World Academy of Science, Engineering and Technology
International Journal of Biomedical and Biological Engineering
Vol:12, No:06, 2018

Qualitative and Quantitative Screening of Biochemical Compositions for Six Selected Marine Macroalgae from Mediterranean Coast of Egypt

Authors : Madelyn N. Moawad, Hermine R. Z. Tadros, Mary G. Ghobrial, Ahmad R. Bassiouny, Kamal M. Kandeel, Athar Ata

Abstract : Seaweeds are potential renewable resources in marine environment. They provide an excellent source of bioactive substances such as dietary fibers and various functional polysaccharides that could potentially be used as ingredients for both human and animal health applications. The observations suggested that these bioactive compounds have strong antioxidant properties, which have beneficial effects on human health. The present research aimed at finding new chemical products from local marine macroalgae for natural medicinal uses and consumption for their nutritional values. Macroalgae samples were collected manually mainly from the Mediterranean Sea at shallow subtidal zone of Abu Qir Bay, Alexandria, Egypt. The chemical compositions of lyophilized materials of six selected macroalgal species; Colpomenia sinuosa, Sargassum linifolium, Padina pavonia, Pterocladiella capillacea, Laurencia pinnatifidia, and Caulerpa racemosa, were investigated for proteins using bovine serum albumin, and carbohydrates were assayed by phenol-sulfuric acid reaction. The macroalgae lipid was extracted with chloroform, methanol and phosphate buffer. Vitamins were extracted using trichloroacetic acid. Chlorophylls and total carotenoids were determined spectrophotometrically and total phenols were extracted with methanol. In addition, lipid-soluble, and water-soluble antioxidant, and anti α-glucosidase activities were measured spectrophotometrically. The antioxidant activity of hexane extracts was investigated using phosphomolybdenum reagent. The anti-α-glucosidase effect measurement was initiated by mixing α-glucosidase solution with p-nitrophenyl α-D-glucopyranoside. The results showed that the ash contents varied from 11.2 to 35.4 % on dry weight basis for P. capillacea and Laurencia pinnatifidia, respectively. The protein contents ranged from 5.63 % in brown macroalgae C. sinuosa to 8.73 % in P. pavonia. A relative wide range in carbohydrate contents was observed (20.06–46.75 %) for the test algal species. The highest lipid percentage was found in green alga C. racemosa (5.91%) followed by brown algae P. pavonia (3.57%) and C. sinuosa (2.64%). The phenolic contents varied from 1.32 mg GAE/g for C. sinuosa to 4.00 mg GAE/g in P. pavonia. The lipid-soluble compounds exhibited higher antioxidant capacity (73.18-145.95 µM/g) than that of the water-soluble ones ranging from 24.83 µM/g in C. racemosa to 74.07 µM/g in S. linifolium. The most potent anti-α-glucosidase activity was observed for P. pavonia with IC50 of 17.12 µg/ml followed by S. linifolium (IC50 = 71.75 µg/ml), C. racemosa (IC50 = 84.73 µg/ml), P. capillacea (IC50 = 92.16 µg/ml), C. sinuosa (IC50 = 112.44 µg/ml), and L. pinnatifida (IC50 = 115.11 µg/ml).

Keywords : α-glucosidase, lyophilized, macroalgae, spectrophotometrically
Conference Title : ICMPNP 2018 : International Conference on Medicinal Plants and Natural Products
Conference Location : San Francisco, United States
Conference Dates : June 06-07, 2018