF. For example, 15 percent zinc oxide is equal to a SPF 15, which is good for short durations in the sun. Adding 20 to 25 percent zinc oxide provides protection close to SPF 30, which is best for longer periods of sun exposure.

Side Effects and Contraindications

Beginning in 2008, the development of nano-sized zinc oxide particles saw the revolution of sunscreen and skin care products that applied clear on the skin, a step up from the less aesthetically-pleasing predecessor of larger microparticles that left a visible, white film.

This new development divided many in the skin care and scientific communities on the safety of using the nanonized zinc particles (ZnO-NP) in sunscreens and topical ointments. Some believed the microscopic particles of zinc oxide could be easily absorbed into the skin, thus causing toxicity or stress on biological functions of the body. Many studies were conducted and equally-conflicting reports were produced; unfortunately, the debate still continues in some circles today.

Zinc oxide has been shown in most cases to be non-allergenic, non-comedogenic, and generally safe to use. However, the compound may cause allergic reactions, such as

swelling, itching, or tingling in some clients. Clients with sensitive skin or those who have allergic tendencies should check with their doctor first before using products with zinc oxide. Have clients consult their pediatrician before they use zinc oxide creams on infants or children. While reactions with other types of medications are rarely reported in combination with zinc oxide, they may occasionally occur.

Remember, just because an ingredient is labeled 'natural,' does not make it any less potent or prone to cause an allergic reaction. Of course, chemical substances have a greater chance of causing an allergy or toxic reactions, but always be aware of the products being used and the potential reactions that may occur.



Rachele Dupree has over 20 years of experience in marketing, media, and communications. She earned a bachelor's degree in communication arts and marketing and a second degree in graphic design. She studied with a Denver-based herbalist and naturopath for four years, combining her marketing knowledge with her love of natural remedies. She currently contracts as a marketing and communications director for Vivoderm Natural Skincare and various design clients.

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