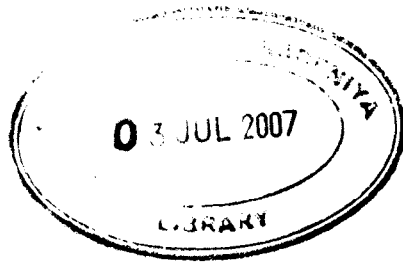


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**CROWN ROT OF BANANA
AND ITS POSSIBLE CONTROL USING PAPAYA LATEX**



**THESIS
SUBMITTED BY**

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ABSTRACT

Crown rot of banana has become an important postharvest disease in Sri Lanka as, currently there is a tendency to display deheaded bananas in local retail markets and increased banana exports. A survey conducted within the Kandy area showed that about 32% deheaded bananas were affected by crown rot. Among the popular cultivars "Ambun" (AAA) and "Aanamalu" (AAA) recorded the highest incidence of crown rot, while "Embul" (AAB) and "Kolikuttu" (AAB) showed somewhat lesser disease incidence.

Examination of diseased crowns showed that *Fusarium semitectum*, *Colletotrichum musae*, *Colletotrichum gloeosporioides* and *Verticillium theobromae* are the most predominant fungi involved in crown rot. *Botryodiplodia theobromae* and several other unidentified fungi were also occasionally found associated with the disease.

A mixture of conidia of *F. semitectum* and *C. musae*, *C. gloeosporioides* when artificially inoculated into freshly exposed unripe crown tissue, began to develop symptoms of crown rot within 3-5 days while ripening. Control of crown rot was attempted by using the water-soluble fraction of papaya latex (*Carica papaya* L). The papaya latex is a complex mixture of enzymes notably chitinase, proteases, glycosidase, lipase and simple sugars. The water-soluble fraction of papaya latex can completely digest conidia of many fungi upon a brief exposure *in vitro*. Among them were several important postharvest pathogens including *F. semitectum*, *C. musae* and *C. gloeosporioides*, which incite crown rot in banana. Conidia of many other fungal species lost their viability when exposed to latex. *Rhizopus arrizus* is exceptional as it can infect unripe papaya fruits containing latex and also grow profusely in the presence of papaya latex *in vitro*. Papaya latex exhibits properties of an excellent natural fungicide. Application of water soluble fraction of papaya latex on to the crowns of boxed bananas pre-inoculated with a mixture of conidia of *F. semitectum*, *C. musae* and *C. gloeosporioides* prevented crown rot development completely. The latex-treated crowns developed a black coloration on the surface but remained hard.

Latex, when applied immediately after deheading, was not found effective in suppressing crown rot development. This was found to be due to the coagulation of

proteins in the papaya latex by polymeric carbohydrates and tannins present in the banana latex. The crown should therefore be devoid of any banana latex at the time of treatment with papaya latex for its effectiveness.

Storability is an important property of a fungicide. However, fresh papaya latex cannot be stored at room temperature for long periods due to rapid bacterial growth that brings an unpleasant odour too. Solar-dried or oven-dried water soluble fraction of papaya latex could be successfully stored at -18°C . This retains spore digestion property for about 6 months. Freeze-dried water soluble fraction of papaya latex retains spore digestion property for more than 6 months during storage at -18°C .

The research findings conclude that papaya latex was successful in controlling crown rot of banana.