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Comparative bioactivity of *Sargassum sp.*, *Hypnea sp.*, and *Chaetomorpha sp.* collected from Kalpitiya and Udappuwa during the northeast monsoon

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This study examined the bioactivity of methanolic extracts from three species of marine macroalgae: *Sargassum sp*. (collected from Kalpitiya), *Hypnea s*p., and *Chaetomorpha sp*. (both collected from the Chilaw-Udappuwa) during the northeast monsoon season. In this study, the antioxidant capacity was evaluated using DPPH radical scavenging and FRAP assays. Additionally, cytotoxicity, phytotoxicity, and alpha-amylase inhibitory activities were assessed. In the DPPH assay, *Sargassum sp*. showed the strongest radical scavenging activity (IC_{50} = 1593.50±5.23 mg/L), followed by *Hypnea sp*. (IC_{50} = 2924.70±1.62 mg/L) and *Chaetomorpha sp*. (IC_{50} = 3662.40±6.50 mg/L). However, all were significantly ($p<0.05$) less effective than the ascorbic acid control (IC_{50} = 7.90±0.10 mg/L). FRAP values of species are *Sargassum sp* 0.07±5.86 μmol Fe2+g-, *Hypnea sp.* 0.07±4.32 μmol Fe2+g-, and *Chaetomorpha sp*. 0.07±5.02 μmol Fe2+g-. This result showed similar antioxidant capacities among the three species. Cytotoxicity screening displayed that *Hypnea sp*. had the lowest LC_{50} (1869.70±18.65 mg/L), indicating higher toxicity compared to *Sargassum sp*. (3414.60±12.56 mg/L) and *Chaetomorpha sp.* (19661.70±24.236 mg/L). Phytotoxicity tests showed varied effects on shoot and root growth. *Sargassum sp*. and *Hypnea sp*. showed both inhibitory and stimulatory effects depending on the concentration. In the alpha-amylase inhibition test, *Hypnea sp*. had the highest inhibitory activity (IC_{50} = 186.20±4.45 mg/L), followed by *Sargassum sp*. (IC_{50} = 625.50±5.96 mg/L). The positive control, acarbose, was significantly ($p<0.05$) more effective (IC_{50} = 45.99±0.07 mg/L). Bioactivity studies on these seaweed species from Chilaw and Kalpitiya coasts of Sri Lanka have not been conducted previously. This study provides a preliminary foundation for more comprehensive future investigations into impact of geographic location, environmental conditions, and harvesting time on the bioactive compound profile of marine microalgae.

***Keywords**: Alpha-amylase inhibition, antioxidant activity, cytotoxicity, marine macroalgae.*