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Potential sustainable utilization of pineapple waste of *Murusi* & *Kew* varieties; a comparative study of biological activities

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Many countries face various challenges as a result of the number of by-products derived from fruit processing, particularly peels, seeds, leaves, and other fruit residues, including socioeconomic and environmental concerns. Identifying and effectively utilizing the biological activities of fruit residues by converting waste into valuable products has recently become a popular concept in terms of value addition. According to statistics, pineapple has a high waste percentage of 55%, which indicates that more than half of the fruits are wasted. The focus of this research was the recovery of bioactive compounds from the waste of two major seasonal pineapple varieties *Murusi* and *Kew* commonly consumed in Sri Lanka, using low-cost and environmentally friendly techniques and comparing biological activities. Pineapple waste is primarily in the form of peel, crown, and leaves, and each portion is rich in different bioactive compounds. A preliminary qualitative phytochemical screening was performed to confirm the presence of primary and secondary metabolites in aqueous plant extracts prepared from *Murusi* and *Kew* pineapple waste. The total phenol content (TPC), total flavonoid content (TFC), and antioxidant assay including 2,2-diphenyl-1-picrylhydrazyl (DPPH) radical scavenging activity and ferric reducing antioxidant power (FRAP) were determined using spectrophotometric methods. The analysis revealed that each type of waste extract from *Murusi* contained higher TPC, TFC, DPPH, and FRAP values compared to *Kew* waste extracts. The TPC values were 7.40 ± 0.30 mg GAE/g in *Murusi* peel extract, 6.50 ± 0.16 mg QAE/g in *Murusi* leaf extract, and 6.24 ± 0.023 mg GAE/g in *Murusi* crown extract. The *Kew* peel extract contained the highest TPC (4.26 ± 0.35 mg GAE/g) than its other residues. The TFCs were 1.55 ± 0.32 mg QAE/g in *Murusi* peel extract, 1.24 ± 0.20 mg QAE/g in *Murusi* leaf extract, and 0.95 ± 0.19 mg QAE/g in *Murusi* crown extract. *Kew* peel extract exhibited 1.05 ± 0.10 mg QAE/g as the highest TFC compared to leaves and crowns. In antioxidant assays, *Murusi* peel extract had a higher percentage of antioxidant scavenging activity (61% for the 200 ppm) than the other waste extracts, as well as *Murusi* peel extract indicated the highest FRAP values of each pineapple extract. Since the peel extracts from both varieties are higher in secondary metabolites, natural phenolics, and have more potent antioxidant activity than the leaves and crowns, they can be effectively utilized for the production of valuable products.

Keywords: Antioxidant activity, *Kew* and *Murusi* varieties, Phytochemistry, Total phenolic content, Total flavonoid content.