

Preliminary exploration of anti-melanogenesis of MGF in Zebrafish

MGF 抑制斑馬魚黑色素形成作用之初步探索

¹Ching-Wen Chang, ²Yu-Siou Chen, ²Jiou-Chuan Lin, ¹Yi-Hsuan Chuang,
¹Yu-Han Chen, and ^{2,*}Yu-Chin Lin

¹張靜雯、²陳郁琇、²林久絹、¹莊苡瑄、¹陳雨涵、^{2,*}林郁進

¹ Department of Cosmetic Applications and Management, MacKay Junior College of Medicine, Nursing, and Management, Taipei, 11260, Taiwan

² Department of Medicinal Botanicals and Foods on Health Applications, College of Biotechnology and Bioresources, Da-Yeh University, Changhua, 515006, Taiwan

¹ 馬偕醫護管理專科學校 化妝品應用與管理科

² 大葉大學 生技與生物資源學院 藥用植物與食品保健學系

This study uses zebrafish as the experimental system to evaluate the safety and ability of MGF on melanogenesis. The melanin can absorb UVs lights and protect the deep layers of the skin from sunlight harm to prevents DNA damage and reduces the risks of skin cancer. Zebrafish is an experimental system between cells and animals. It is a phenotype-based fast-screening platform for the screen of active ingredients related melanogenesis. MGF is one of active ingredients of the *Anacardiaceae* and *Liliaceae* families, etc. Many studies indicated that it has various pharmacological activities. Additionally, some scholars used molecular docking analysis to find that MGF can affect melanin synthesis by an influence on tyrosinase. Also used commercial assay kits such as Tyrosinase Inhibitor Screening Colorimetric Assay Kit to assessed *in vitro* inhibitory activities against aging-mediated enzymes. However, scholars have opposite opinions on whether MGF has the effect of inhibiting melanin formation. Some scholars also used zebrafish for testing, but used a dose of 250 μM or higher, making the experimental results unsatisfactory. Our preliminary study hopes to clarify MGF's ability to inhibit melanogenesis and its possible dosage. Based on the dosage experience of different trials in the past, we selected 0.1, 0.5, 1.0, 5.0 and 10.0 μM for preliminary dose exploration. In addition to using zebrafish embryos to evaluate the safety of MGF, we also used it at different developmental stages (24, 48 and 72 hpf) to evaluate MGF's ability to inhibit the melanogenesis. Experimental results showed that MGF exceeding 5 μM is toxic to zebrafish embryo, and that 0.1, 0.5 and 1.0 μM can reduce melanogenesis in a dose-dependent manner. According to toxicological and pharmacological principles, dose determines the toxicity and efficacy of a compound. Therefore, we will evaluate the dose-efficacy relationship and possible mechanisms.

Keywords: Melanin, Melanogenesis, Zebrafish.