

Evaluation of Fruit Development Dynamics in King Coconut (*Cocos nucifera* L. var. *aurantiaca*)

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Understanding the process of fruit development is essential for successful management of crops, for determining the optimum harvesting time and criteria, and effective seed collection. Despite the economic importance of King-coconuts (KC), detailed information on fruit development remains scarce. This study was conducted to evaluate physicochemical changes during the development of KC fruits. Seven KC trees from Lunuwila, Sri Lanka were selected. From these trees, bunches aged 1–12 months from fertilization were harvested and pooled by stage. Then, 7–10 fruits per stage were randomly selected. Morphometric data on mesocarp, liquid and solid endosperm were recorded for each stage. Furthermore, the electrical conductivity (EC), pH, and total sugar content (TSC) of the liquid endosperm were measured. The differences between the growth stages were assessed by GLM and ANOVA. The results revealed that the fruits achieve their full size at seven months after fertilization (MAF). The thickness of the polar end of the mesocarp exhibited dynamic changes, whereas that of distal and equatorial ends of the mesocarp remained constant. Solid endosperm formation started from 5–6 MAF and continued up to 8 MAF. The highest water volume and TSC were recorded at 6–7 MAF, suggesting this period is optimal for beverage purposes. Temporal changes in the EC and pH of the liquid endosperm provided insight into its biochemical development. These findings are important in King coconut crop management and will provide novel insights into the coconut fruit development biology.

Keywords: Fruit Development, Kernel Development, Mesocarp Thickness

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