

Introduction

According to the World Health Organization, air pollution is a major environmental health problem affecting everyone in low-, middle-, and high-income countries.

The concentration of particulate matter (PM) in the air is a common indicator used to measure air pollution. The PM corresponds to particles suspended in the earth's atmosphere and affects people more than any other pollutant. Finer particles are more likely to enter the body either by the respiratory system or through skin pores which will induce numerous damages. These pollutants generate oxidation processes and inflammation of skin cells, of their lipids and proteins, even DNA is affected.

This research demonstrates that, due to its specific morphology, diatomaceous earth (DE), a natural mineral composed of microporous fragments, can provide a barrier effect against these harmful pollutants.



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Natural. Mineral. Beautiful.

Conclusion

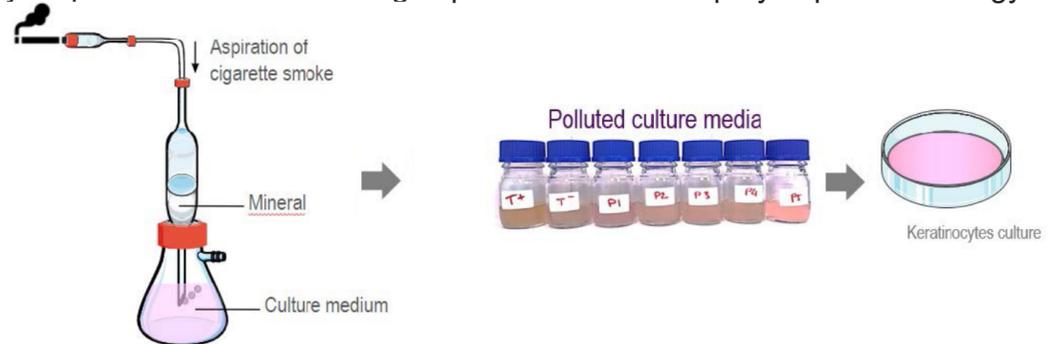
This study describes a new grade of diatomaceous earth presenting superior porosity, acting as an antipollution agent. This patented solution forms a physical barrier, preventing skin adhesion and the penetration of polluting particles.

This mineral plays a key protective role by preserving the barrier function of the skin, maintaining the cohesion of the dermoepidermal junction, reducing the cytotoxicity of keratinocytes and protecting DNA.

It is natural and compliant with the Cosmos standard.

Material and methods

In vitro test: evaluate the capacity of the mineral to retain cigarette smoke by measuring the level of keratinocytes preserved. The following experiment was set-up by experts in biology:



Ex vivo test: evaluation of the protective effect of a pressed powder formulation on skin explants exposed to cigarette smoke.

Mineral characterization: porosity analysis by SEM FEG to prove the unique microporous structure of this new diatomite based solution specifically engineered to prevent from pollution.

Results

In vitro results: median lethal concentration

LC50 is performed to measure the short term toxic potential of pollutants. The higher the LC50 value, the less toxic the product. To reach the same mortality threshold of keratinocytes, only 4% of cigarette extract is needed for the set-up without minerals, while 40% is needed with the new DE grade. This microporous mineral shows a real filtering effect on cigarette smoke.

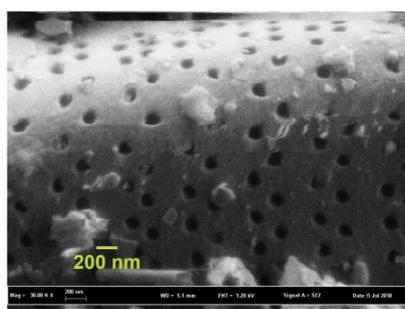
	LC50 (%)
Without mineral	4
Standard talc	8
Standard DE	20
New DE grade	40

Ex vivo results: efficiency proved on skin explant

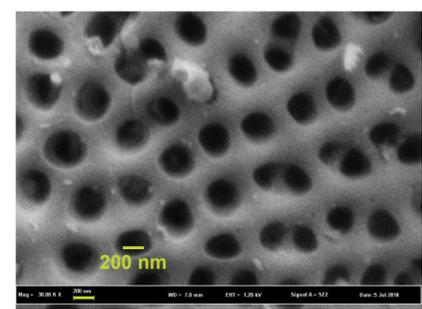
Smoke exposure	Non exposed	Exposed to 8 cigarettes	Exposed to 8 cigarettes
Treatment with formulation	Not treated	Treated without new DE grade	Treated with new DE grade
Skin section with HE staining			
Comments on skin morphology	Reference: dermal-epidermal cohesion ensured by the basal keratinocytes of the epidermis and the fibroblasts of the dermis.	Separation between the dermis and the epidermis revealing destabilization of the dermo-epidermal junction.	Morphology of the skin preserved

Morphological analysis of the skin

Porosity analysis



Standard diatomaceous earth



New diatomaceous earth grade

Scanning electron microporosity - Field emission gun image of diatomaceous earth