

PMS-F 5000

Heal the Skin Barrier Dysfunction led by Urban Particulate Matter



Find plant extract solution with
DermaLab

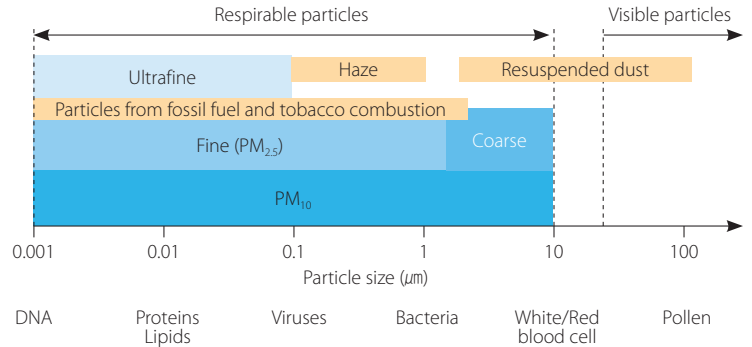
HOW WE PROTECT OUR SKIN FROM PM

What is Particulate Matter (PM)?

PM is the tiny solid particles or liquid droplets of air borne substances which are below 10µm in size. PM is made up of acids, organic chemicals, metals and soil or dust particles.

Major sources of PM

Primary particles are from natural sources such as volcanic eruption, forest fires, pollen and from anthropogenic sources such as industrialization, vehicles, fossil fuels, population growth. Secondary particles are formed as a result of the interaction of chemicals in the air.



How can particles affect our health?

PM 10 : Inhalable coarse particles. Bypass the body's natural defense structure and settle in the lungs. Occur near road and dusty industries.

PM 2.3 : Fine particles. Suspended in the air and travel long distance. Emitted from industries and cars. Penetrate deeper into the lungs and cause tissue damage.

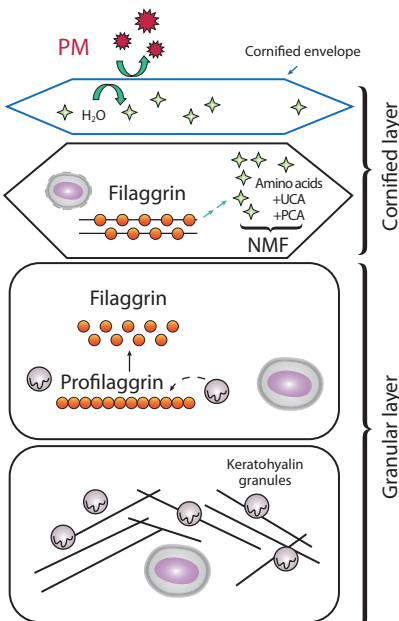
PM 0.1 : Ultra-fine particles. Inorganic ions, hydrocarbons and metals. Infiltrate into blood stream and circulate like oxygen molecules.

PM and Skin Barrier Function

The skin is a sophisticated sensory organ and builds a barrier to protect us from the harmful environment. Keratinocytes are in charge of the skin defense and undergo continuous differentiation process to maintain skin integrity and homeostasis.

PM can trigger inflammatory reactions by direct interactions with the intracellular molecule Aryl hydrocarbon receptor (AhR) in keratinocytes. AhR is a ligand dependent transcription factor that binds to xenobiotics. PM enter into the cells via diffusion and bind to the cytosolic AhR. PM also can be a cause of allergic immune responses in dermis which is a common symptom in atopic dermatitis.

Inflammatory reactions in epidermis and immune response in dermis release various cytokines and disrupt the expression of essential skin barrier components such as filaggrin (FLG), loricrin (LOR) and involucrin (IVL) in keratinocytes.



<IN EPIDERMIS>

- Filaggrin is localized in the granular layer and aggregates with keratin to form a cytoskeleton system of dense protein-lipid matrix. FLG plays a crucial role in skin barrier function.
- Loricrin is a terminally differentiating structural protein lipid comprising more than 70% of the cornified NMF and this lamellar structure is essential for barrier function.
- Involucrin is located adjacent to the cell membrane and provides scaffolding for other proteins.

<IN DERMIS>

- Thymic stromal lymphopoietin (TSLP) is a protein belonging to the cytokine family, and it is released by keratinocytes, fibroblasts and mast cells to protect our body. Cellular damage may cause inflammation through this allergic immune response in dermis.

PMS-F 5000

Xanthium strumarium is a widely distributed plant in Korea. It grows well on the roadside and in desolate areas.

In traditional Korean herbal medicine remedy, the whole plant including its fruits has been used for the treatment pityriasis versicolor, hives, psoriasis, eczema, chronic sinusitis and ulcerative dermatitis due to its anti-inflammatory, anti-allergic and antibiotic properties.

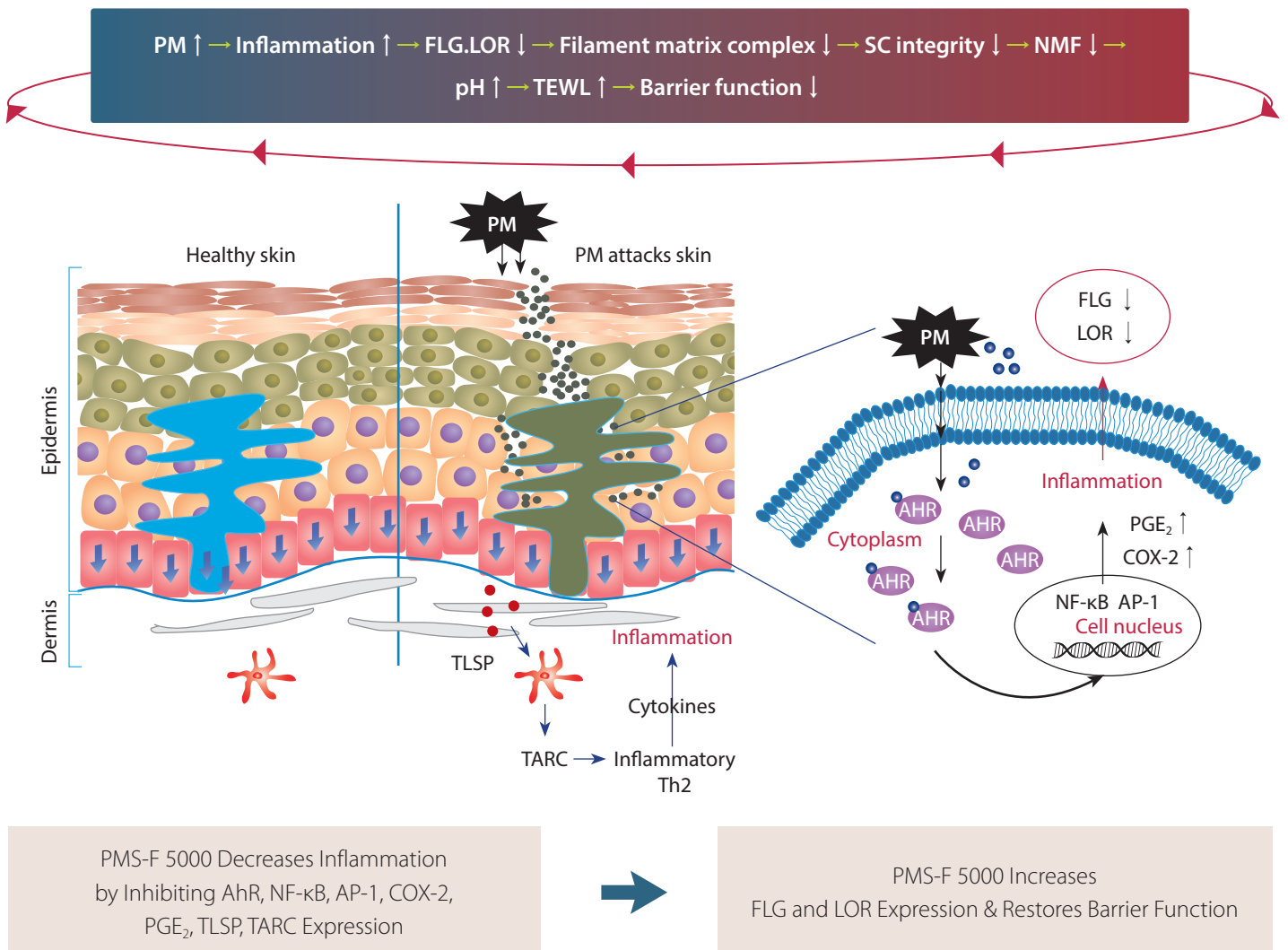
PMS-F 5000 is a cocklebur polysaccharide solution extracted from the fruits, and up-regulates the skin barrier function by inhibiting inflammatory reactions induced by the contact of pollutants on our skin.



MECHANISM

- Aryl hydrocarbon receptor (AhR) binds PM in cytoplasm and activates the expression of AhR in keratinocytes. More AhR binds more PMs and the inflammatory process is initiated.
- Thymic stromal lymphopoietin (TSLP) released by keratinocytes/fibroblasts activates dendritic cells and acts through Th2 cytokine production.

These inflammatory reactions cause skin barrier dysfunction by disrupting FLG and LOR expression.



IN-VITRO TEST

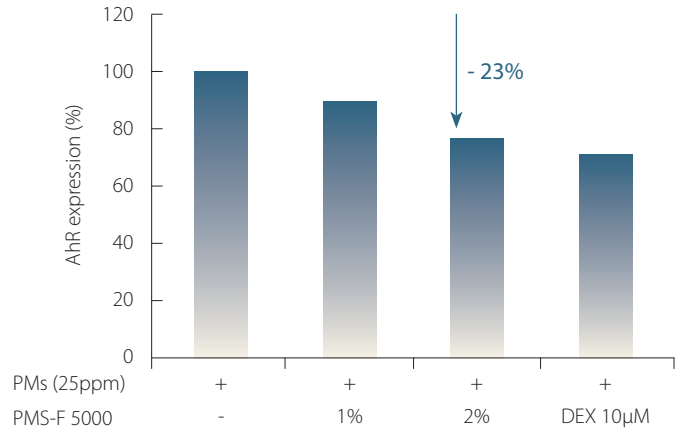
ANTI-INFLAMMATORY EFFECT

PMS-F 5000 DECREASES AhR EXPRESSION

Aryl hydrocarbon receptor (AhR) binds several exogenous ligands. It is a transcription factor known to regulate cellular responses to inflammation.

The expression of AhR : 23% ↓

Protocol: Human epidermal keratinocyte (HaCaT) cultures were incubated during 36 hours (at 37°C, CO₂: 5%) in presence of PMS-F 5000 and PMs. The expression levels of mRNA were analyzed by RT-PCR. DEX : Dexamethasone, positive control.



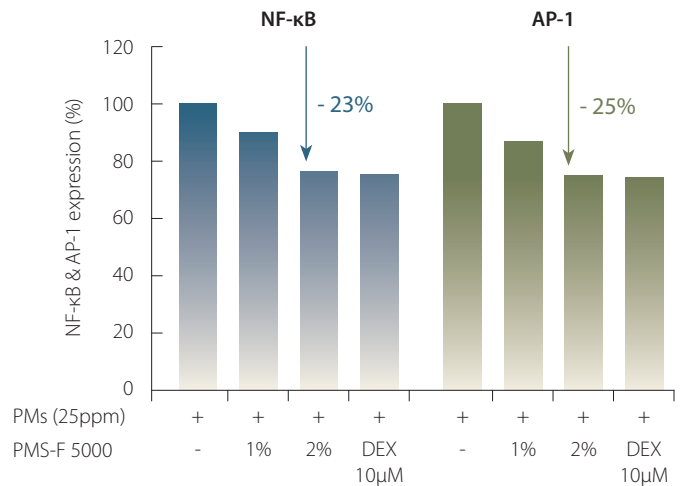
PMS-F 5000 DECREASES NF-κB & AP-1 EXPRESSION

Nuclear factor-κB (NF-κB) and Activator protein-1 (AP-1) play a key role in regulating the expression of COX-2 and PGE₂ which is the major mediator of inflammation.

The expression of NF-κB : 23% ↓

The expression of AP-1 : 25% ↓

Protocol: Human epidermal keratinocyte (HaCaT) cultures were incubated during 36 hours (at 37°C, CO₂: 5%) in presence of PMS-F 5000 and PMs. The expression levels of mRNA were analyzed by RT-PCR. DEX : Dexamethasone, positive control.



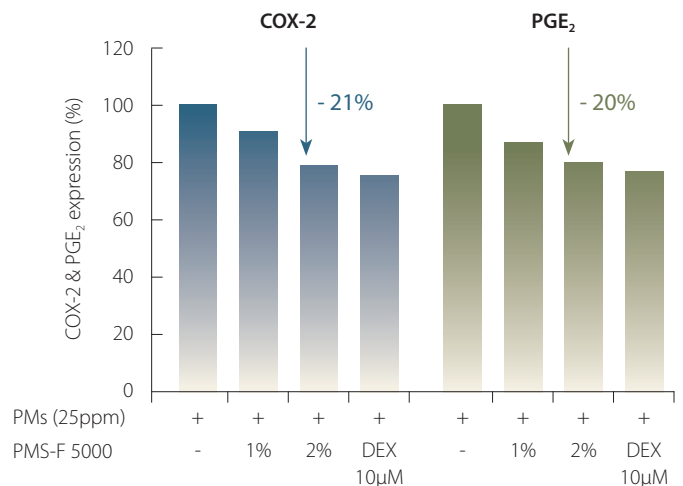
PMS-F 5000 DECREASES COX-2 & PGE₂ EXPRESSION

Cyclooxygenase-2 (COX-2) is an enzyme that acts to upregulate the production of prostaglandins. Prostaglandin E2 (PGE₂) is a principal mediator of inflammation.

The expression of COX-2 : 21% ↓

The expression of PGE₂ : 20% ↓

Protocol: Human epidermal keratinocyte (HaCaT) cultures were incubated during 36 hours (at 37°C, CO₂: 5%) in presence of PMS-F 5000 and PMs. The expression level of mRNA were analyzed by RT-PCR. DEX : Dexamethasone, positive control.



IN-VITRO TEST

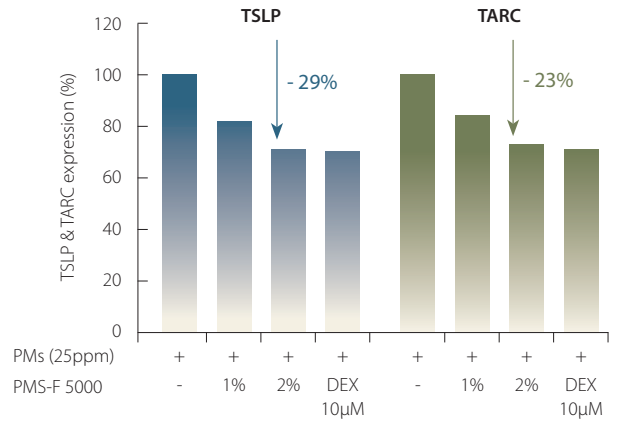
PMS-F 5000 DECREASES TSLP & TARC EXPRESSION

Thymic stromal lymphopoietin (TSLP) is a major proallergic cytokine that promotes Th2 responses through dendritic cell activation. Thymus and activation regulated chemokine (TARC) is a member of the T-helper 2 chemokine family, and mediate the Th2-dominated inflammation in the skin.

The expression of TSLP : 29% ↓

The expression of TARC : 23% ↓

Protocol: Human epidermal keratinocyte (HaCaT) cultures were incubated during 36 hours (at 37°C, CO₂: 5%) in presence of PMS-F 5000 and PMs. The expression level of mRNA were analyzed by RT-PCR. DEX: Dexamethasone, positive control.



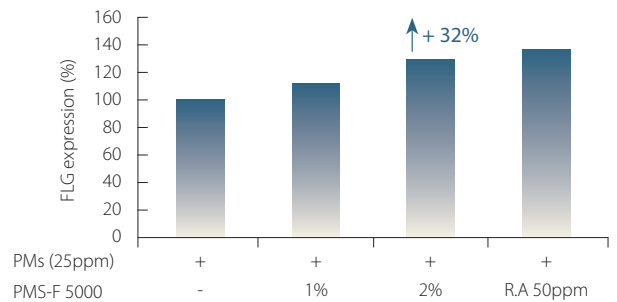
SKIN BARRIER FUNCTION ENHANCEMENT

PMS-F 5000 INCREASES FLG EXPRESSION

Filaggrin (FLG) is essential for the regulation of epidermal homeostasis such as regulating skin hydration and skin pH.

The expression of FLG : 32% ↑

Protocol: Human epidermal keratinocyte (HaCaT) cultures were incubated during 36 hours (at 37°C, CO₂: 5%) in presence of PMS-F 5000 and PMs. The expression level of mRNA were analyzed by RT-PCR. R.A: Retinoic Acid, positive control.

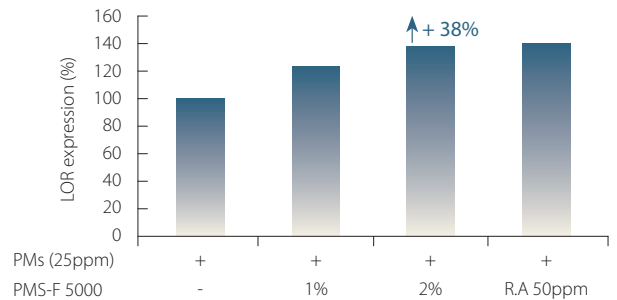


PMS-F 5000 INCREASES LOR EXPRESSION

Loricrin (LOR) is a major protein component of the cornified cell envelope which is highly insoluble and provides a vital physical barrier.

The expression of LOR : 38% ↑

Protocol: Human epidermal keratinocyte (HaCaT) cultures were incubated during 36 hours (at 37°C, CO₂: 5%) in presence of PMS-F 5000 and PMs. The expression level of mRNA were analyzed by RT-PCR. R.A: Retinoic Acid, positive control.



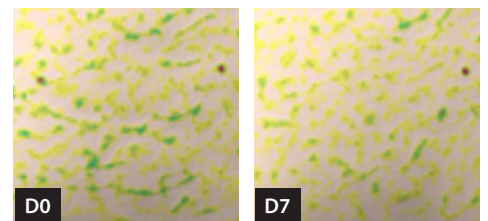
IN-VIVO TEST

SKIN ROUGHNESS IMPROVEMENT EFFECT

PMS-F 5000 improves a roughness of skin

- Volunteers : 5 male & female aged between 27 and 49 years old
- Formulation : Lotion containing 2% PMS-F5000
- Application : After stimulate an irritations on forearm with 1% Sodium lauryl sulfate during 24hr, apply formulation twice a day for 7 days
- Analysis : Evaluate an elevation with Antera 3D

Skin roughness improvement Average +71.90% Up to +91.79%

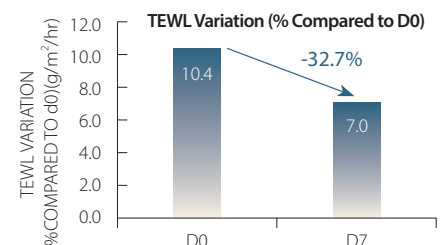


TEWL REDUCTION EFFECT

PMS-F 5000 decrease TEWL

- Volunteers : 5 male & female aged between 27 and 49 years old
- Formulation : Lotion containing 2% PMS-F5000
- Application : After stimulate an irritations on forearm with 1% Sodium lauryl sulfate during 24hr, apply formulation twice a day for 7 days
- Analysis : Evaluate TEWL with Dermalab TEWL Probe

Decrease of TEWL Average -32.70% Up to -48.91%





Dermalab Co., Ltd.

231 Munmakgongdan-gil Munmak-eup Wonju-si Gangwon-do 26362 Rep. of Korea

TEL. +82-33-732-7561 FAX. +82-33-732-7563

info@dermalab.co.kr www.dermalab.co.kr

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| Cosmetic activities | <ul style="list-style-type: none">• Anti-inflammatory effect Decrease AhR, NF-KB, AP-1, COX-2, PGE2, TSLP, TARC expression• Enhance Skin barrier function Increase Filaggrin and Loricrin expression |
| INCI name | <ul style="list-style-type: none">• PMS-F 5000 Water (and) Butylene Glycol (and) Phenoxyethanol (and) Ethylhexylglycerin (and) Xanthium Strumarium Fruit Extract• PMS-F 5000(HD) Water (and) Butylene Glycol (and) 1,2-Hexanediol (and) Xanthium Strumarium Fruit Extract |
| Recommended % of use | PMS-F 5000 2% PMS-F 5000(HD) 2% |