The proximate composition, vitamin C, α-tocopherol, dietary fibers, minerals, fatty acid and amino acid profiles of three tropical edible seaweeds, Eucheuma cottonii (Rhodophyta), Caulerpa lentillifera (Chlorophyta) and Sargassum polycystum (Phaeophyta) were studied. The seaweeds were high in ash (37.15–46.19%) and dietary fibers (25.05–39.67%) and low in lipid content (0.29–1.11%) on dry weight (DW) basis. These seaweeds contained 12.01–15.53% macro-minerals (Na, K, Ca and Mg) and 7.53–71.53 mg.100 g−1 trace minerals (Fe, Zn, Cu, Se and I). The crude protein content of E. cottonii (9.76% DW) and C. lentillifera (10.41% DW) were higher than that of S. polycystum (5.4% DW), and protein chemical scores are between 20 and 67%. The PUFA content of E. cottonii was 51.55%, C. lentillifera 16.76% and S. polycystum 20.34%. Eicosapentaenoic acid (EPA), accounted for 24.98% of all fatty acids in E. cottonii. These seaweeds have significant vitamin C (~35 mg.100 g−1) and α-tocopherol (5.85–11.29 mg.100 g−1) contents.