



Characterization and biological potential of three Traditional Chinese Medicine plants from the Yunnan province of China

Shao, Qi Miao¹; Jeong, Eun-Young²; Moussou, Philippe³; Henry Florence³; Danoux Louis³
¹ BASF Advanced Chemicals Co., Ltd., Shanghai, China; ² BASF East Asia Regional Headquarters Ltd., Hong Kong; ³ BASF Beauty Care Solutions France SAS, Pulnoy, France

Introduction:

Traditional Chinese Medicine (TCM) has been used for thousands years in cosmetics as an important tradition in China. The Northwest Yunnan province of China in the pan-Himalaya area is home to a diversity of medicinal resources. Our aim was to study TCM plants from this area and to **develop highly titrated premium TCM herb extracts with proven efficacy for skin health and beauty.**

Materials & Methods:

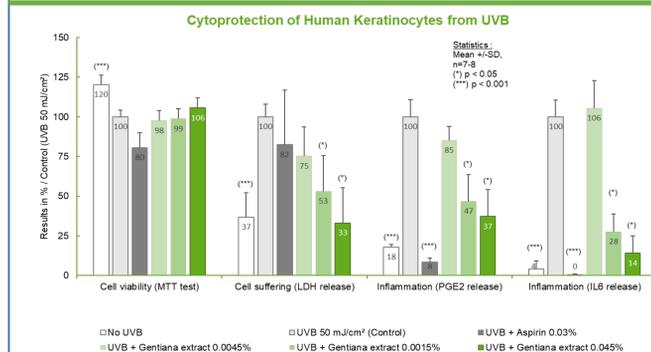
- Phytochemistry:** The phytochemical analysis was realized using UPLC coupled to DAD or Q-TOF-MS, and by size exclusion chromatography for polysaccharides. Non-cytotoxic doses were determined by MTT assays.
- Antioxidant effect:** The formation of intracellular reactive oxygen species (ROS) was evaluated using fluorescent probes (DCF and C11-Biodipy) and measurement of malondialdehyde (MDA) after UVA (20 mJ/cm²) exposure of fibroblasts (NHDF). Vitamin E was used as positive control.
- Anti-aging:** The stimulation of collagen type I synthesis was determined on NHDF according to Delfia method. Vitamin C was used as positive control.
- Inflammation:** For anti-inflammatory activity, LDH, PGE2 and IL6 were analyzed by ELISA after UVB (50 mJ/cm²) exposure of keratinocytes (NHEK). Aspirin was used as positive control.
- Hydration:** Aquaporin-3 (AQP3) gene expression and protein synthesis were evaluated by qRT-PCR and immunostaining on NHEK. Calcium chloride was used as positive control. Corneodesmosin and hyaluronic acid were analyzed by ELISA on NHEK. EGF was used as positive control.

Radix Gentianae (Qinjiao (秦艽 in Chinese name) is the dried roots of the plants which belong to the Gentiana genus [2].

Roots contain as active ingredients iridoids, gentiopicoside and loganic acid, which were extracted and purified to obtain a highly titrated extract.



Anti inflammatory effect of Gentiana



After treatment with Gentiana:
 - 67% LDH release
 - 63% PGE2 release
 - 86% IL-6 release

Figure 3: Cytoprotection of human keratinocytes against UVB-induced damage and inflammatory response

Dendrobium candidum is a precious magical herb listed in the top 9 Chinese herbal legends.

- Various applications: (boost the immune system, delay age or in nutrition [3]);
- Stem contains as active ingredient a polysaccharide composed mainly by glucose and mannose, that has a molecular weight of ~730 kDa.



Moisturizing effect of Dendrobium

+49% corneodesmosin
 +46% hyaluronic acid

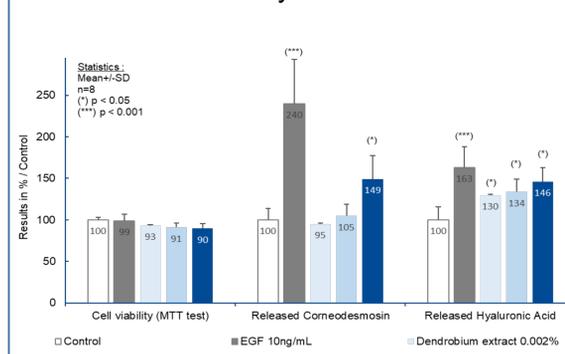


Figure 4: Corneodesmosin and Hyaluronic Acid synthesis in human keratinocytes

Aquaporin (AQP3)
 x1.7 gene level
 +20% protein level

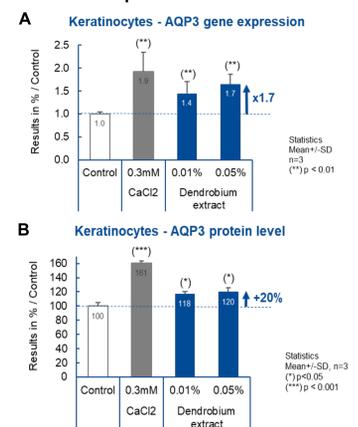


Figure 5: AQP3 gene (A) and protein (B) expression

Results & Discussion:

Three TCM plants were selected, and titrated extracts were developed.

Pyracantha fortuneana (torch fruit, HongZi, life-saving food). Its use as medicine and food started 1700 years ago in China. Fruits contain as active ingredients proanthocyanidins (tannins) and flavonoids [1] which were extracted and purified to obtain a highly titrated extract.



Antioxidant and anti-aging effect of Pyracantha

at 0.02% -38% cellular ROS
 -31% lipoperoxides
 -55% MDA release (data not shown)

at 0.10%
 x 6 collagen I synthesis

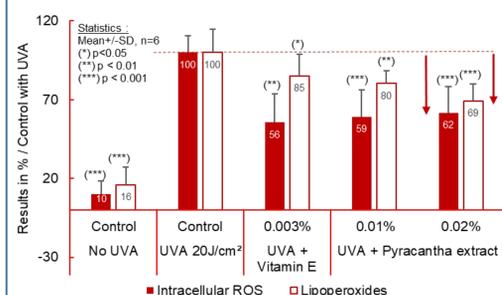


Figure 1: UVA-oxidative stress in human dermal fibroblasts

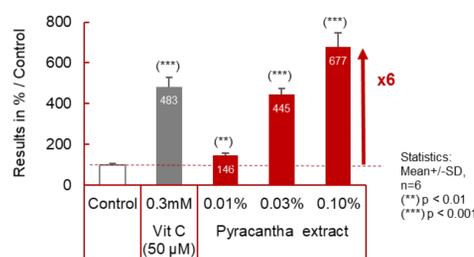


Figure 2: Collagen type I synthesis by human dermal fibroblasts

Conclusions:

TCM is part of a holistic healing system which fit to the wellness and natural trends. This study permitted to identify and produce titrated extracts containing either **flavonoids, iridoids or polysaccharide** bioactive compounds from 3 TCM plants, and to evaluate their biological potential which were particularly promising. Theses results encourage the use of those TCM extracts to answer to 3 major cosmetic market demands: anti-aging, sensitive skin and moisturization. **Clinical studies on Chinese human volunteers have been conducted** to assess their anti-aging soothing of sensitive and irritated skin, and moisturizing effects.

References:

- [1] Wang H, et al (2019) HPLC-QTOF-MS/MS profiling, antioxidant, and α-glucosidase inhibitory activities of Pyracantha fortuneana fruit extracts. J Food Biochem.43:e12821.
- [2] Zhang X, et al, (2018) Botany, traditional use, phytochemistry, pharmacology, quality control, and authentication of Radix Gentianae Macrophyllae - A traditional medicine: A review. Phytomedicine 46:142-163,
- [3] Ramesh, et al (2019). Medicinal properties of some Dendrobium orchids – A review. Journal of Applied and Advanced Research 4:119-128