

July 10, 2025

## **Patent Acquired for Improvement of UVA-Induced Photoaging by Psoralea corylifolia Fruit extract (PhytoRetinol™)!**

We are pleased to announce that we have acquired a new patent (Patent No. 7667651: Oral Wrinkle Improvement Agent) for the improvement of UVA-induced photoaging using Psoralea corylifolia Fruit extract (PhytoRetinol™), a product we launched in 2020.

### ■ Patented Mechanism of Action

We have discovered the following effects of PhytoRetinol™.

#### ✓ Suppression of Fibroblast Atrophy by UVA Irradiation

When normal human fibroblasts (NB1RGB cells) were exposed to UVA, cell contraction was suppressed, and normal cell morphology was maintained. This suggests that PhytoRetinol™ reduces UVA-induced damage to fibroblasts and helps maintain their normal function.

#### ✓ Enhancement of Collagen Gel Contraction Ability

In a 3D dermal model incorporating fibroblasts in a collagen gel, a significant reduction in the contraction area was observed. This indicates improved cell contraction ability and activated matrix remodeling, which are expected to enhance skin firmness and elasticity.

#### ✓ Promotion of Integrin $\alpha 1$ Expression

The expression of integrin  $\alpha 1$ , involved in cell-extracellular matrix (ECM) adhesion, significantly increased in the PhytoRetinol™-treated group even after UVA irradiation. This suggests that cell-ECM adhesion is maintained, contributing to skin elasticity.

#### ✓ Promotion of Fibrillin 4 and Laminin 5 Expression

Experiments using aged fibroblasts showed a significant increase in the gene expression of fibrillin 4, which supports the formation of elastic fiber structures, and laminin 5, which is involved in maintaining basement membrane structure. These effects are expected to suppress deep wrinkles originating from the dermis and superficial wrinkles originating from the epidermis.

#### ✓ Hyaluronidase Inhibitory Effect

It was confirmed that PhytoRetinol™ exhibits an inhibitory effect on the activity of hyaluronidase, an enzyme that degrades hyaluronic acid, thereby contributing to the maintenance of skin moisture.

### ■ Future Developments

Based on this patent, We will promote the development of anti-aging ingredients through a hybrid approach of food and cosmetics, with a focus on these newly patented components. We aim to strengthen our active proposals to the beauty and anti-aging market.

### ■ About Psoralea corylifolia Fruit extract (PhytoRetinol™)

Psoralea corylifolia Fruit extract (PhytoRetinol™) was launched in 2020 as an inner and outer beauty ingredient for wrinkle care. Psoralea corylifolia Fruit is a leguminous plant distributed from India to Southeast Asia and China, and has been long used as a traditional herbal medicine in Ayurveda and traditional Chinese medicine.



Psoralea corylifolia  
Fruit

We standardize Bakuchiol as the active component and have discovered multifaceted effects of *Psoralea corylifolia* Fruit extract (PhytoRetinol™) for both food and cosmetic applications, including anti-aging, anti-inflammatory, improvement of firmness and elasticity, enhancement of self-healing, and wrinkle improvement against photoaging.

Furthermore, we have confirmed the following results regarding its anti-wrinkle effects in human studies:

**【For Food Applications】**

In a study involving 19 healthy men and women aged 36–61, continuous intake of PhytoRetinol™-3 (3.0% Bakuchiol-standardized product) at 35mg/day for 4 weeks showed a tendency for wrinkle improvement in terms of total volume ratio (sum of wrinkles and skin texture volume), wrinkle area ratio, and wrinkle volume ratio, based on wrinkle replica analysis.

**【For Cosmetic Applications】**

In a study where 19 healthy men and women aged 41–61 applied a cream containing 2% PhytoRetinol™-3C (3.0% Bakuchiol-standardized product) to the outer corners of their eyes for 4 consecutive weeks, a tendency for improvement in both deep wrinkles and fine lines was observed.

Sincerely,  
Oryza Oil & Fat Chemical Co., Ltd.