Cavendish Banana and its Artificial Ripening for Markets

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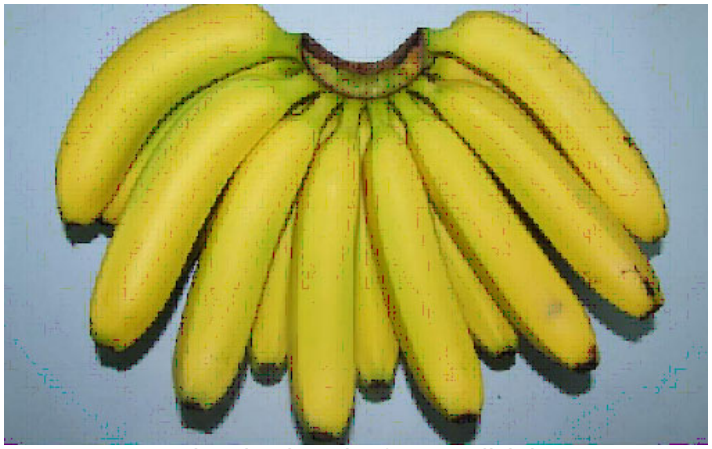
The Cavendish or Dwarf Cavendish banana (*Musa acuminata* Colla (AAA Group) cv. 'Dwarf Cavendish') is known as the dessert banana which originated in Southeast Asia. It is the most widely-grown and traded banana cultivar in the world. Commercial production of this banana is mainly in S.E. Asia, Africa, and Latin America. This Cavendish banana with its distinct and evenly yellow peel, is commonly found on the shelves of Western supermarkets.

A fruiting Cavendish Banana plant


An attractive ripe bunch of Cavendish bananas

In Sarawak, a private company introduced and promoted the Cavendish banana as another potential economic fruit crop in the State in 2008. Since then, a number of Entrepreneurs/Growers have ventured into commercial production of this high quality banana in Sarikei, Sibu, Kuching and Samarahan Divisions. The sizes of these farms range from about 15,ooo to over 100,000 plants. The planting materials used are quality tissue-cultured plants supplied by the said company. By early 2009, a number of these farms have commenced production and artificially ripened Cavendish banana has also made its appearance in the local market then. After the initial cautious response to it, most local consumers have accepted this high quality banana and paid a bit of premium for it. With a limited local market, most of these Cavendish bananas produced are meant for the export market.

Bananas must be transported over long distances from the tropics to world markets. To obtain maximum shelf life, bananas are harvested green at about the 75% mature stage and are only ripened in market areas. The fruit requires careful handling, rapid transport to ports, cooling, and refrigerated shipping. The goal is to prevent the bananas from producing their natural ripening agent, ethylene. This technology allows storage and transport for 3–4 weeks at 13-14 °C (56-58 °F). On the other hand, the shelf-life of "tree-ripened" Cavendish bananas is about 7-10 days which limit them to local market.

At the market end, green-picked Cavendish bananas are ripened in special rooms. These ripening rooms must be well insulated, air-tight and refrigerated. An efficient air circulation is required to disperse the ethylene from the room after the ripening treatment. High relative humidity (90-95%) is essential in the room to avoid fruit dehydration. Moisture may be introduced automatically in the form of a mist or spray of water.

A ripening room at the Postharvest Technology Centre, Semongok

Ripening of green banana is initiated by releasing ethylene into the ripening room for 24 hours with fruit pulp temperatures at 15 to 20^{0}C. The recommended ethylene concentration is 0.01 to 0.04% based on free air space in the ripening room. After 24 hour ripening initiation period, vent room for 15 to 20 minutes with exhaust fan on to remove ethylene from the room. The bananas are then kept at 16-20^{0}C (pulp temperature) as they ripen into indexes 3 or 4 stages in about 3-7 days' time. They are then delivered to retail outlets where temperature should be managed below 25^{0}C to reduce incidences of 'soft neck' and 'mushy' banana problems.

As the green banana ripens, the peel begins to lose its chlorophyll content and this results in colour change from green to yellow. During this time, the starch in the inner linings of the peel and in the fruit proper start to convert into sugars that work through the fruit evenly,

resulting in a texture that is softer and sweeter. The sugar level increases from 2.5% to 19.3% when green Cavendish banana ripens from index 2 to index 7 (Table1).

The above mentioned ripening facilities and package are available at the Post harvest Technology Centre at ARC, Semongok. And the Centre has been and is transferring this ripening technology package to interested parties along the local Cavendish banana supply chain.

Table 1: Physical and chemical changes on ethylene-treated Cavendish banana

Color Index No.	 1	 2	 3	 4	 5	 6	 7
Peel Color	Completely Green	Green with trace a of yellow	More green than yellow	More yellow than green	Yellow with Green tips	Fully yellow	Yellow with brown spots
Firmness (KgF)	-	4.1	2.7	2.6	0.6	0.5	0.4
Sugar (%)	-	2.5	6.0	13.1	19.6	19.2	19.3