

β -Glucogallin isolated from *Fusidium coccineum* and its enhancement of skin barrier effects

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Introduction:

Fusidium coccineum (FC) is widely known to make fusidic acid, an antibiotic substance, and this fusidic acid is used as an ointment for wound healing. Additionally, we hypothesized that FC can produce various secondary metabolites that could improve the skin condition.

In this study, we investigated the medium of fermented FC (=SA-1FC) as a covering for dryness, inflammation, and wounds. Previous study, we revealed that an alcohol extract of FC had a skin-enhancing effect, and thin-layer chromatography revealed a major component in a non-polar fraction.

Here, we identified a major compound β -glucogallin which isolated from medium of fermented FC non-polar fraction. FC and β -glucogallin increased filaggrin and HAS3 mRNA levels in keratinocytes. In addition, FC and β -glucogallin showed anti-inflammatory effects by suppressing expression of interleukin-4/poly(I:C)-induced chemokines and inflammatory cytokines. And FC and β -glucogallin stimulated the cell migration in fibroblasts, Hs68 cells.

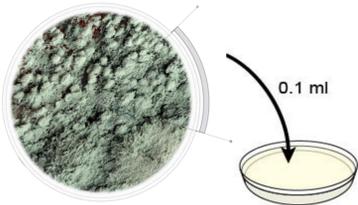
These results suggest that β -glucogallin which isolated from FC can enhance skin barrier function.

Materials & Methods:

Production of FC and β -glucogallin

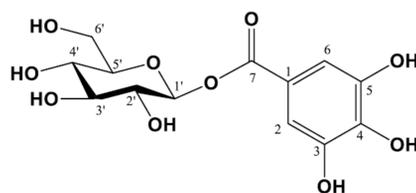
- 1st stage: *Fusidium coccineum* (FC) SA-1FC (Ascomycota) is a fungus found in nature, and its by-products are present in humid soils with plant humus.

Isolation of FC from soil



Fusidium coccineum (FC)

- 2nd stage: Extraction of β -glucogallin from FC



Molar mass: 332.26g/mol
Chemical formula: C₁₃H₁₆O₁₀

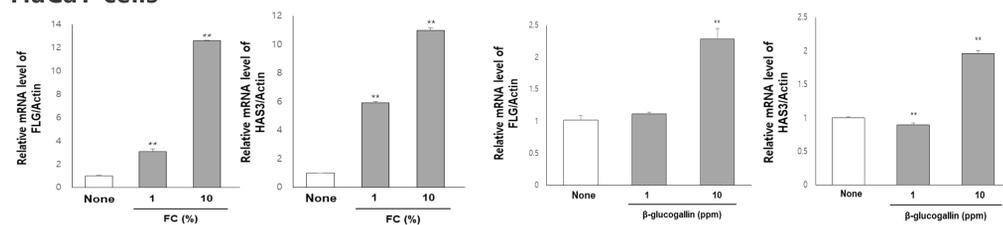
Chemical structure of β -glucogallin

Efficacy Test on Cell

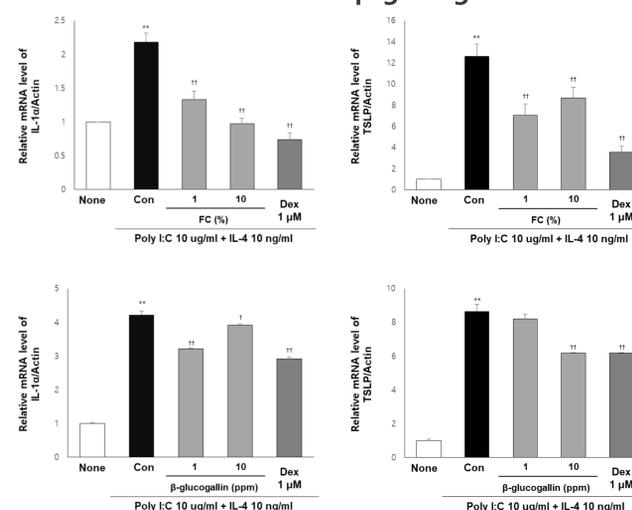
- **Cell Line**
 - Human epidermal keratinocytes cell line (HaCaT)
 - Human dermal fibroblasts cell line (Hs68)
- **Inducer of Pro-inflammatory Cytokines**
 - Poly I:C 10 μ g/ml and IL-4 10 ng/ml
- **Evaluation of Biomarkers Level**
 - Real-time PCR
- **Evaluation of Wound healing**
 - Cell migration assay with Wound maker (IncuCyte ZOOM system)

Results & Discussion:

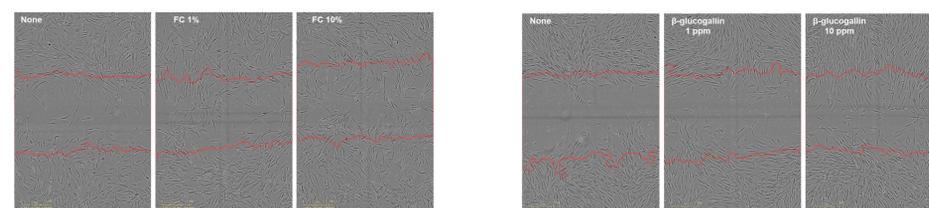
Barrier development and hydration effect of FC and β -glucogallin in HaCaT cells



Anti-inflammation effect of FC and β -glucogallin in HaCaT cells



Wound healing effect of FC and β -glucogallin in Hs68 cells



Conclusions:

- We identified a major compound β -glucogallin which isolated from medium of fermented *Fusidium Coccineum* SA-1FC(=FC)
- FC and β -glucogallin increased skin barrier enhancing factor. In addition, FC and β -glucogallin showed anti-inflammatory effects in keratinocytes.
- And FC and β -glucogallin stimulated the cell migration in fibroblasts, Hs68 cells.
- These results suggest that FC and β -glucogallin can enhance skin function.

Aknowledgments:

H-GK, KSK, D-GL, and N-IB planned this study and made in paper. H-GK, MHB, and N-IB isolated and identified β -glucogallin. KSK, MJK, SHS, and D-GL performed experiments about enhanced skin barrier. All authors read and approved the final manuscript.

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