Usage of *Oldenlandia diffusa* for skin diseases and skin-care

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Dear Editor,

*Oldenlandia diffusa* (Bai Hua She She Cao) is a common herb in traditional Chinese medicine. It belongs to the Rubiaceae family and the category of “clearing heat and eliminating toxins” in traditional Chinese medicine theory. *Oldenlandia diffusa* has many pharmaceutical actions such as antimicrobial, anti-inflammatory, and anti-tumor properties. We would like to discuss the background of traditional Chinese medicine for *Oldenlandia diffusa*, its pharmaceutical activities, clinical studies, and daily usages.

*Oldenlandia diffusa* is a well-known medicinal plant and used in Chinese medicine for a long time. Based on the traditional Chinese medicine theory, *Oldenlandia diffusa* is in the category of “clear heat and eliminate toxins”. This is “light-sweet” and “cold” in nature. The functions of *Oldenlandia diffusa* include removing heat, drying dampness, and strongly neutralizing toxins to balance Yin-Yang in the human body.¹ Accumulating studies have shown that *Oldenlandia diffusa* possesses antimicrobial, anti-inflammatory, and anti-tumor properties.²

Chen et al. reported that *Oldenlandia diffusa* had a strong inflammatory response in LPS-activated macrophages. It modulated the production of NO and the levels of cytokines such as TNF-α, IL-6, and IL-1β in LPS-treated RAW 264.7 cells causing phosphorylation of p38, JNK, and ERK1/2, also blocked the activation of NF-κB and MAPK signaling pathways to disrupt the synthesis of proinflammatory mediators.³

Zhu et al. indicated that *Oldenlandia diffusa* suppressed the infiltration of inflammatory cells and activation of the NF-κB signaling pathway which regulated the levels of TNF-α and IL-6 for the pathogenesis of arthritis (RA). TNF-α could enhance the properties of antioxidant and anti-inflammatory, also IL-6 could trigger the immune system by activating B-cells and releasing immunoglobulins as well as increasing the production of rheumatoid factor. These results showed that *Oldenlandia diffusa* is effective to alleviate the symptoms of arthritis in rats.⁴

Fu et al. discovered that *Oldenlandia diffusa* inhibited the proliferation of HaCaT cells by arresting HaCaT cell growth at the G1 phase and promoted cell apoptosis by inducing protein expressions of Bcl-xl and cIAP1 to cleavage caspase-3.⁵

Wang et al. indicated the anti-inflammatory mechanism of *Oldenlandia diffusa* involving NF-κB, MAPK, 5-LOX signaling pathways, and the anti-tumor mechanisms relating to PI3K/AKT, TGF-β/Mad, MAPK, STAT3 signaling pathways. *Oldenlandia diffusa* played an important role in the action of inflammatory via the regulation of NF-κB, MAPK, VEGF signaling pathways.⁶

Jayasooriya et al. identified that *Oldenlandia diffusa* inhibited the LPS-induced degradation and phosphorylation of IκBα in RAW 264.7 cells which sustained the expression of p65 in the cytosol. *Oldenlandia diffusa* also suppressed the LPS-induced DNA binding activity of NF-κB to induce the production of NO, PGE2, and TNF-α by regulating the activation of NF-κB.⁷

Deng et al. reported the use of *Oldenlandia diffusa* in phytotherapy for the management of psoriasis. Phytotherapy (PT) interventions included oral administration of single or multiple PTs or extracts thereof. An assessment of the clinical efficacy of psoriasis treatments based on the proportion of the Psoriasis Area Severity Index (PASI) score reduction. The significant change of *Oldenlandia diffusa* in PASI score was a 50% reduction. They considered the pharmacological actions of *Oldenlandia diffusa* including anti-inflammatory and anti-proliferative activities for psoriasis management.⁸

Recently, Li et al. indicated *Oldenlandia diffusa* as one of the traditional Chinese medicines for treating systemic scleroderma. According to the traditional Chinese medicine theory, systemic scleroderma belongs to Liver-Yin and Kidney-Yin deficiency with wind-dampness condensation, blood heat, stasis, and skin blockage causing grain skin. *Oldenlandia diffusa* is heat-clearing, removing toxic substances and dampness which functions to restore Qi of the kidney, detoxicating, dispelling wind clearing damp, and softening hard masses. The Chinese medicine decoction consisted of 15g *oldenlandia diffusa*, 12g matrimony vine, 8g *Chinese ephedra*, 20g honeysuckle, 15g *forsythia*, 15g *codonopsis*.
ardisae mamillatae. The effective rate reached nearly 97.0%.10

In another study by Wang et al., Oldenlandia diffusa was used to treat skin acne. Acne is hot, wet, and stasis of blood in the skin inflammation. It belongs to the category of “accumulation dampness heat and blood stasis” based on traditional Chinese medicine theory. Oldenlandia diffusa is one of the fumigation and washing agent. These Chinese medicine formulations consisted of 45g oldenlandia diffusa, 22g drymoglossum herba drymoglossi, 24g herba euphorbiae thymifoliae, 9g herba speranskiae tuberculatae, 21g schefflerae octophyllae cortex, 17g zanthoxyli avicennae radix, 28g flemingiae philippinensis radix, 25g buttonbush root, 10g herba gallii tenerti, 20g herba silenes fortunei, and 12g herba ardisiae mamilatae. The effective rate reached nearly 97.0%.9

Nowadays, there is a cosmetic product developed by Kim’s research team in Korea. Oldenlandia diffusa is disclosed as one of the whitening compositions for the skin because there are several bioactive components in the Oldenlandia diffusa extract such as betulin, betulinic acid, usnic acid, oleanolic acid, stigmasterol, β-sitosterol, β-glycyrrhetinic acid, p-coumaric acid, glucoside, and hentriacontane which possesses the anti-inflammatory and antiviral effect. If Oldenlandia diffusa extract combines with Rheum undulatum extract, and Broussonetia kazinoki extract, it exhibits superior melanogenesis inhibition and skin whitening cosmetics. Its function is to protect the skin to prevent Ultra-Violet (UV) irradiation and change the skin color within 8 weeks. The ointment ingredients content contains 0.1g Oldenlandia diffusa, Rheum undulatum, and Broussonetia kazinoki extract, 8.0g glycerine, 4.0g butylene, 15.0g liquid paraffin, 7.0g β-glucan, 3.0g carborner caprylic/capric triglyceride, 1.0g squalene, 1.5g Cetearyl glucoside, 0.4g sorbitan stearate, 1.0g Cetearyl alcohol, and 4.0g anti-septic adequate fragrance adequate pigment adequate beeswax.11

The above information demonstrates that Oldenlandia diffusa has potential in treating skin diseases and skin-care. However, much more work needs to be done for supporting Oldenlandia diffusa in the Chinese medicine decoction and its cosmetic product combined with other Chinese medicine herbs including the study on antimicrobial, anti-inflammatory, and anti-tumor activities, as well as its safety evaluation.

References

13. Kim EJ, Rho HS, Kim SJ, et al. Whitening composition for the skin because there are several bioactive components in the Oldenlandia diffusa extract such as betulin, betulinic acid, usnic acid, oleanolic acid, stigmasterol, β-sitosterol, β-glycyrrhetinic acid, p-coumaric acid, glucoside, and hentriacontane which possesses the anti-inflammatory and antiviral effect. Oldenlandia diffusa extract combines with Rheum undulatum extract, and Broussonetia kazinoki extract, it exhibits superior melanogenesis inhibition and skin whitening cosmetics. Its function is to protect the skin to prevent Ultra-Violet (UV) irradiation and change the skin color within 8 weeks. The ointment ingredients content contains 0.1g Oldenlandia diffusa, Rheum undulatum, and Broussonetia kazinoki extract, 8.0g glycerine, 4.0g butylene, 15.0g liquid paraffin, 7.0g β-glucan, 3.0g carborner caprylic/capric triglyceride, 1.0g squalene, 1.5g Cetearyl glucoside, 0.4g sorbitan stearate, 1.0g Cetearyl alcohol, and 4.0g anti-septic adequate fragrance adequate pigment adequate beeswax.11