SKIN CARE

SEBOREGULATING

Pureskin

PROVITAL GROUP

For a beautiful life from cells to the skin

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Pureskin

INTRODUCTION

Sulphur has been used as a therapeutic agent to treat dermatological conditions from times immemorial. Its keratolytic action is due to a sulphur hydrogen formation reaction that depends directly on the interaction between sulphur particles and keratinocytes.

The smallest particles attain the highest interaction degree and consequently, the strongest therapeutic efficacy.

In Provital there are two versions, with different presentation and solubility:

- **Pureskin powder** → is a product consisting of about 80% sulphur, which contains a protective colloid as a stabilizer.
- **Pureskin fluid** → associated with vegetable oils of hydrophilous character that enable its solubilization in water.

CHEMISTRY

Sulphur is a yellow colored non-metal element, widely distributed throughout the planet.

Different sulphur-based topical preparations have been developed through the years, such as precipitated sulphur and sublimed sulphur.

Both contain sulphur in defined degrees of purity, 99.5% in the anhydrous basis.

Sublimed sulphur is prepared by changing sulphur from solid to gas (sublimation). The resulting gas is subsequently condensed into fine yellow powder, which can be used in different ways.

The physical properties of sublimed sulphur differ from those of precipitated sulphur. Sublimed sulphur, washed sulphur, or flowers of sulphur, is made of large particles with mild therapeutic efficacy; it is yellow, non-soluble in water or alcohol, slightly soluble in olive oil (10%) and tastes slightly acidic. Washed sulphur is sublimed sulphur, treated with diluted ammoniac first and boiling water afterwards.

Precipitated sulphur, also called magistery of sulphur or milk of sulphur, is made of small particles with high therapeutic efficacy; it is whitish-yellow, non-soluble in water, slightly soluble in alcohol, soluble in 1:100 olive oil and insipid.

Colloidal sulphur consists of minute particles, smaller than those of precipitated sulphur (1 to 100 nm), which can be suspended in a colloidal solution. So far, this form is considered the most active one.

Currently, the so-called biosulphur is most frequently used, because of its better diffusion and higher activity on the skin. This is presented as a brown, dark, thick liquid and with weak peculiar smell, or as a light, toasty, dispersible powder, but with which no can be real solutions.

TRADITIONAL USES

Sulphur is an essential mineral that plays an important role in the health of connective tissues, as well as skin, bones, teeth, hair and muscles.It is a constituent of the amino acids cysteine and methionine and, therefore, necessary for the synthesis of proteins present in all living organisms.

Sulphur has been used since the time of Hippocrates for medicinal purpose to the present day; especially, used to treat acne. As early as 5000 years ago, the ancient Egyptians used a salve made with sulfur to treat both acne and eczema, and Traditional

Chinese Medicine was using sulfur in skin care before the reign of the Yellow Emperor, some 2200 years ago.

Sulfur has several potential uses for skin health. Dermatologists sometimes recommend topical sulfur ointments for treating acne, seborrheic dermatitis, rosacea, eczema and dandruff.

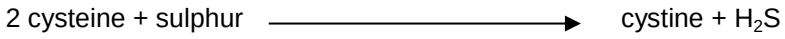
COSMETIC PROPERTIES

Keratolytic activity

The action of sulphur depends on its direct interaction with the skin. The smallest particle sizes have the largest interaction area and therefore, they are most efficient.

For many years, sulphur has been considered a specific remedy for seborrhea, used as octahedral sulphur solution in disulphide carbon or as colloidal dispersion.

The therapeutic effects of sulphur on acne-prone skin or skin with excessive sebum secretion could result from its keratolytic action. The mechanism underlying such effect is not known; it probably depends on the interaction of sulphur with the cysteine into keratinocytes.



Cystine is a major constituent of the horny layer. This reaction promotes normal keratinization, due to the keratoplastic effect of sulphur, applied at low concentrations.

Applied at high concentrations, the same reaction causes keratolytic effects, because sulphur hydrogen breaks keratin. It is possible that applications of high sulphur concentrations on the skin result in sulphur hydrogen accumulation enough to dissolve the horny layer.

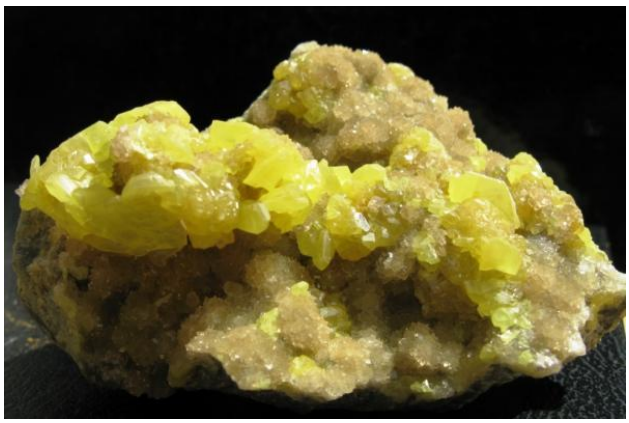
This mechanism is also related to an anti-dandruff action. In 1987, Leyden *et al.* tested the effectiveness of sulphur 2% and salicylic acid 2% either alone or in combination in a shampoo base through a clinical assessment of scaling and corneocyte counts (the number of desquamating cells/cm^2). After 5 weeks of treatment, the combination of both components had a more powerful anti-dandruff activity, though the components separately also reduced this symptom.

Therefore, Pureskin is recommended to formulate cosmetic products with regulatory activity on sebum secretions and anti-dandruff efficacy.

Anti-irritant activity

Rosacea is a chronic skin condition that reveals redness, irritation, and visible blood vessels on the cheeks, nose and forehead. Topical treatment with sulphur can decrease inflammation and irritation in this type of disorder.

In a study conducted by Torok *et al.* in 2005, they showed that a cream containing sulphur was more effective in reducing erythema and inflammatory lesions of rosacea than an antibiotic cream (with metronidazole). For 12 weeks, the participants in the study used an antibiotic cream containing metronidazole or a cream based on sulphur. Participants who used sulphur cream showed an 80% reduction of redness and lesions, more than participants who used the topical antibiotic.



Therefore, Pureskin is recommended to formulate cosmetic products with anti-irritant activity, for sensitive and/or irritated skin.

Antifungal action

Sulphur antifungal action depends on the conversion of sulphur into pentathionic acid (H2S5O6), a compound toxic to fungi. Sulphur hydrogen formation could also be involved in this action.

Applied on the skin, sulphur turns into pentathionic acid due to the action of skin bacteria and keratinocytes. Furthermore, the keratolytic action of sulphur could cause the fungi to detach from the horny layer.

The topical sulphur is used to treat acne. Thanks to its antifungal and antibacterial activity (Gupta, 2004), it can help to reduce excess sebum and soothe redness and inflammation, as well as helping to clean the pores and prevent the spread of pimples and blackheads.

Therefore, Pureskin is recommended to formulate cosmetic products with purifying and antiseptic activity.

COSMETIC APPLICATIONS

Action	Active	Cosmetic application
Keratolytic	Pureskin	Seboregulating Hair care Anti-dandruff
Anti-irritant	Pureskin	Rosacea treatment Sensitive and/or irritated skin
Antifungal	Pureskin	Acne-prone skin Purifying Antiseptic

RECOMMENDED DOSE

The recommended dose is between 0.5% and 5.0%.

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