



Antioxidant and antimicrobial activities of (6E, 10E)-2, 6, 24-trimethylpentacosa-2, 6, 10-triene from *Euclea crispa* leaves

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ABSTRACT

The purpose of the present study attempt to investigate the antioxidant and antimicrobial activities of isolated bioactive compound from ethanolic extract of *Euclea crispa* (*E. crispa*) leaves. Column chromatography method was used to isolate the bioactive compound from the plant leaves followed by UV-Spectroscopy. FT-IR, ¹H and ¹³C NMR analyses were used to identify the structure of the isolated compound. Subsequently, the antioxidant activity was demonstrated by 2, 2-diphenyl-1-picryl-hydrazyl (DPPH) radical scavenging assay, reducing power assay, ferric reducing antioxidant power (FRAP) assay, hydroxyl scavenging assay and nitric oxide scavenging assay while disc-diffusion assay was used to analyze the antimicrobial activity. The NMR and other spectral data confirmed that the isolated compound was (6E, 10E)-2, 6, 24-trimethylpentacosa-2, 6, 10-triene (compound-1). The DPPH radical scavenging ($116.1 \pm 0.9 \mu\text{g/ml}$), hydroxyl scavenging ($118.9 \pm 1.0 \mu\text{g/ml}$) and nitric oxide scavenging ($124.3 \pm 0.2 \mu\text{g/ml}$) showed the significant half maximal inhibitory concentration (IC₅₀) values on compound-1 suggesting good antioxidative potential. Additionally, it exhibited considerable activity in reducing power and FRAP (the maximum absorption of 0.41 ± 0.02 and 0.54 ± 0.02 at $500 \mu\text{g/ml}$, respectively) when compared with standard drug. Furthermore, compound-1 showed maximum antimicrobial activity with inhibition zone against the tested microorganism of *Staphylococcus aureus*, *Streptococcus aureus*, *Escherichia coli*, *Klebsiella pneumonia*, *Aspergillus niger* and *Aspergillus terreus*. Conclusively, the isolated bioactive compound-1 from *E. crispa* leaves could be a new source of natural antioxidative and antimicrobial agents with potential value.

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1. Introduction

The drug resistance in microbes is well recognized as a major threat to human health. This necessitated the search for new antimicrobial compounds from natural source (Fair and Tor, 2014). As a result, the resistance of numerous human pathogenic organisms to various currently available drugs results into considerable mortality and morbidity worldwide. Thus, novel antibiotics are needed to compact these life-threatening pathogens (Subramani et al., 2017). The report from ethnopharmacological data indicate that, infectious diseases can aggravate the oxidative stress events in the human body, because the reactive oxygen and nitrogen radicals secreted by pathogens accumulate in the microenvironment of affected tissues (Dimitrova et al., 2017). Therefore, the human body antioxidant defense system is overwhelmed to prevent the various oxidative damages. Recent studies though report that, antibiotics may increase the oxidative stress via the Fenton reaction, this finding remains controversial (Zhao and Drlica, 2014). Thus, the investigation of phytochemicals from the medicinal plants, which

does not only possess antioxidant properties but also exhibit the antimicrobial activity, is eminent (Altemimi et al., 2017).

There is a rising interest in use of traditional medicine, a variety of good modern medicine have been isolated from the medicinal plants and other natural sources (Poornima et al., 2017). Accordingly, about 80% of the world population depends on the medicinal plant for the human disease management (Rupani and Chavez, 2018) as corroborated by World Health Organization (WHO) in one of their reports. Now the systematic search needed for useful bioactivity from the medicinal plants and it is considered to be a rational approach in nutraceuticals and drug research (Nichita et al., 2015). In the plant kingdom, approximately 300,000–400,000 plant species grow on the earth. Nevertheless, only a small percentage of their biological function and phytochemicals have been investigated (Hostettmann et al., 1998; Chugh et al., 2012). Hence, raw materials or preparation of extracts from endemic species of medicinal plants, containing phytochemicals with significant antioxidant, antimicrobial and other health benefits needs to be evaluated (Perumal et al., 2016).

Euclea crispa (*E. crispa*) is an afro-tropical plant species of the family Ebenaceae. It is commonly known as the blue guarri (Eng.), bloughwarrie (Afr.), motlhaletsogane (Setswana), iDungamuzi, umGwali (isiZulu) (Perumal and Ashafa, 2018). It is a hardy evergreen plant that usually

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