

Study on Physico-Chemical and Microbial Quality during Thermal Processing of King Coconut Water (*Cocos nucifera* var. *aurantiaca*) under Different Process Conditions in Sri Lanka

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King Coconut Water (KCW) is thermally processed as “acidified foods” targeting an extended shelf life. This study investigated the physico-chemical and microbial quality along processing steps in selected KCW processing facilities in the aim of evaluating existing processing conditions. KCW samples (n= 90; triplicated trials) were collected from three factories: FI (semi-automated, 500 l/batch), FII (automated, 2000 l/batch), FIII (manual, 100 l/batch), where pasteurization (100 °C, 12.5 min), UHT sterilization (140 °C, 3s) and pasteurization (100 °C, 20 min) were practiced, respectively. Five critical processing steps (P₁; nut-water extraction, P₂; bulk-collection, P₃; standardization/acidification, P₄; pre-heating prior to hot-filling, P₅; pasteurization/sterilization) were identified as sampling points. Physico-chemical changes; colour (ΔE), pH, Total Soluble Solids (Brix) and total sugars (g/100 ml) were measured at P₁-P₅ in each premise. Microbial quality was evaluated as Aerobic Plate Counts (APC), Yeast and Moulds (Y&M), Coliforms and *Escherichia coli* according to ISO standards. All tested physico-chemical parameters at FI and FII were significantly different ($p < 0.05$) among P₁-P₅, while only pH and colour were significantly differed ($p < 0.05$) among P₁-P₅ in FIII. Significantly higher ($p < 0.05$) Y&M counts were detected at P₁ in FII due to nut-water extraction at an open-area. Coliforms and *E. coli* counts, exceeding permissible limits (0.0 MPN/ml) were detected in P₅ at FI, which may govern by prolonged handling-time during P₁-P₂. However, no APC counts were detected in P₅ at all premises. Quality deterioration in processed KCW at FIII was significantly lower ($p < 0.05$), led by immediate thermal processing with minimum handling-time. In conclusion, physico-chemical and microbial quality of KCW have been greatly influenced by the method of operation at each processing step. Therefore, current practices should be upgraded according to revealed knowledge on existing microbial loads and physico-chemical changes, while adhering to Good Manufacturing and Hygienic Practices.

Keywords: King coconut water, Physico-chemical changes, Microbial quality

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