

Evaluation of Antioxidant activities, Anthocyanins, Total Phenolic Content, Vitamin C Content and Cytotoxicity of *Carissa carandas* Linn.

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ABSTRACT

Carissa carandas, commonly known in Thai as ‘nham-daeng’, has a long history in alternative medicine in Thailand. Ethanolic extracts of fresh leaves, unripe fruits and fully-ripe fruits were investigated for their antioxidant activity, total phenolic content, total anthocyanins, anthocyanin identification, vitamin C content and cytotoxicity. Results showed that the leaf extract exhibited the highest antioxidant activity, FRAP value and total phenolic content. The antioxidant activities of leaf, unripe and fully-ripe fruit extracts were 65.24 ± 0.69 , 0.85 ± 0.03 and 2.42 ± 0.41 mg AAE/g, respectively. Total phenolic contents were 24.91 ± 0.22 , 1.29 ± 0.16 and 4.67 ± 0.41 mg GAE/g and total anthocyanins were 0, 0.33 ± 0.04 and 54.80 ± 6.07 mg/l, respectively. The fully-ripe fruit extract, which showed low antioxidant activity and total phenolic contents, exhibited the highest total anthocyanins and cyanidin-3-galactoside levels. The unripe fruit extract showed the highest content of vitamin C (300.75 ± 57 mg/100g). The major anthocyanin of all samples was cyanidin-3-galactoside. At a concentration of 200 µg/ml, treatment with the leaf extract caused the greatest reduction in HepG2 viability among the three extracts. These results indicated that the amounts of total phenolics and antioxidant activity could be correlated with cytotoxicity on HepG2 cells for the leaf sample.

Keywords: *Carissa carandas*, antioxidant, anthocyanin, cytotoxicity

INTRODUCTION

Carissa carandas Linn. is a tropical tree that belongs to the Apocyanaceae family. Its botanical name is *Carissa congesta* Wight, but the name *C. carandas* is still widely used in the literature. The plant is commonly known as karanda (India and Malaysia), nham-daeng (Thailand), caramba (Philippines) and ci huangguo (Chinese). The plant is native to India and cultivated in Taiwan, Indonesia, Malaysia, Burma, Sri Lanka, Thailand and the Pacific Islands (Wiert, 2006). *C. carandas* is a large dichotomously branched evergreen shrub with short stem and strong thorns in pairs (Hegde et al, 2009). Whole plant and its parts are used in tradition-