

***In vitro* and *in vivo* Application of Eco-friendly Treatments to Control Postharvest Stem-end Rot of Naturally Infected Avocado (cv. Pollock)**

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ABSTRACT

Purpose: Stem-end rot (SER) is an endophytic fungal infection of avocado causing significant postharvest losses, affecting its marketability. This study was conducted to identify effective concentrations of selected eco-friendly essential oils and chemicals to control SER pathogens by conducting *in vitro* bioassays and to develop treatments to control SER in naturally infected avocado (cv. Pollock) using less hazardous alternatives to synthetic fungicides.

Research Method: *In vitro* disc volatilization and poison food bioassays were conducted to identify inhibitory concentrations of some essential oils and chemicals against SER pathogens. Avocado fruits were subjected to eco-friendly fumigation and dip treatments and their pathological, physicochemical and sensory properties were assessed after 7 days of storage at 15 °C.

Findings: Disc volatilization bioassay revealed that 5 µL/plate clove oil was most effective against *Lasiodiplodia theobromae*, *Diaporthe nelumbonis* and *Fusarium oxysporum*. According to Poisoned food bioassay, 5% (w/v) sodium bicarbonate and 0.07% (v/v) acetic acid were highly effective against the test pathogens. SER incidence of avocado fruits has been successfully delayed for 7 days after subjecting to fumigation treatment with clove oil and dip treatments with sodium bicarbonate and acetic acid, followed by storage at 15 °C. None of the treatments adversely affected physicochemical and sensory properties of avocado.

Originality/Value: Treatments could be further improved by conducting a medium-scale *in vivo* trial to obtain good quality avocado with higher consumer acceptance.

Keywords: acetic acid, avocado, clove oil, eco-friendly, sodium bicarbonate, stem-end rot

INTRODUCTION

Avocado (*Persea americana* Mill.) belongs to the family Lauraceae and is one of the few commercially significant members of the genus *Persea* (Yahia, 2012). Avocado is a high fat fruit, containing rare sugars of high carbon number and is relatively rich in vitamins (A, B, C, E and K), dietary fibre, minerals (potassium, phosphorus, magnesium and iron and nitrogenous substances) (Yahia, 2012; Bill *et al.*, 2015). Avocado is one of the popular fruit crops grown and consumed in Sri Lanka. Pollock, Hass and Purple are some of the popular avocado cultivars grown in Sri Lanka and other sub-tropical regions. Although it is not grown in orchard scale in Sri Lanka, a

sizeable volume of harvested crop from backyard gardens come to the local market. Apart from the wet zone, avocado is becoming popular in the intermediate zone as a home garden crop in Sri Lanka (Sarananda *et al.*, 2004).

Higher susceptibility of avocado to qualitative and quantitative postharvest losses is one of the prime challenges faced by both growers and

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