



## Evaluation of antioxidant and anti-tyrosinase activities of surfactant and alcohol extracted *Combretum Indicum* leaves

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### ABSTRACT

*Combretum Indicum* (CI), which contains numerous bioactive compounds, has been used in traditional medicine for a variety of reasons, including the treatment of skin conditions. This study investigates the antioxidant and anti-tyrosinase activities of CI leaves extracted using different surfactants (Triton X-100 and Vitamin E TPGS) at concentrations of 1%, 2%, and 3%, as well as various alcohol solvents (acetone, methanol, and ethanol) at concentrations of 50%, 70%, and 90%. The antioxidant activity of the extracts has been evaluated using Total Phenolic Content (TPC) and 2,2-diphenyl-1-picrylhydrazyl (DPPH), while the anti-tyrosinase activity was assessed through a mushroom tyrosinase inhibition assay. Prior to analysis, CI leaves had been macerated, extracted, and freeze-dried. The research established that ethanol at a concentration of 50% is the optimum solvent to extract CI leaves, as it demonstrated good antioxidant and anti-tyrosinase action with a high percentage of yield and total phenolic content. As a result, the outcomes of this study contribute to a better understanding of the potential applications of CI leaf extract in cosmetics, notably in the treatment of oxidative stress and hyperpigmentation. Further study and development in this field could lead to the creation of effective and natural cosmetic products produced from CI leaves that have antioxidant and anti-tyrosinase effects.

### 1. Introduction

Currently, the cosmetic industry is receiving overwhelming demand for skincare products. The general public, especially women, has grown more aware of the importance of having healthy and bright skin in accordance with modern beauty standards. A 2021 Euromonitor report on the world market for beauty and personal care stated that skincare has exceeded expectations by becoming the world's largest category in 2020 and will continue to be the strongest sector of the global beauty market up until 2025 [1]. Unfortunately, each and every cosmetic product that has been produced on the market has its own benefits and drawbacks due to the use of synthetic ingredients, which often leads to numerous side effects, including acne, erythema, dermatitis, and skin irritation [2]. In 2018, the Ministry of Health banned 14 products that were found to have hazardous chemicals such as mercury, hydroquinone, tretinoin, and diphenhydramine [3]. Hence, consumers prefer to use cosmetic products that are based on natural ingredients in their skincare routine for better skin health and reduced side effects from prolonged usage. As a result, natural products are now receiving more attention from the cosmetics industry [4]. Antioxidants are known to be

chemical compounds used in small concentrations that can delay, lessen, or stop oxidation caused by an oxidant [5]. By reacting with lipid and peroxy radicals and transforming them into more stable, non-radical products, antioxidants can prevent lipid oxidation. Examples of natural antioxidants that can be found in plant extracts include polyphenols, flavonoids, flavanols, stilbenes, and terpenes [6]. Tyrosinase is a wide-ranging enzyme that is present in almost every body cell. It heavily influences melanocytes to produce melanin and plays a crucial role in the coloration of skin, hair, and eyes [7]. Therefore, tyrosinase inhibition is a major approach used in cosmeceutical manufacturing to produce skin-lightening formulations [8]. Kojic acid is a tyrosinase inhibitor that is extensively investigated and commonly used as an anti-tyrosinase agent in cosmetics to treat hyperpigmentation and melasma [9]. Medicinal plants are essential for drug exploration and development because they are an abundant source of various biologically active molecules [10]. *Combretaceae* consists of 20 genera and is a large family. Approximately 250 to 300 species of *Combretum*, *Terminalia*, and *Quisqualis* are the most commonly seen genera [11].

*Combretum Indicum* (CI), also called the Rangoon creeper [12] or Chinese honeysuckle, is a vine that is native to tropical Asia and has

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