

Physico- and biochemical properties of alginates extracted from *Ecklonia maxima* and *Sargassum fluitans* using a simple cascade process

Abstract

Alginate fractions from the pelagic *Sargassum fluitans* (Børgesen) Børgesen and kelp, *Ecklonia maxima* (Osbeck) Papenfuss sourced from the coastal waters of Ghana and South Africa respectively, were extracted by a simple sequential protocol different from the conventional methods. A total of six different phycocolloids were obtained, with two extracted under ambient conditions (fractions 1A) and the remaining four under hot conditions (fractions 2A and 3A) using ethanol and CaCl₂, respectively, for precipitation. These extracts were assessed for variations in their physicochemical properties, tyrosinase inhibition, antioxidation and anticoagulation activities. Molecular weights of the extracts were ~ 58–1506 kDa with their yields ranging between 4.8 to 11.1%. A sequential reduction (up to tenfold) was observed in their total phenolic compounds, proteins and sulphate contents. ¹H-NMR analysis of their uronic acid block structure revealed M/G ratios less than 1 for all extracts with dominant FG and FGG units depicting guluronic acid rich alginate fractions. Extracts from *S. fluitans*, notably, showed distinct antioxidation activity comparable to the well-known antioxidants like ascorbic acid. For tyrosinase inhibition, the highest was from *S. fluitans* fraction 1A (~ 37.1 ± 4.38%). The variations in properties of extracts reported herein, elucidates the possibility of obtaining series of relatively desirable alginate fractions from *E. maxima* and Ghanaian sourced *S. fluitans* via this modified extraction process.