

IMPACT OF AGRO-ECOLOGICAL ZONES AND VARIATIONS IN HARVESTING SEASONS ON THE STRENGTH OF PHYTONUTRIENTS IN SOURSOP (*Annona muricata*)

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Soursop (*Annona muricata*) is one of the tropical fruits which bears immense nutritional and health benefits. This study aimed to determine the impact of agro-ecological zones (AEZs) and the harvesting seasons (HSs) on the phytonutrient strength of *Annona muricata* grown in Sri Lanka. Hence, the ripened fruits of *Annona muricata* were collected from seven (07) AEZs during two (02) harvesting seasons. The lyophilized powders of fruit pulp obtained from the collected fruits were extracted by 70% methanol. Phytonutrients were quantified (in vitro) in terms of total polyphenolic and total flavonoid contents (TPC and TFC) together with Ferric Reducing Antioxidant Power (FRAP) by using spectrophotometric methods. The results disclosed that the variation of both AEZs and the HSs made a significant effect ($p < 0.05$) on TPC and FRAP of *Annona muricata* while the TFC varied significantly ($p < 0.05$) with the AEZs only. In the first HS (August – September), the highest TPC, TFC, and FRAP (35.74 ± 2.31 mg GAE g^{-1} , 0.29 ± 0.039 mg QE g^{-1} and 660.8 ± 60.7 μ mol Fe (ii) L^{-1} respectively) were found in the upcountry intermediate zone. While in the second HS (April - May), highest TPC (27.57 ± 1.59 mg GAE g^{-1}) and TFC (0.29 ± 0.033 mg QE g^{-1}) were recorded in the upcountry wet zone, whereas the highest FRAP value (451.78 ± 31.2 μ mol Fe (ii) L^{-1}) was observed in the mid-country intermediate zone. In conclusion, both AEZs and HSs have a great impact on the strength of phytonutrients of *Annona muricata*. Moreover, fruits grown in upcountry intermediate (elevation > 900 m, annual rainfall 1750-2500 mm) and upcountry wet zones (elevation > 900 m, annual rainfall > 2500 mm), are strengthened with more phytonutrients in the first and second harvesting seasons respectively.

Keywords: Agro-ecological zones, *Annona muricata*, Harvesting seasons, Phytonutrients