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Phytochemical screening, quantification of tannin, flavonoid and *in vitro* antimicrobial activity of different forms and varieties of coconut water

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Abstract

Tender coconut water (*Cocos nucifera*) is a natural beverage and sports drink in tropical countries due to the presence of high mineral content and other nutritional properties. The aim of this study was to investigate the nutritional and phytochemical analysis and *in vitro* antimicrobial activity for eight different forms and varieties of tender coconut water with a maturity stage of 5-7 months. Tender coconut water of *Nawasi*, *Ran thembili*, Green dwarf, Brown dwarf, Yellow dwarf, King coconut, CRIC 60, and CRIC 65 were collected in sterile bottles and liquid-liquid extraction was carried out in different separating funnels using the nonpolar solvent n-hexane for qualitative analysis. Nutritional and phytochemical screening was carried out for n-hexane extract and fresh coconut water. The findings from the nutritional and phytochemical screening show the presence of carbohydrates, reducing sugars, amino acids, phenols, tannins, flavonoids, terpenoids, alkaloids and glycosides. Quantification of tannin was determined using Folin ciocalteu assay and flavonoid was determined using Aluminium chloride assay. *Ran thembili* (Tall variety) shows significantly higher total tannin content ($22.32 \pm 0.909 \mu\text{g TAE/ mL}$) and *Nawasi* (Tall variety) shows significantly higher total flavonoid content ($1.229 \pm 0.114 \mu\text{g QUE/ mL}$). When agar well diffusion assay was used to determine the antibacterial and antifungal activity of fresh coconut water, *Pseudomonas aeruginosa* showed an inhibition zone for *Nawasi* ($2.5 \pm 0.109 \text{ cm}$), *Ran thembili* ($2.783 \pm 0.223 \text{ cm}$), Green dwarf ($2.45 \pm 0.152 \text{ cm}$), Brown dwarf ($2.45 \pm 0.188 \text{ cm}$), Yellow dwarf ($2.383 \pm 0.24 \text{ cm}$), King coconut ($2.567 \pm 0.294 \text{ cm}$), CRIC 60 ($2.33 \pm 0.234 \text{ cm}$), and CRIC 65 ($2.417 \pm 0.214 \text{ cm}$) while Streptomycin (positive control) shows an inhibition zone of ($5.03 \pm 0.34 \text{ cm}$) and the diameter of the well was 0.9 cm. Microorganisms such as *Staphylococcus*, *E.coli*, *Enterococcus*, *Klebsiella*, *Proteus*, *Bacillus*, *Mucor*, *Aspergillus*, *Penicillium*, and *Fusarium* were not inhibited by coconut water. The components in the coconut water of all the varieties inhibit the growth of *Pseudomonas aeruginosa* while not inhibiting the growth of other microorganisms tested. Preliminary nutritional and phytochemical analysis of coconut water shows the existence of biologically active compounds.

Keywords: Antimicrobial, *Cocos nucifera*, Nutritional, Phytochemicals, Tender coconut water

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