DAEBONG Life Science

Skin Improvement Effects of *Scutellaria baicalensis* Root Extract

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Introduction:

Scutellaria baicalensis is a perennial herb of the genus Scutellaria in the family Lamiaceae, and dried the barked roots of *Scutellaria baicalensis* Georgei. It is mainly grown in Korea, China, Mongolia, and eastern Siberia. In china, it was used to stabilize high fever, dry cough, vomit. Studies on the physiological and pharmacological effects of *Scutellaria baicalensis* extracts have reported anti-inflammatory and anti-convulsive effects, immune control functions, anti-tumor and tumor metastasis inhibitory effects, and respiratory infection effects. In addition, it is known that the root of *Scutellaria baicalensis* extracts contain flavonoids such as baicalin, baicalein, neobaicalein, wogonin, wogonoside, hispidulin. Therefore, this study, the *Scutellaria baicalensis* root extract with various physiological activities was investigated the blue light blocking effect, moisturizing effect, and inhibition effect of sebum production, and the possibility of development as skin improvement was reviewed.

Materials & Methods:

Materials

- **Scientific name :** *Scutellaria baicalensis*
- **English name :** Skullcap
- **Distribution :** Korea, China, Mongolia and eastern siberia

Methods

1. *Scutellaria baicalensis* root extract (SBRE) preparation

After dried *Scutellaria baicalensis* root powder is extracted with 70% ethanol. Then the ethanol is removed, concentrated and freeze-dried to obtain a *Scutellaria baicalensis* root extract (SBRE).

2. Protective effect against blue light damage

HaCaT cells were seeded to 24-well plates and incubated for 24 h. After incubation, the cells were treated with various concentrations of SBRE. After that, the cells were incubated with sample for 48 h. Cell viability was analyzed using the EZ-Cytox (Dogen, Korea).

3. Blue-light absorption effect

In order to investigate the blue light absorption effect of SBRE, the SBRE was diluted to 25, 50, and 100%, and then the absorption spectrum was observed using a UV-Vis spectrophotometer (X-ma 3200, Human Co. Korea). The wavelength was 419 to 470 nm, which is known to cause skin cytotoxicity at the blue light wavelength.

4. Measurement of Lipid contents

Sebocyte cells seeded to 24-well plates and incubated for 48 h. After incubation, the cells were treated with various concentrations of SBRE for 5 days. Cell lysates were analyzed for lipid using a Lipid Extraction Kit, Lipid Assay Kit (Abcam, UK).

5. Measurement of lipid droplets

Sebocyte cells seeded to 24-well plates and incubated for 48 h. After incubation, the cells were treated with various concentrations of SBRE in serum-free culture media for 5 days. At the indicated time, lipid droplet was observed using Oil Red O Stain Kit (Abcam, UK).

6. Measurement of Hyaluronic acid contents

HaCaT cells were seeded to 24-well plates and incubated for 24 h. Then the cells were treated with various concentrations of SBRE. The cell supernatants were analyzed for HA using a Human Hyaluronic acid (Cusabio technology LLC, China).

Results & Discussion:

Protective effect against blue light damage

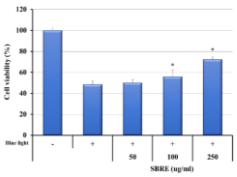

Figure 1. Cell protective effect of SBRE on Blue light induced HaCaT Cells. HaCaT cells were treated with various concentrations of SBRE for 48 h after being irradiated to blue light with SBRE. At the end of incubation, cell viability was analyzed using the EZ- Cytox kit. All values are means SD of 3 independent experiments. *p<0.05 compared with Control group.

Blue light absorption effect

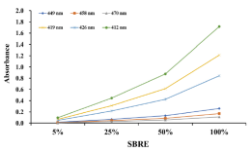

Figure 2. Blue light absorbance spectra of SBRE at a wavelength of 412 ~ 470 nm. The absorption spectra of SBRE was observed using an UV-Vis spectrometer.

Effect on the contents of total lipid

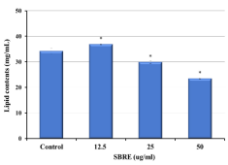

Figure 3. Effect of SBRE on the total lipid content of sebocytes. Cells were treated with various concentrations of SBRE for 5 days. At the end of incubation, total lipid was measured by lipid assay kit. The data represent the mean ± SD of triplicate experiments. *p<0.05 compared with Control group.

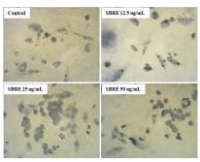

Figure 4. Effect of SBRE on cytoplasmic lipid droplets formation. Sebocytes were treated with various concentrations of SBRE for 5 days. At the end of incubation, cytoplasmic lipid droplets were observed with Oil Red stain.

Moisturizing effect

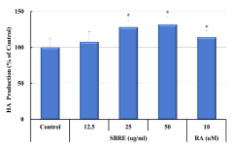

Figure 5. Effect of SBRE on Hyaluronic acid (HA) production in HaCaT Cells. Cells were treated with various concentrations of SBRE for 24h. At the end of incubation, cell supernatants were analyzed for HA using an enzyme-linked immunosorbent assay (ELISA) kit. All values are means SD of 3 independent experiments. *p<0.05 compared with Control group.

Conclusions:

In conclusion, SBRE increased HA production, inhibited sebum production, and exhibited a protective effect against blue light damage and a blue light absorption effect. These results suggest that SBRE could potentially be applied as a skin improvement ingredient in the cosmetic and pharmaceutical industries.

Acknowledgements:

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