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**Structural characteristics, biomass, and above-ground carbon stock of mangrove forest, Sampalathivu lagoon, Trincomalee, Sri Lanka**

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**Abstract**

Mangroves are the major source of blue carbon which store the atmospheric carbon (C) in soil and biomass. Sampalathivu Lagoon is a part of a complex of wetland that includes pigeon island, a well-known tourist destination and hotspot for biodiversity. The study aims to assess the diversity and structural characters of this lagoon which undergo rapid alternations due to human interventions and changes of hydrological regime. The seven sites were selected considering the mangrove distribution. The community structure, biomass and Above-Ground Carbon stock (AGC) were assessed by laying 3 belt transects perpendicular to the shoreline at each site. The diversity was estimated using diversity indexes and to compare diversity between sites. The total biomass and total AGC were estimated using the allometric equations respective to mangrove species. Six true mangrove species; *Excoecaria agallocha*, *Lumnitzera racemosa*, *Aegiceras corniculatum*, *Rhizophora mucronata*, *Avicennia marina*, and *Avicennia officinalis* under 5 families and 4 mangrove associate species were recorded. *E.agallocha* was the dominant and most important species with high abundance and high importance value index (IVI) of 185.012. The highest value of Shannon diversity index (1.46), Simpson index (0.73), Pielou's evenness index (0.38) and Margalef's richness index (1.5417) recorded in site 4 with high species richness and abundance. The lowest Shannon diversity index (0.75), Simpson index (0.42), and Pielou's evenness index (0.20) recorded in site 2. The lowest Margalef's richness index (0.4809) recorded with low species richness and high abundance. Hutcheson's t-test result revealed that, there was a significant difference in diversity between site 2 and 4 ( $p < 0.005$ ). Further, Site 2 and 4 shared lowest Sorensen similarity index (0.36), which exhibit the unique assemblage of mangroves in each site. *R. mucronata* were recorded the highest total biomass (2.98 t ha<sup>-1</sup>) and AGC value of 1.38 t C ha<sup>-1</sup> because of high mean DBH value. The lowest above ground biomass (0.0178 t ha<sup>-1</sup>), below ground biomass (0.015 t ha<sup>-1</sup>), total biomass (0.039 t ha<sup>-1</sup>) and AGC (0.0089 t C ha<sup>-1</sup>) values were recorded in *A.corniculatum*. The study is the first record which provides baseline information about biodiversity and structural attributes of mangrove forest in Sampalathivu lagoon. The structural characters of mangroves and carbon sequestration capacity are the important tool for future restoration activities. The present study highlights the requirement of year around study to understand structural and functional dynamics in the mangrove ecosystem.

**Keywords:** Above Ground Carbon; Biomass, Diversity; Sampalathivu; Structural characteristics

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