Byungpul Extract

Product for skin soothing, anti-inflammatory, anti-allergic, wound healing effects
Centella asiatica, commonly called gotu kola, is a herbaceous annual plant of the family Apiaceae. It is native to India and widely distributed in Asian countries. It is used as a medicinal herb in Ayurvedic medicine and Traditional Oriental Medicine to treat skin diseases and wounds. It is also used in Sri Lankan cuisine, where it is called gotu kola, referring to the conical shaped leaf.
Several scientific research studies reported the use of *C. asiatica* in the treatment of wounds and in promoting wound healing. The topical application of *C. asiatica* on the wound area increased the rate of healing by stimulating the production of type I collagen. It also decreases over active inflammatory reactions. *C. asiatica* contains four principle bioactive compounds, asiatic acids, madecassic acid, asiaticoside, and madecassoside, in which asiaticoside was identified as the main active constituent responsible for wound healing.
There is a folklore from India about *C. asiatica* and tiger. According to the folklore, injured tiger often rolls against *C. asiatica* for wound healing. Because of the story, *C. asiatica* is well known for tiger’s herb in Asia.

Traditionally, tiger’s herb has been applied to wound healing and soothing effects.

In Korea, we apply *C. asiatica* in a broad range of products such as tooth pastes, cosmetics, and medicines.
in vitro Efficacy Evaluation

- Anti-inflammatory Effect
  COX-2 Inhibition Activity

- Anti-allergic Effect
  β-hexosaminidase Release Inhibition Activity

- Wound Healing Effect
  Scratch Assay

in vivo Efficacy Evaluation

- Skin Soothing Effect
  Erythema Index
What is Skin Inflammation?

Inflammation is part of the complex immunological responses to a wide range of harmful stimuli including skin injury, tissue necrosis, infection, and irritants. The immune system is responsible for protecting our body from the harmful stimuli and of maintaining homeostasis. Like any other part of the body, the skin can be involved in immune responses. Inflammation in the skin often causes a rash to form. It’s a response from the immune system to conditions such as bacterial/viral/fungal infections, allergic reactions, heat, and sunlight. The symptoms of skin inflammation are rash, skin redness, blisters or pimples, warmth, and thickening of the skin in the affected area.
Inflammation Mechanism

Cytokines → Kinases, NF-kB → iNOS mRNA → L-arginine → L-hydroxy arginine → L-citrulline → iNOS → NO → COX-2 → PGs → Inflammation

NO → Apoptosis → DNA Damage → ONOO⁻ → Collagen Synthesis → Metalloprotease Synthesis
**in vitro Efficacy Evaluation: Anti-inflammatory Effect**

- COX-2 Inhibition Activity in Macrophages (RAW 264.7)

The anti-inflammatory property of *Byungpul Extract* has been identified by measuring the decrease of COX-2 activity in macrophage cells (RAW 264.7). As the result, it showed 51% of COX-2 inhibition activity by applying 20 ppm of *Byungpul Extract*. 
Allergic Reaction: Histamine Release

Histamine is a biogenic amine formed by the enzymatic decarboxylation of histidine. In a human organism, histamine is stored in its inactive form in mast cell and basophil granules. The physiological secretion of histamine can be initiated by a number of factors, all of which involve binding of IgE, cross-linked by antigen, to the mast cell or basophil’s Fc receptors causing degranulation of these cells. Once released, histamine binds to a number of different target cell receptors causing the symptomatic effects of allergies.
Allergic Reaction: β-hexosaminidase Release

Immediate allergy is caused by a chemical mediator released from basophile and mast cells via cell degranulation due to the reaction between an immunoglobulin E (IgE) antibody, bound with the IgE receptor on the cell membrane, and an antigen. Because mast cells play essential roles in provoking the pathogenesis of allergic reactions via the degranulation process, measuring the degree of degranulation reflects the level of mast cell activation. β-hexosaminidase released by these cells during this process has been reported to be a suitable marker for determining the degree of degranulation.
in vitro Efficacy Evaluation: Anti-allergic Effect

- β-hexosaminidase Release Inhibition in Basophils (RBL-2H3)

The anti-allergic property of Byungpul Extract has been identified by measuring the decrease of β-hexosaminidase release in basophils (RBL-2H3). As the result, it showed 47% decrease of the β-hexosaminidase release by applying 100 ppm of Byungpul Extract.
Wound Healing Assay

Scratch Wound Healing Assay has been widely adapted and modified by researchers to study the effects of a variety of experimental conditions, for instance, gene-knockdown or chemical compound treatment, on cell migration and proliferation.

The basic principle of the assay is that a “wound gap” in a cell monolayer is created by scratch, followed by monitoring the “healing” of this gap by cell migrating and growth towards the center of the gap, as a result of this filling up the “gap”. Factors that alter the motility, the growth or both of the cell can lead to an increased or decreased rate of “healing” of the gap.
in vitro Efficacy Evaluation: Wound Healing

After 24 hours of culture, cells (HDFn) were scratched with a 200 μL pipette tip and cultured for additional 48 hours. Photos for the stained monolayer were taken on a microscope.
**in vivo Efficacy Evaluation: Skin Soothing Effect**

- **Target Site:** Forearm
- **Subjects:** 8 females, aged between 18 to 65 years old (avg age: 53.27 ± 8.40)
- **Test Item:** Cream with 2% Byungpul Extract 3% SLS solution patches to induce erythema
- **Application:** 40 mg of cream on application area
- **Application Area:** 20 cm²/site (4 cm * 5 cm)
- **Measurements:** 0, 1, 3, 5, 7, 9, 10 days after application
- **Test Instrument:** Mexameter MX18 (CK Electronic GmbH, Germany)
- **Dermatologist’s Evaluation:**
- Scoring Reference:
  - Score 0: No erythema
  - Score 1-3: Slight erythema
  - Score 4-6: Moderate erythema
  - Score 7-9: Severe erythema
in vivo Efficacy Evaluation: Skin Soothing Effect

On Day 0, patches containing 3% SLS solution were applied for 24 hours to induce erythema onto the forearms of 8 female volunteers aged between 18 and 65. On Day 9, erythema was re-induced by applying 3% SLS solution. A cream containing 2% Byungpul Extract was applied to the irritated skin twice a day for 10 days.

**Dermatologist’s Scoring**

**Erythema Value**
Marketing Points

- Well-known plant extract used for skin disorders for a long time
- Inhibits the activity of inflammatory cytokine
- Inhibits the release of allergy-causing enzyme
- Increases cellular proliferation at the wounded site
- Soothes down the irritated skin
Product Information

- **Product Name:** Byungpul Extract, Byungpul Extract (PD)
- **INCI Name:** Centella Asiatica Extract
- **Dosage:** 1 – 3%
- **Formulation:** Add to the formulation when the temperature is lower than 55°C. Recommended to add after the cooling process.
- **Storage:** Avoid direct light or UV. Keep it in a dry area at room temperature.
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