## Studies on the Synthesis of the Glycoside and Whitening Effects as a Cosmetics Material Using the Chlorogenic acid its Metabolite Contained in the Plants

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Research in the areas of medical and cosmetic treatments has progressed rapidly though the use of plants and herbs. As soon as an evident biological activation substance is extracted independently from a natural ingredient, research of all its chemical synthesis of similar compounds, exchange of microorganisms, and biological metabolism is also studied, for research and development in hope of a stronger biological activation. On the other hand, because of environmental destruction on a global scale is a problem with the effect on the human body. The ubiquitous use of flon gas and the resulting destruction of the ozone layer was led do increasing ultraviolet radiation reaching the surface of the earth and the consequential thus led to an increase to melanin which causes the formation of stains and freckles.

The investigation of natural products have bee increased expecting the effectiveness and safety. Caffeic acid (3,4-dihydroxy cinnamic acid)(2), ferulic acid (trans-4-hydroxy-3-methoxy cinnamic acid)(3) and isoferulic acid (trans-3-hydroxy- 4-methoxy cinnamic acid)(4) may be readily obtained by hydrolysis of chlorogenic acid (1). (1) was isolated from green coffee beans. In this report, we synthesized three compounds (2) - (4) form 3, 4-dihydroxy benzoic acid (5), 4-hydroxy-3- methoxy benzoic acid (6) and 3-hydroxy-4-methoxy benzoic acid (7) by reduction (LiAlH<sup>4</sup>), Jones oxidation and condensation with malonic acid.

We conducted tests targeted at the tyrosinase activity, superoxide scavenging activity and hyaluronidase activity inhibitor for compounds and made evaluation in the direction of practical use. Of the compounds (3) and (4) showed strong tyrosinase inhibitory activity and superoxide scavenging activity. Some of these compounds are only effective in the tyrosinase stage, while the compounds (3) and (4) in this report are show a high inhibition effect in both the tyrosine and DOPA stage. We found favorable results daggering from cosmetic whiteners that originate from natural ingredients that have been reported in the past.