In vitro antioxidant potential of eleven medicinal herbs in Sri Lanka: 1 2

Correlation with phenols and flavonoids

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Abstract: Antioxidants play a crucial role in preventing and treating noncommunicable diseases (NCDs) by scavenging free radicals. Medicinal herbs, used for centuries in traditional healthcare systems, have been gaining attention recently due to the negative effects of synthetic medicines. This study assessed the total phenolic content (TPC), total flavonoid content (TFC), and antioxidant activity of aqueous extracts from eleven commonly used Sri Lankan Ayurvedic plants and determined the relationship between their phenolic and flavonoid content with antioxidant activities. TPC and TFC were measured using the Folin-Ciocalteu and Aluminum chloride methods, respectively. Antioxidant activity was evaluated using ABTS, FRAP, and DPPH assays. Pearson correlation analysis assessed the relationship between TPC and TFC with antioxidant activity. Phyllanthus emblica (PE) showed the highest TPC, TFC, and antioxidant activity ($p \le 0.05$) significantly. TPC and TFC exhibited significantly positive correlations with FRAP and ABTS assays while the DPPH assay showed a negative correlation. Phenols and flavonoids in the selected extracts may significantly contribute to the antioxidant activity measured by ABTS and FRAP assays, while other secondary metabolites and their synergism effect may influence the DPPH assay. The significant antioxidant properties of PE, highlight its potential to treat various NCDs. Further studies are essential to determine their bioactivities, effective doses, and toxicity levels.

1. INTRODUCTION 10

Non-communicable diseases (NCDs), also known as chronic diseases, have emerged as a global 11 pandemic, leading to millions of deaths and disabilities worldwide. According to the World 12 Health Organization (WHO), in 2023, NCDs accounted for 74% of all annual deaths globally, 13 affecting over 41 million people, with more than 15 million falling within the age group of 30 14 to 69 years (World Health Organization, 2023). Various physiological processes in the human 15 body produce free radicals, and their overproduction causes oxidative damage to biomolecules, 16 which eventually leads to numerous chronic diseases including cardiovascular diseases, 17 cancers, and diabetes mellitus (Fu et al., 2011). 18 Antioxidants play an important role in the prevention and treatment of chronic diseases by 19

- 20 scavenging free radicals. Due to the adverse side effects associated with synthetic antioxidants,
- 21 there is a growing trend to substitute them with naturally occurring antioxidants (Dudonné et
- al., 2009). Plants are reported to contain a wide range of free radical scavenging molecules like 22
- phenolic compounds (phenolic acids, flavonoids, quinones, coumarins, lignans, stilbenes, and 23 24 tannins), nitrogen compounds (alkaloids, amines, and betalains), vitamins, terpenoids
- 25 (including carotenoids), and some other metabolites that exhibit potent antioxidant properties
- (Choi et al., 2002; Fu et al., 2011). 26
- 27 Medicinal herbs are increasingly recognized as rich sources of natural antioxidants and play a significant role in traditional healthcare systems. The World Health Organization (WHO) 28 reports that nearly 80% of the population in many developing countries, representing 29