ABSTRACT

PRESENTER: Dr. Richard Leroux

COMPANY: SEDERMA SAS

JOB TITLE: Scientific and Technology Specialist

Podium Title: *Low environmental impact plant cell culture derived products against pollution-induced skin aging*

Background information (Short introduction)

Environmental pollution increases both morbidity and mortality. The skin is exposed to numerous pollutants such as particulate matter (PM), Benzo[a]pyrene (B[a]P), ultraviolet radiations (UVR) and Ozone (O3), all contributing to skin cell damages and aging. Exposome, a term coined by Wild in 2005, describes the totality of exposures suffered during lifetime. Skin exposome is related to environmental pollutant factors involved in cell and tissue damages leading to skin aging.

Objective

The exposure to pollutants can have impacts on cells metabolisms. PM can penetrate the keratinocytes (KC) and release pollutants as B[a]P inside the cells leading to damages of mitochondria, ROS production both well known for accelerating skin aging. The objective of this study was to develop, identify and evaluate efficiency of original technologies on pollutants induced aging. These high sustainable technologies with a low carbon imprint match with low climate impact industries expectations.

Methodology

Plant Cell Culture (PCC) is a technology generating plant cell lines from a plant. Isolated cells are amplified and elicited and thus can be used to boost skin cells endogenous defenses.

Both genomic and proteomic approaches were used on human keratinocyte, fibroblast cultures or living skin equivalents exposed to environmental stress models. Mitochondria dynamism was evaluated using an original method with fluorescence probe, so was energy production.

Clinical evaluations with cream or make-up containing PCC extracts were performed versus placebo on 336 volunteers to measure their efficiency both on volunteers living in polluted area and with mature women. Several parameters were measured: oxidation and carbonylation of corneocytes, wrinkles, neck sagging, skin roughness and graining using negative print and FOITS analyses.

Results

PCC extracts reduced in vitro, B[a]P, O3 and UVB-induced mitochondrial dynamism impairments, KC PM engulfment, DNA breaks, MMPs production, IL-6, -8, -1a and PGE2 inductions.

Moreover, clear and significant improvements were measured on face skin receiving cream (Roughness -9.1%, skin homogeneity +7.3%) after 4 weeks of application on volunteers living in polluted area.

In addition, neck sagging reduction (-10.6%) was measured after 3 weeks, whereas skin anisotropy was improved (+17.3%), tear through volume reduced (-8.8%) so was crow's feet (-16.8%) after 2 months, all $p<0.05$ or $p<0.01$.

Conclusion

Using original in vitro and in vivo evaluation methods, we showed that PCC extracts present significant beneficial effects on pollution-induced damages on cells and skin. Extracts enhance cells reinforcement of natural protection pathways, barrier functions and maintenance of mitochondria dynamism. Clinical tests demonstrated the reduction of aging signs as wrinkles, roughness and sagging, using creams and for the first time with make-up. This sustainable technology generates powerful solutions for the cosmetic industry to fight against effects of pollutants on skin cells while reducing pollution impacts. It complies with low climate impact industries expectations.

Why is this important to the industry?

Environmental pollution is a main concern. PCC processes promote syntheses of natural defense substances boosting skin cells endogenous defenses. They offer a natural, innovative and sustainable way to get active ingredients from plants with very low impact on the biosphere compared to traditional cultures. This breakthrough technology offers pragmatic solution to the cosmetic industry for reducing its environmental imprint.

Richard Leroux is the Scientific and Technology Specialist for SEDERMA. He is in charge of the promotion of SEDERMA's Scientific and Technology capabilities. He is a scientific support for open innovation projects with the commercial partners.

Richard has a PhD in organic chemistry from University of Rouen (France) on synthesis of biologically active peptides.

For 18 years, Richard has been part of the R&D leading team to develop the new generation of active ingredients capitalizing on his expertise in peptide chemistry and his experience to design biomimetic peptides as well as molecular structures inspired by nature.

Nowadays Richard is also involved in the development of botanical actives, biotechnology and plant cell culture.