**Evaluation of Skin-Improving Activities of Limonium Species Based on Telomere Lengthening Activity**

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**Background and aims.** Skin aging is known to result from intrinsic factors (such as genetics) and extrinsic factors (including environmental exposure). Among various aging biomarkers, telomere shortening is widely recognized as a key indicator of cellular senescence. The genus *Limonium*, which comprises over 600 species, includes *L. tetragonum*, a native Korean species that has demonstrated excellent skin-beneficial properties such as whitening, hydration, and anti-inflammatory effects in vitro. In addition, several *Limonium* species, including *L. gerberi*, *L. narbonense*, *L. tetragonum*, and *L. vulgare*, are registered as cosmetic ingredients in the International Cosmetic Ingredient Dictionary (ICID). Based on these findings, this study aimed to evaluate the telomerase activation and telomere lengthening effects of 12 species belonging to the family Plumbaginaceae, including 11 species from the genus *Limonium* and 1 species from the genus *Goniolimon*. Additionally, we assessed their skin whitening and hydration effects to identify promising candidates for novel cosmetic ingredient development.

**Methods.** Dried plant materials were extracted using either hot water or 50% ethanol after pulverization. Telomerase activity was evaluated by analyzing the mRNA expression of hTERT and c-MYC in HaCaT cells. Telomere length was measured using a quantitative PCR-based Telomere Length Quantification Assay Kit. Skin hydration activity was assessed by examining the expression of HAS1, HAS2, HAS3, and AQP3, while whitening activity was determined by measuring the mRNA levels of MITF, TYR, TYRP1, and TYRP2 in α-MSH-stimulated B16F10 cells.

**Results.** All extracts enhanced the expression of telomerase-related genes compared to the negative control. *L. telleum* (**7**) and *L. tenetanum* (**9**) exhibited significantly greater effects than the positive controls, curcumin or quercetin. In the telomere lengthening assay, *L. flexuosum* (**4**), **7**, **9**, and *L. tetragonum* (**12**) demonstrated remarkable activity. In the whitening assay, most extracts (excluding **3**, **5**, **9**, **10**, and **12**) showed inhibitory effects on melanogenesis-related genes. For skin hydration, **4** and *G. speciosum* (**11**) showed the strongest effects, significantly upregulating hydration-related genes and outperforming D-panthenol, the positive control.

**Conclusion/Discussion.** These results suggest that selected *Limonium* and *Goniolimon* species may serve as promising multifunctional cosmetic ingredients with telomere-protective, whitening, and hydrating properties.