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**EFFECTIVENESS OF SOME ESSENTIAL OILS ALONE OR IN
COMBINATION WITH SODIUM BICARBONATE IN THE CONTROL OF
BANANA CROWN ROT
(*Musa acuminata* AAB)**

A PROJECT REPORT PRESENTED BY

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ABSTRACT

**EFFECTIVENESS OF SOME ESSENTIAL OILS ALONE OR IN
COMBINATION WITH SODIUM BICARBONATE IN THE
CONTROL OF BANANA CROWN ROT**

(Musa acuminata AAB)

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Crown rot is one of the most common postharvest diseases in banana in Sri Lanka. This is a disease complex caused by several pathogenic fungi, *Fusarium moniliforme*, *Lasiodiplodia theobromae* and *Colletotrichum musae*. Currently, the disease is controlled by spray and dip applications of systemic fungicides, benomyl and thiabendazole, in the local and exports market of banana. The mounting pressure against these fungicides due to their carcinogenicity in humans, harmful effects on environment and the development of resistant strains among the pathogenic fungi restricted their use in the control of postharvest diseases in fruits and vegetables.

Essential oils and other safe chemicals such as Generally Regarded As Safe (GRAS) compounds have a great potential to be used as alternatives for fungicides. Previous *in vitro* and *in vivo* studies have shown the fungistatic and fungicidal nature of different plant essential oils against pathogens. *In vivo* bioassays were conducted to test the efficacy of liquid spray treatments of essential oils combined with 2% w/v food grade sodium bicarbonate to control the crown rot during prolonged storage at 13-14 °C and with induced ripening. The essential oils used were lemongrass (*Cymbopogon citratus*), basil (*Ocimum basilicum*) and the essential oil component citral a and b. Crown rot disease severity in bananas after the treatment period was evaluated using a standard index. The physicochemical properties such as firmness of fruits, total soluble solid content (TSS),

titratable acidity (TA) and pH of the fruit pulp were also measured after the storage period. Organoleptic properties such as flavour, odour, taste and the overall acceptability were evaluated by a group of taste panelists at the end of the treatment period.

The results of the experiment revealed that the spray treatments of banana with citral a and b (major essential oil component of lemon grass) at 0.4% (v/v) combined with sodium bicarbonate (2% w/v) and basil oil (*Ocimum basilicum*) at 0.16% (v/v) combined with sodium bicarbonate (2% w/v) were effective in controlling crown rot disease to the same extent as benomyl (0.1% w/v) at the tested conditions. The treatments of fruits with oils plus NaHCO₃ showed an ability to control the disease for 21 days of prolonged storage at 13-14 °C and 85-90% relative humidity and for another three days at ambient temperature. In contrast, lemongrass oil was not completely effective at the tested conditions. The oil treatments and SBC treatments did not have an adverse effect on physicochemical and organoleptic properties of bananas for the tested storage period and were in acceptable quality. This system of spray treatments based on essential oils has a potential to be developed as a safer alternative to control the major postharvest disease in banana. Such a system could be used to reduce the reliance of horticultural industry on synthetic fungicides.