B-02: Studies on physico-chemical characters and storage of carambola (*Averrhoa carambola* L)

W M T Madhujith, S F Hussain
(*Horticultural Research and Development Institute, Gannoruwa Peradeniya*)

Carambola (*Averrhoa carambola L*) is gaining recognition in the world market as a fruit with high potential for the fruit juice industry. High contents of oxalates have been associated with carambola which could cause health implications such as reduction of calcium absorption, formation of urinary calculi and even death.

The objective of the present study was to assess the food value of carambola by physico-chemical and storage studies on a local variety and an exotic variety, Fwang Tung. The enhanced importance of toxicological study led to a great deal of research on quantification of oxalates in the novel fruit.

Fruits of 4 carambola varieties (Arkin, Fwang Tung, Local and Maha) were studied for their shape, texture, size, characteristics of wings and cross sections. Under the quality study, colour, edible fruit percentage, extractable juice percentage and density change with maturity of 2 varieties were studied. The contents of moisture, total solids, ash, sugar, titrable acidity, pH, Brix, protein and vitamin C were determined using standard analytical techniques. The total oxalate content of 2 carambola varieties (Fwang Tung and local) at 2 maturity stages (mature and unripe), as well as one set of fruits with ridges (wings) and the other set with ridges removed, was determined.

To study the storage behaviour, samples of Fwang Tung and local were stored separately at 3 different temperatures (7, 8, and 30^{0}C)in uniformly perforated polyethylene bags. The samples were assessed for external appearance, colour changes, blemishes and spoilage.

Varietal character study showed that the varieties differ from each other in their texture, shape and other outward characteristics. Fwang Tung variety has high edible fruit (95%) and extractable juice (80%) compared to the local

variety which has 80% edible fruit and 75% extractable juice. Density of both varieties showed a gradual downward trend with maturity so that it can be used to develop a maturity index for carambola. Fwang Tung variety has high sugar (279 mg/100g) with less acidity (0.3%) and therefore has a high Brix-Acid ratio. The local variety has relatively low sugar (177 mg/100g) and high acid (1.17%) compared to that of Fwang Tung variety.

A significant difference in total oxalates was observed in the 2 varieties; local had 0.57% and Fwang Tung had 0.34%. Regardless of the variety, fruits at ripe stage had significantly high content of oxalates 0.52% than that at unripe stage where the oxalate content was 0.39%. Further, significantly high oxalate content in whole fruit 0.57% compared to the fruit without ridges 0.33% give the evidence that oxalates are concentrated in ridges. Carambola stored at 3 efferent temperatures (30, 18, 7°C showed that fruits can be stored for 3 weeks at 30°C and for 5 weeks at 18 and 7°C.

The physical quality studies indicate Fwang Tung variety to be superior to the local variety. Fwang Tung variety is superior in consumer acceptance on account of high sugar with less acidity. Hence Fwang Tung variety can be used as a fresh fruit or processed into fruit juice, jam or other products whereas local variety has less consumer acceptance due to high tartness. Due to high oxalate content of local variety, it cannot be recommended while the Fwang Tung variety can be recommended for consumption with ridges removed for improved safety.