

**THE ANALYSIS OF RICE BRAN AND SEA GRAPES EXTRACTS FOR
HYPERPIGMENTATION SERUM**

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(Nur Fatihah Binti Khaironezam)

ABSTRACT

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Over decades, the cosmetic industry has conducted substantial research on the usage of bioactive compounds from plants. These substances have been used to increase the physico-chemical and sensory qualities of cosmetic ingredients. Sea grapes and rice bran bioactive compounds are not only beneficial in the food industry but also in the cosmetics and pharmaceutical industries. Rice bran and sea grapes are proven to contain useful bioactive compounds, especially with an anti-oxidant effect. Hence, in this study, the chemical and biological properties of sea grapes and rice bran were investigated and evaluated as new ingredients in hyperpigmentation serum. The bioactive compounds from rice bran and sea grapes were extracted using Soxhlet extraction and maceration extraction, respectively. The extracts were to determine its biological-physical properties via FTIR, ICP-OES and DPPH. The percentage yields of rice bran and sea grapes extracts obtained were 37.15% and 29.14%, respectively. The total phenolic compound (TPC) value for rice bran (0.075 ± 0.002 mg GAE/g) and sea grapes (0.063 ± 0.003 mg GAE/g). While the percentage of RSC for sea grapes ranges from 49.44 % to 61.35 %. The IC_{50} values for antioxidant capacity for rice bran and sea grapes extracts were 950.80 ppm and 127.52 ppm, respectively. The antibacterial activities of rice bran and sea grapes extract were determined by an inhibition against *E.coli* and *B.lichen* bacteria. Both extracts were found to be inhibited in all concentrations that had been analyzed. For the heavy metal analysis, the extracts show most metals present are below the maximum limit of concentration for cosmetic products. The extracts were then used to formulate the hyperpigmentation serum. The pH value for the formulated serum is 6.61, which is suitable for human skin conditions. Moreover, a negative result was found for irritation, inflammation, and allergies in 10 of the respondents tested.

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CHAPTER 1

INTRODUCTION

1.1 Background

Hyperpigmentation is a skin disorder as dark patches or spots on the skin appearance. Hyperpigmentation occur when patches become darker than the surrounding of the skin. The patches varies by brown to grayish colours and primarily on the face, particularly in the periorbital and zygomatic areas (Kim et al., 2020). Bossart et al., (2021) stated that hyperpigmentation is a darkening of the skin produced by an increase in melanin production from activated melanocytes or hemosiderin deposits in the skin. Melanin is a pigment that contributes to skin hyperpigmentation and is created by the process of melanogenesis. According to Rathee et al., (2021), there is mainly three type of skin hyperpigmentation which are melasma, post-inflammatory hyperpigmentation and age spot or liver spot. There are caused by a number of intrinsic factors, including skin types and genetic background, and extrinsic factors, including the sun exposure and environmental pollution (Qian et al., 2020). Melanin production are controlled by tyrosinase enzyme, which is the rate-limiting enzyme involved in the biosynthesis of pigments and over activity of tyrosinase enzyme will also cause hyperpigmentation (Panzella and Napolitano, 2019).