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Title of The Manuscript Max. 20 Words (Times New Roman 14)

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Abstract

The abstract should not be more than 200 words, be self-contained, and without citations. The abstract must include the following four aspects: the study purpose, methods, review of results, and conclusion.

Keywords: keyword 1, keyword 2, keyword 3, keyword 4, keyword 5.

INTRODUCTION

Tyrosinase (EC 1.14.18.1), a metalloenzyme containing copper ion (Cu^{2+}), is a crucial enzyme in regulating melanin production in melanocyte cells.[1-3] In melanin production, tyrosinase catalyzes two different rate-limiting reactions, namely the o-hydroxylation of 4-hydroxyphenylalanine (L-tyrosine) to 3,4-dihydroxyphenylalanine (L-DOPA) (monophenolase activity) and then the oxidation of L-DOPA to dopaquinone (diphenolase activity) which will polymerize to form melanin.[4]

Melanin is found in many living cells like animals, plants, fungi, and bacteria, which are responsible for generating natural pigments in melanocytes through the melanogenesis process.[3-5] In mammals, melanin is produced in the eyes, skin, hair, and brain, controlled by intrinsic factors like mutation, hormones, and the immune system, and extrinsic factors like UV radiation and chemicals.[6] However, uncontrol melanin production leads to high melanin content in the skin, which causes dermatological disorders (freckles, vitiligo, melasma, cancer) and non-dermatological disorders (Parkinson's disease).[7-9] People who have darker skin are more vulnerable to these diseases.[10] Melanogenesis is performed by enzymatic processes like tyrosinase.[11] Therefore, tyrosinase has been a targeted protein in evaluating drug candidates, applicable in pharmaceutical and cosmetics.

Many tyrosinase inhibitors have been reported and widely used in medicine, agriculture, and cosmetics, including kojic acid, arbutin, hydroquinone, and L-ascorbic acid in Figure 1.[12, 13] Kojic acid is an available tyrosinase inhibitor in the market. However, kojic acid still has several drawbacks in cosmetics which may cause irritations in the skin due to cytotoxicity, low stability, and lipophilicity. Therefore, the development of a new tyrosinase inhibitor is still crucial to have hydrophilic and lipophilic properties to enhance dermal penetration without side effects.[14] Phenolic compounds showed high potency as tyrosinase inhibitors because the structure is similar to kojic acid, which can be a chelating agent.[15] In a previous study, 3,5-dihydroxyphenyl decanoate inhibited a mushroom tyrosinase with an IC_{50} value of 96.5 μM.[16] Thus, our study aimed to make a hybrid between resorcinol as a hydrophilic moiety and acyl with long-chain carbon as a lipophilic moiety to form monoacyl resorcinol via Friedel-Craft acylation and evaluate their inhibitory activity against tyrosinase enzyme. Molecular docking was performed to investigate the interaction between monoacyl resorcinol and enzyme.

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EXPERIMENTAL SECTION

Material and Instrumental

Methods

RESULTS AND DISCUSSION

This part needs to include a thorough explanation and demonstration of the study findings. This part, which might describe "What was done," "Why was done," and "How was the result," has to be written methodically. The image derived from the study findings has been shown in Figures 1 and 2.

Table 1. Data ^{1}H and ^{13}C NMR *epi*-catechin (**3**) in aceton-d_6.

No. C	δ_H (*mult.*, *J* in Hz)	δ_C	δ_C *
2	4,88 (*br s*)	79.4	79.9
3	4,21 (*br d*, 4,5)	66.9	67.5
4	2,73 (*dd*, 16,8; 4,5) 2,85 (*dd*, 16,8; 4,5)	29.1	29.3
4a	-	99.7	100.1
5	-	157.4	158.0
6	6,02 (*d*, 2,2)	96.1	96.5
7	-	157.4	157.7
8	5,92 (*d*, 2,2)	95.7	95.9
8a	-	157.0	157.4
1’	-	132.1	132.3
2’	7,05 (*d*, 1,5)	115.4	115.9
3’	-	145.2	145.9
4’	-	145.1	145.8
5’	6,79 (*d*, 8,4)	115.2	115.3
6’	6,83 (*dd*, 8,4; 1,5)	119.3	119.4

* reference 11.

Table 2. Cytotoxic of compounds (**1** – **3**)

Compound	IC_{50} (µg/mL)
1	55,0
2	24,7
3	> 100

CONCLUSION

The research outcomes must be succinctly and clearly summarized in the conclusion. Verify that the conclusions align with the goals of the investigation. Conclusions are not numbered; instead, they are organized into paragraphs.

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