Research Article

Phytochemical Screening of Essential Oils and Antibacterial Activity and Antioxidant Properties of Barringtonia asiatica (L) Leaf Extract

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Objective. To ascertain the essential oil phytochemicals of the leaf and to test for the antibacterial and antioxidant properties of dichloromethane crude extract of Barringtonia asiatica leaf. Methods. The phytochemical screening of essential oils, extraction by hydrodistillation using the Clevenger apparatus, and analysis performed by gas chromatography equipped with a flame ionization detector (GC-FID). Antibacterial activity and the inhibition rate (mm) were determined using the agar disc method against four bacterial strains using tetracycline as positive control. The antioxidant potential of dichloromethane crude extract was investigated spectrophotometrically using 1,1-diphenyl-2-picrylhydrazyl. Results. The essential oil properties were reasonable with major phytochemicals like uncineol 30.9%, eicosane 27.4%, eicosane 21.6%, and 4-propyl-guaiacol 14.05%. The antibacterial activity of the dichloromethane crude extract showed broad-spectrum activity against Salmonella typhi, Escherichia coli, Staphylococcus aureus, and Klebsiella pneumoniae with inhibition value ranges between 2.50 ± 0.10 mm and 5.00 ± 0.06 mm. The dichloromethane crude extract exhibited strong antioxidant activities when compared to the standard. Conclusions. These results suggest that the leaves of Barringtonia asiatica is composed of essential compound as well as antibacterial and antioxidant properties from the crude extract; these are possible due to the presence of some bioactive compounds in the crude extract. The species also showed a reasonable amount of natural products in the essential oils from the hydrodistillation which can as well be used in the cosmetics and food industries.

1. Introduction

In the last century, a tremendous progress in medicinal plants research has been observed. In fact, the world is concerned towards the use of traditional medicine which has created a great interest towards plant and plant extracts.

Essential oils are among the most interesting components of the plant extracts consisting mostly of monoterpenoid or sesquiterpenoids. They are used as therapeutic agents in ethno, conventional, and complementary alternative medicines particularly as analgesic, anti-inflammatory, antispasmodic, local anaesthetic, antiinflammatory, antipruritic, and antiseptic as well as many other therapeutic uses and disease control [1]. Several line of studies have also reported that essential oils are used broadly in medicine and cosmeceutical and pharmaceutical industries and as flavouring agents and preservatives in food industry and design [2, 3].

We also know that bacterial infection is a major cause of death rate mortality particularly in developing countries. A good number of synthetic and semisynthetic pathogenic agents are available today. However, resistance to this microorganism is rapidly growing [4, 5]. One of the major concerns is also drug hypersensitivity and immune-suppression [6, 7]. Because of these negative effects, and the constant development of bacterial resistance, there is a great concern and continuous need to develop newer antibacterial agents to avert this menace with less harm side effect to the patient. Due to these reasons, medicinal plants are needed for this control [8], as they are cheaper [9].

In addition, it is scientifically accepted that natural antioxidants exert health-promoting effects, and their consumption as food or as food additives cannot be underestimated. Thus, medicinal plants contain free-radical scavenging molecules such as phenols, anthocyanin’s tannins,