In Vitro Enzyme Inhibitory Properties, Secondary Metabolite Profiles and Multivariate Analysis of Five Seaweeds

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Abstract: Seaweeds have been exploited as both food products and therapeutics to manage human ailments for centuries. This study investigated the metabolite profile of five seaweeds (Halimeda spp., Spyridia hypnoides (Bory de Saint-Vincent) Papenfuss, Valoniopsis pachynema (G. Martens) Børgesen, Gracilaria fergusonii J. Agardh and Amphiroa anceps (Lamarck) Decaisne using ultra-high-performance liquid chromatography coupled with electrospray ionization mass spectrometry (UHPLC-ESI-MS/MS). Furthermore, these seaweeds were assessed for antioxidant and inhibitory effects against α-amylase, α-glucosidase, acetyl-cholinesterase (AChE), butyryl-cholinesterase (BChE) and tyrosinase. Valoniopsis pachynema and A. anceps yielded the highest flavonoid (4.30 ± 0.29 mg RE/g) and phenolic content (7.83 ± 0.08 mg RE/g), respectively. Additionally, A. anceps exhibited significant antioxidant properties with all assays and significantly depressed BChE (IC50 = 6.68 ± 0.83 mg/mL) and α-amylase activities (IC50 = 5.34 ± 0.14 mg/mL). Interestingly, the five seaweeds revealed potent inhibitory effects against tyrosinase activity. In conclusion, A. anceps might be considered as a key source of phytoantioxidants and a potential candidate to develop nutritional supplements. Besides, the five tested seaweeds warrant further study and may be exploited as promising natural sources for managing hyperpigmentation.

Keywords: seaweeds; antioxidants; tyrosinase; bioactive metabolites; biological activities

1. Introduction

Seaweeds are the ‘lungs of the sea’ as well as a potential ‘wild pharmacy’. These plant-like organisms produce 70–80% oxygen for the atmosphere and possess scads of metabolites with unique structures of medicinal values [1,2]. In addition to their ecological importance, seaweeds have been