Effects of two different water sources used for irrigation on the soil geochemical properties and the quality of the Lohan guava (*Psidium guajava* L. Lohan)

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ABSTRACT

The effect of two different water sources (treated waste water and lake water) used for irrigation on the soil geochemical properties and the fruit quality parameters of the Lohan guava were studied. The fruits’ physical attributes, physicochemical attributes, nutritional attributes, mineral content as well as consumers’ acceptance were evaluated. The properties of the different water sources and their effect, on both the soil and the quality of the fruits, were evaluated. Analysis of the irrigation water revealed that treated waste water was of acceptable quality with reference to irrigation water quality guidelines, while the lake water used for irrigation fell short in several aspects. The different water sources used for irrigation in the farms affected the soil geochemical properties significantly. The quality of guavas harvested from the farms that were irrigated with different water sources was significantly different. Irrigation water qualities were observed to have positive effects on the quality of the fruits and consumers’ acceptance as observed from the results of quality analysis and the consumers’ acceptance test.

**Key words** | fruit quality, irrigation water, Lohan guava, soil properties

INTRODUCTION

The guava (*Psidium guajava* L.) belongs to the genus *Psidium* and the *Myrtaceae* family (Joseph & Priya 2011). It is native to Mexico, Central America, and northern South America but is now extensively cultivated throughout the tropics and subtropics, including Africa, South Asia, Southeast Asia, the Caribbean, subtropical regions of North America, Hawaii, New Zealand, Australia and Spain. Guava is known to contain high amounts of vitamins, minerals and antioxidant properties and is frequently exploited for traditional medication purposes by certain cultures (Hassimotto et al. 2005). The guava is often referred to as a ‘superfruit’ due to its high antioxidant capacity (Sanda Grema & Bukar-Kolo 2011). Furthermore, according to previous reports, it has been proven that guava contains four times more vitamin C than an orange and contains various biologically active secondary compounds such as flavonoids and triterpenoids (Hassimotto et al. 2005). Besides the fruit, different parts of the plant have been actively used to treat diseases such as diabetes, caries, wounds, diarrhoea, inflammation and hypertension (Gutierrez et al. 2008). Moreover, previous researches have reported on the antiplasmodial, anti-inflammatory, hepatoprotective, anticancer and antioxidant activities of the guava fruit (Salib & Michael 2004; Ojowole 2006; Roy et al. 2006; Flores et al. 2013).

In Malaysia, guavas are cultivated primarily for fresh consumption. Secondary uses of guava are for export and processing. The total area for guava plantation in Malaysia was estimated to be 1,440 hectare in 2011 with an annual production of 18,880 metric tons. In 2011, guavas were actively grown in Muar, Johor (213 ha), Perak (185 ha) and Segamat, Johor (68 ha). Currently, there are 14 registered guava clones in Malaysia since 1951 according to the Malaysian Department of Agriculture. The latest variety introduced in Malaysia is the ‘Lohan Guava’ or ‘Giant Guava’, which is the variety of interest in this present study. This variety is larger in size compared to its counterparts, averaging from 600 to 800 grams per fruit. Unlike the other varieties in Malaysia, the ‘Lohan Guava’ is known for its unique ability...