



*Product for skin soothing anti-inflammation, anti-allergy, wound healing*

# BYUNGPUL EXTRACT



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## PLANT STORY



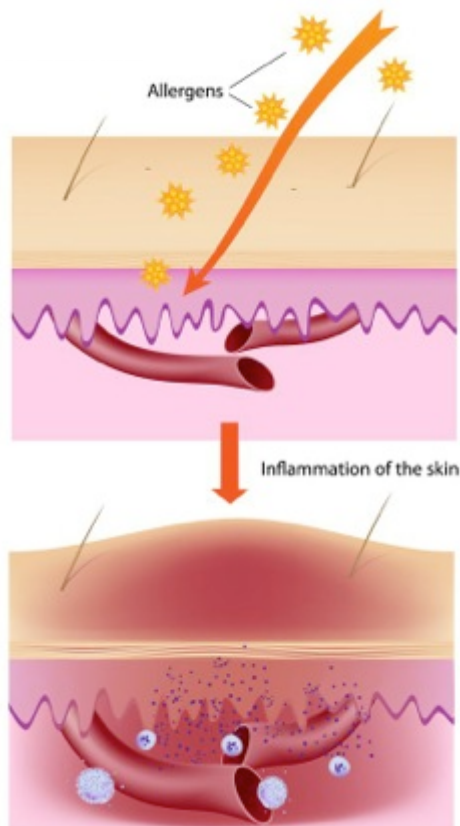
*Centella asiatica*, commonly called gotu kola, is a herbaceous annual plant of the family Apiaceae. It is native to India and widely distributed in Asian countries. It is used as a medicinal herb in Ayurvedic medicine and Traditional Oriental Medicine to treat skin diseases and wounds. It is also used in Sri Lankan cuisine, where it is called gotu kola, referring to the conical shaped leaf.

## PLANT STORY



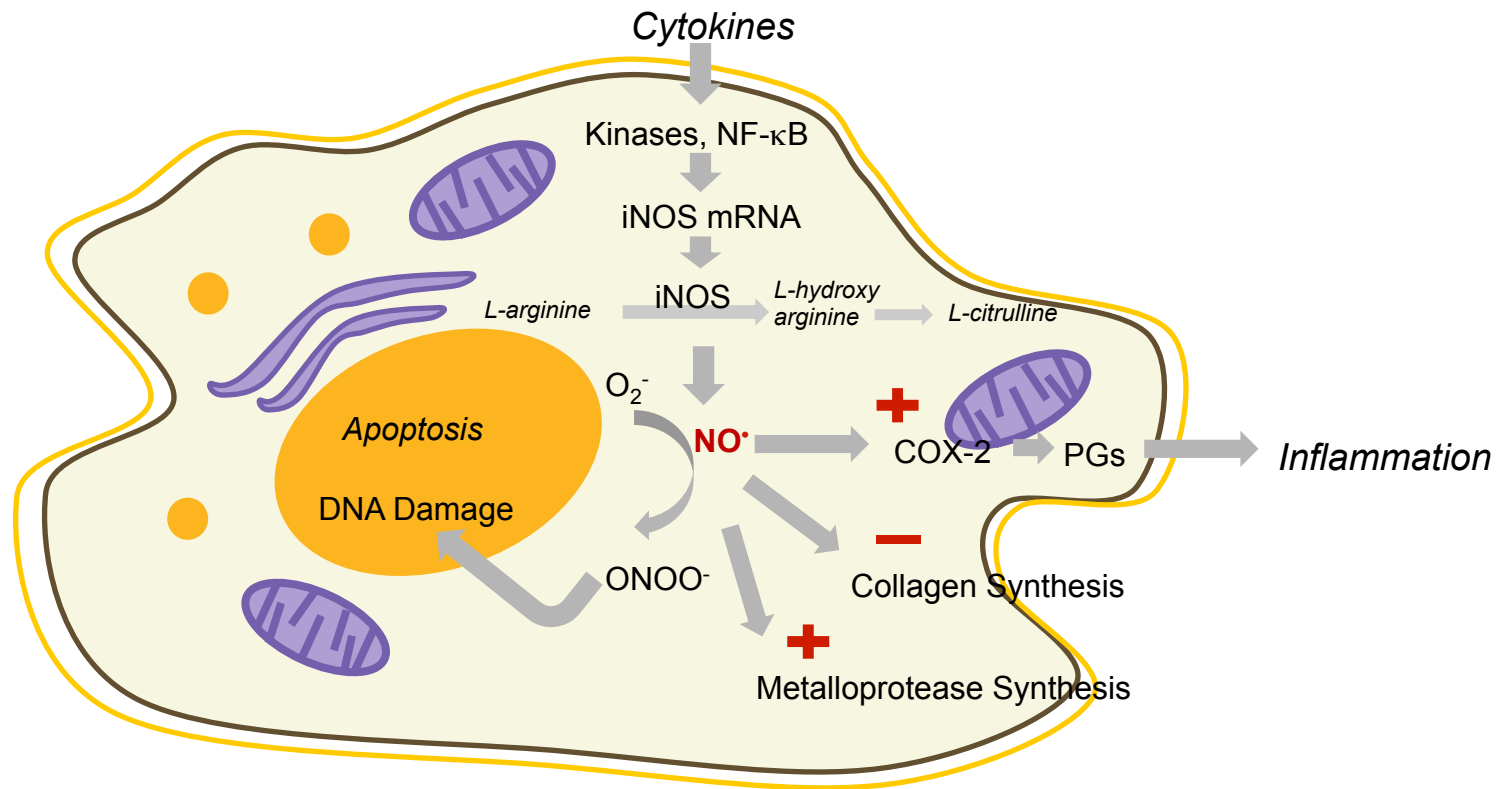
Several scientific research studies reported the use of *C. asiatica* in the treatment of wounds and in promoting wound healing. The topical application of *C. asiatica* on the wound area increased the rate of healing by stimulating the production of type I collagen. It also decreases over active inflammatory 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.

# WHAT IS INFLAMMATION?

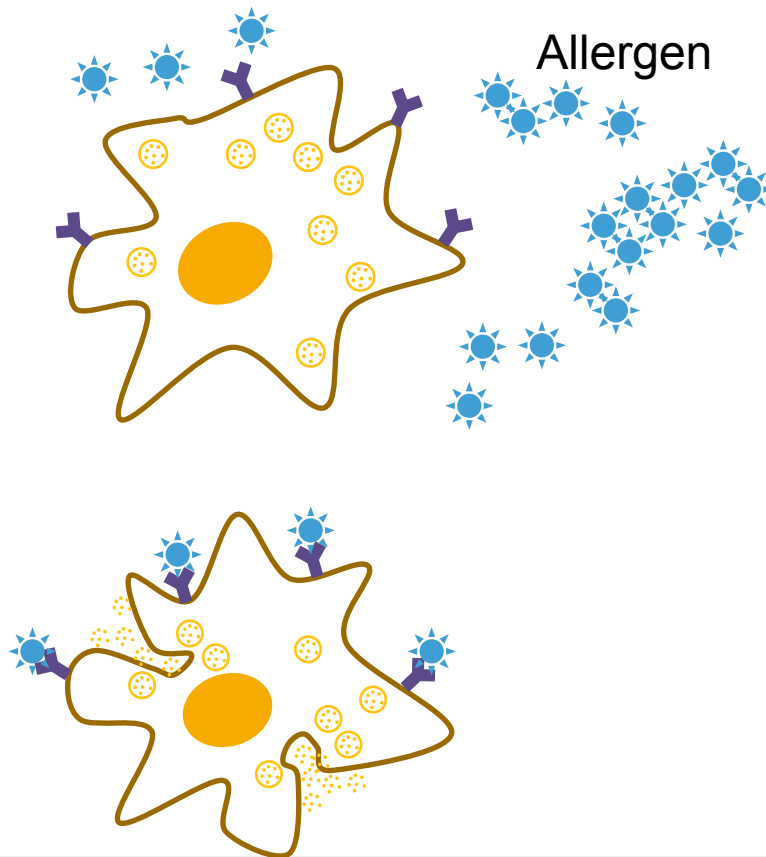


Inflammation is part of the complex biological responses to wide range of harmful stimuli including injury, tissue necrosis, infection, and irritants. The purpose of inflammation is to destroy (or contain) the damaging agent, initiate repair processes and return the damaged tissue to useful function. The symptoms of inflammation are redness, swelling, heat, and pain, which are caused by increased blood flow into tissue. The immune system is responsible of protecting our body from the harmful stimuli and of maintaining homeostasis. Disorders of the immune system can result in autoimmune diseases, inflammatory diseases, and cancer. In an attempt to protect the body, the immune system might overreact to the stimuli, and this might cause allergy or inflammatory reactions.

# INFLAMMATION MECHANISM



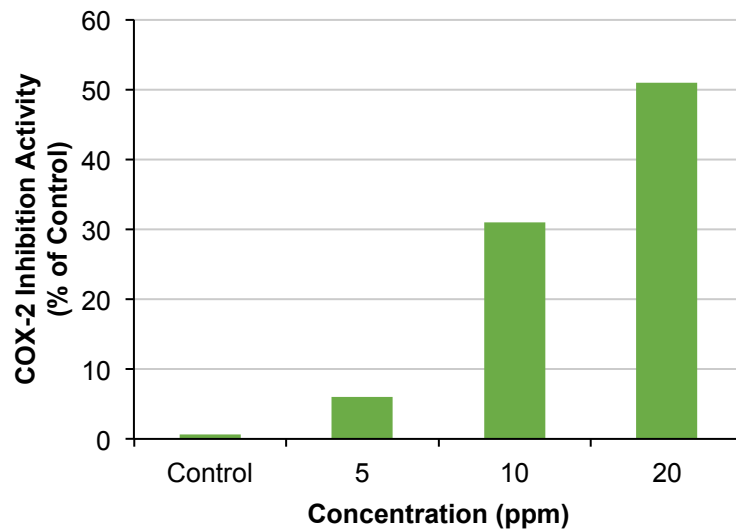
# ALLERGIC REACTION: BETA-HEXOSAMINIDASE RELEASE




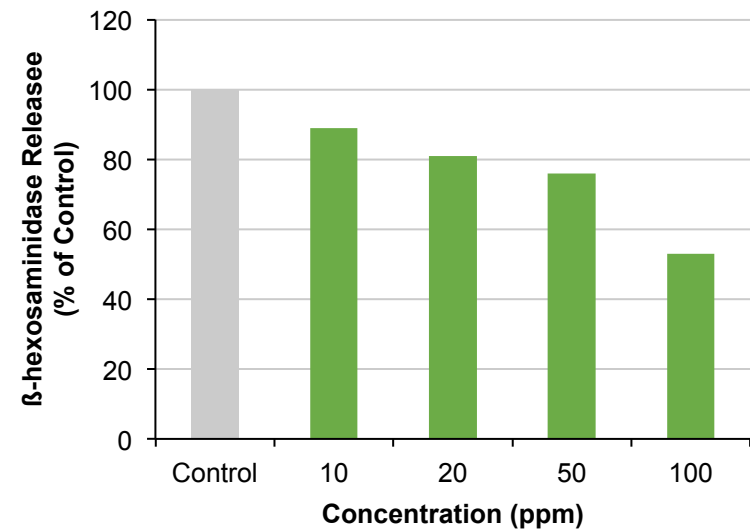
Immediate allergy is caused by a chemical mediator released from basophile and mast cells via cell degranulation due to reaction between an immunoglobulin E (IgE) antibody, bound with the IgE receptor on the cell membrane, and an antigen. Because mast cells play essential roles in provoking the pathogenesis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

# IN VITRO EVALUATION

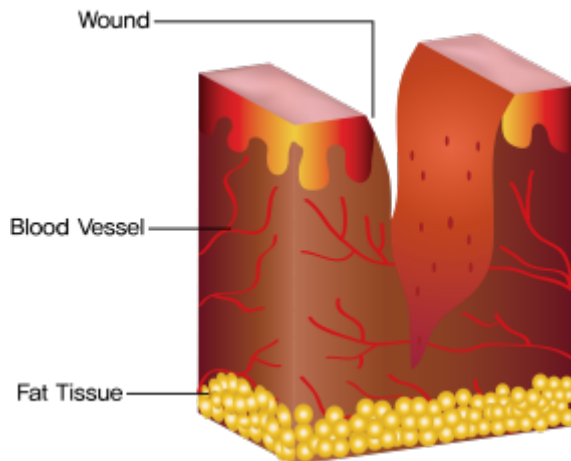
 **Anti-inflammatory Effect**  
COX-2 Inhibition Activity in Macrophages (RAW 264.7)



 **Anti-allergic Effect**  
 $\beta$ -hexosaminidase Release Inhibition in Basophils (RBL-2H3)



## WOUND HEALING ASSAY

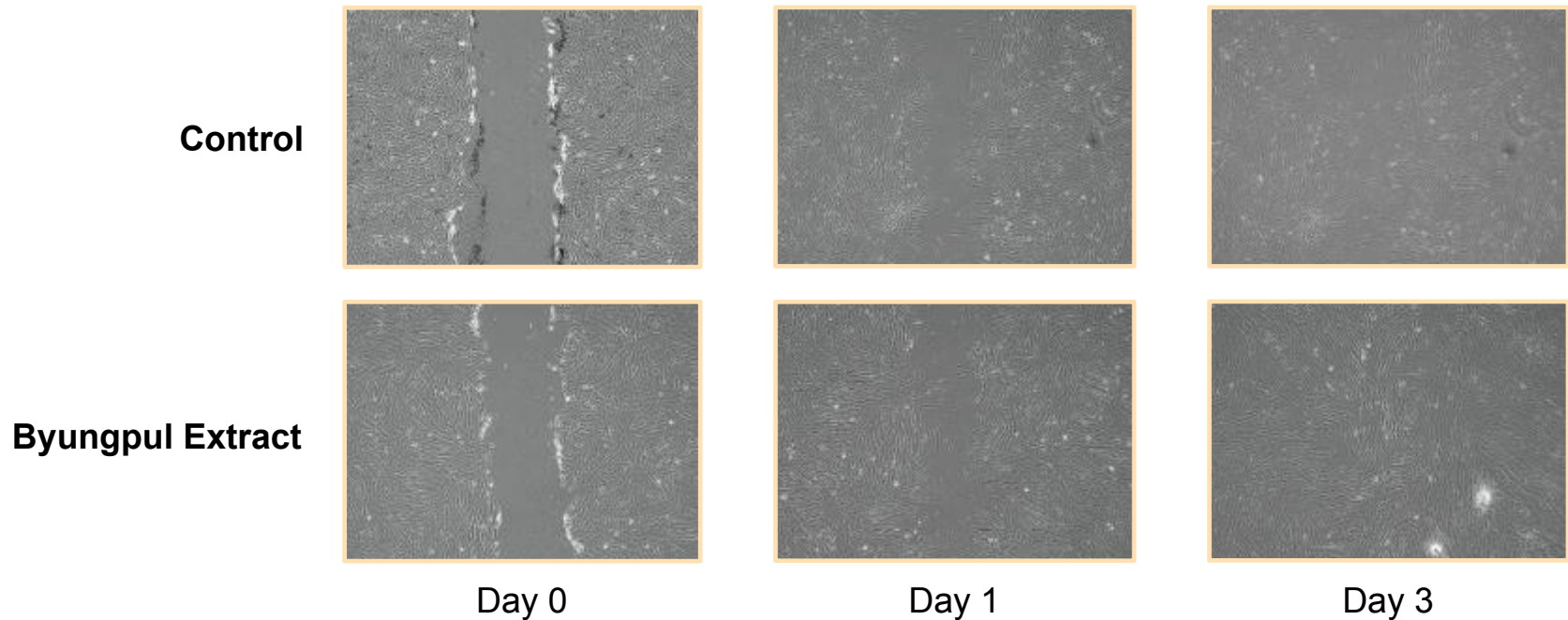


Scratch Wound Healing Assay has been widely adapted and modified by researchers to study the effects of a variety of experimental conditions, for instance, gene-knockdown or chemical compound treatment, on cell migration and proliferation.

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, hereby filling up the “gap”. Factors that alter the motility and/or growth of the cell can lead to increased or decreased rate of “healing” of the gap.

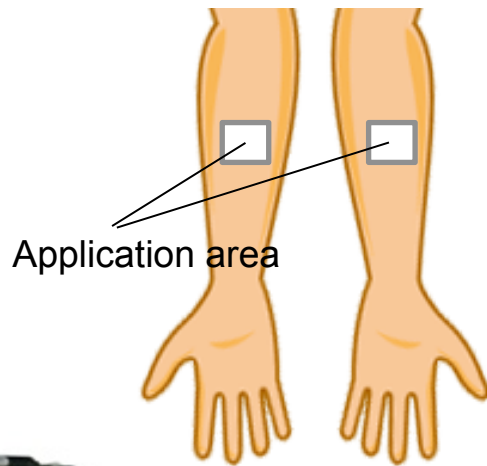


## IN VITRO EVALUATION: WOUND HEALING



After 24 hours of culture, cells were scratched with a 200  $\mu$ L pipette tip and cultured for additional 48 hours. Photos for the stained monolayer were taken on a microscope.

# IN VIVO EVALUATION: SKIN SOOTHING EFFECT



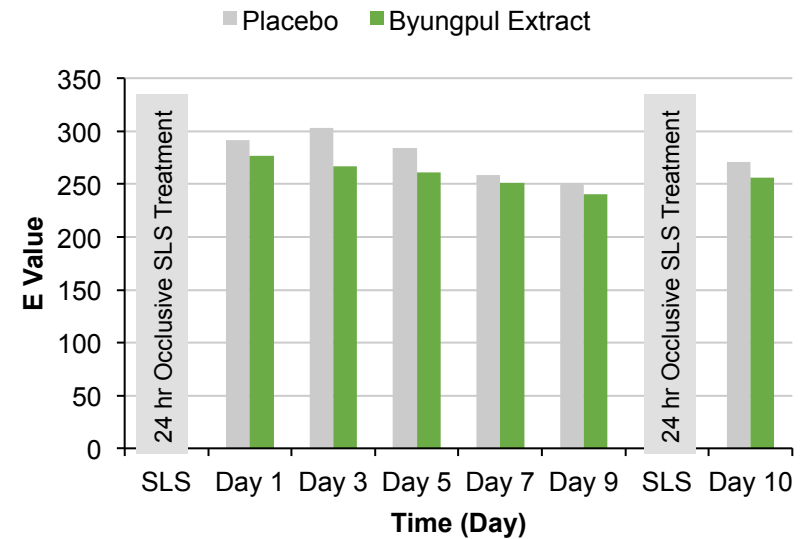
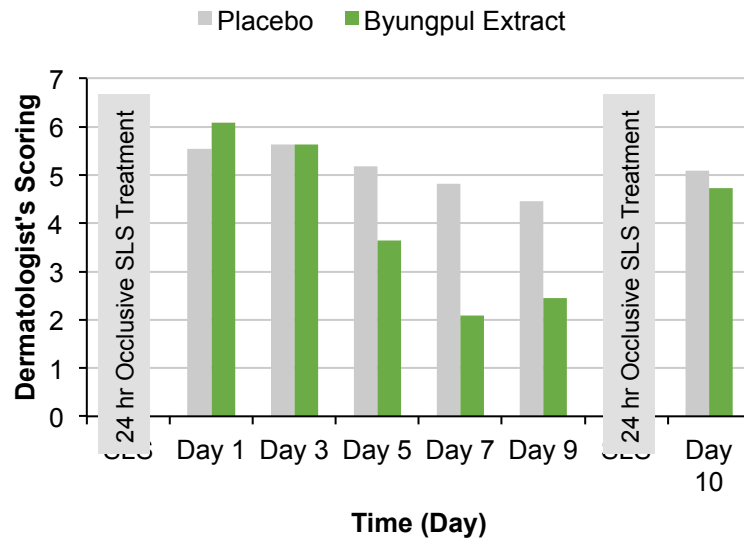
- Target site: Forearm
- Subjects: 8 females, aged between 18 to 65 years old  
(Average age: 53.27±8.40)
- Test item: Cream with 2% Byungpul Extract  
3% SLS solution patches to induce erythema
- Application: 40 mg of cream on application area
- Application area: 20 cm<sup>2</sup>/site (4 cm \* 5 cm)
- Measurements: 0, 1, 3, 5, 7, 9, 10 days after application
- Test instrument: Mexameter MX18 (CK Electronic GmbH, Germany)
- Scoring reference for dermatologist's evaluation:



- Score 0 : No erythema
- Score 1-3 : Slight erythema
- Score 4-6 : Moderate erythema
- Score 7-9 : Severe erythema

## IN VIVO EVALUATION: SKIN SOOTHING EFFECT

On Day 0, patches containing 3% SLS solution were applied for 24 hours to induce erythema onto the forearms of 10 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.



## 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 cool and dry area.

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